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J. J. YEALLAND

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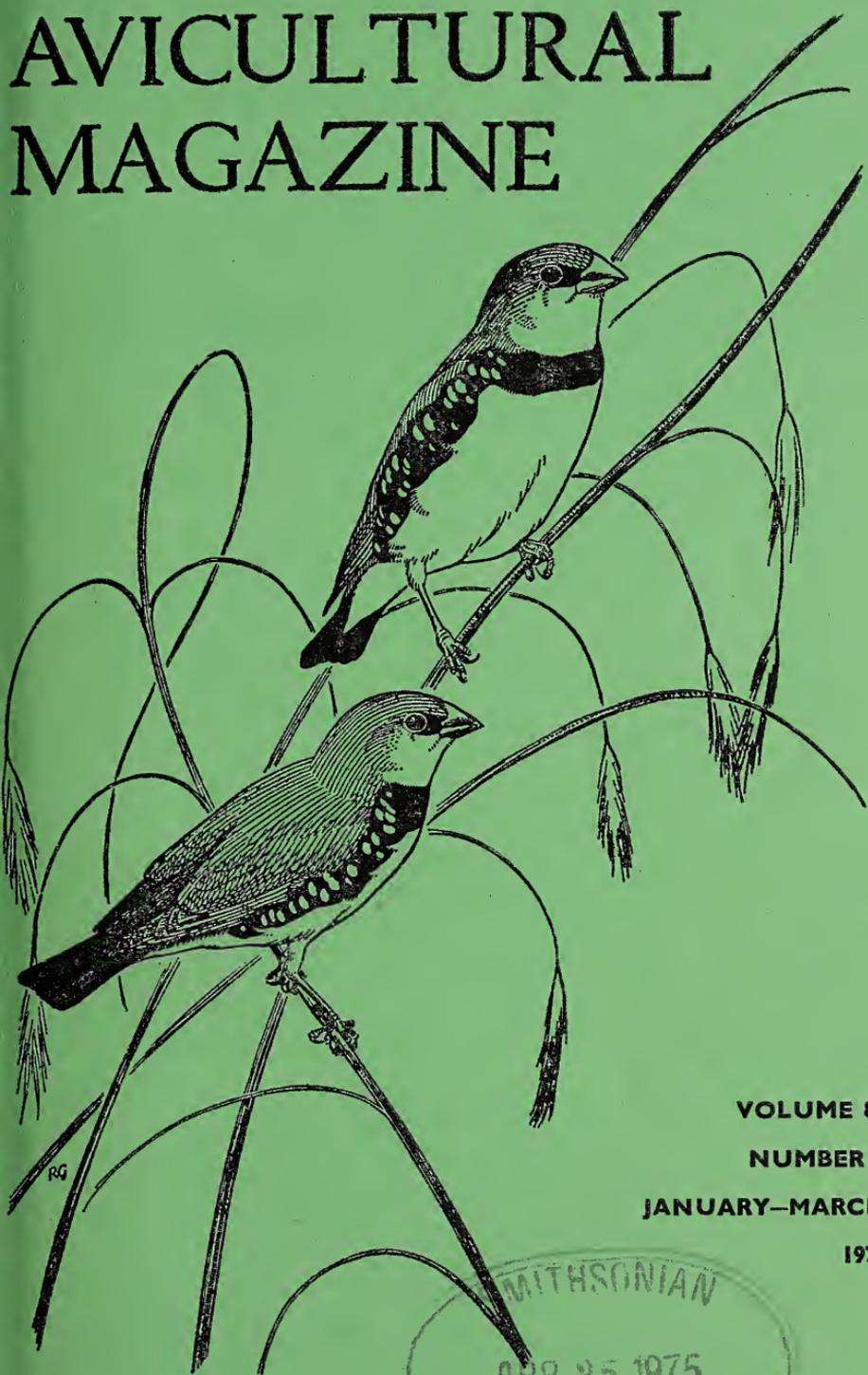
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JANUARY - MARCH 1975

THE REED WARBLER

Acrocephalus scirpaceus

By FRANK MEADEN (Cheshunt, Herts.)

It was in 1948 that we had four young Reed Warblers brought to us by an over-enthusiastic but well meaning angler who had found them after cutting down reeds in preparation for his future fishing site : they were merely skin and dark down, about four days old. However, using a well insulated box we were able to keep them sufficiently warm during the following nights to allow their continued growth with no noticeable ill-effects from their new surroundings or changed diet; a cardboard carton fully lined with cuttings from polystyrene ceiling tiles is ideal for such purposes in an emergency of this kind. They were kept in this warm box until they reached the stage of pecking any edible item from the tweezers we used for feeding them during this period; the tissue paper they were huddled in was changed two or three times daily to avoid soiling their feet or growing plumage. Whilst their droppings are enclosed in a sac they are so easily removed from the rearing box, that, should they be collected immediately after feeding, this being the time they are normally passed, such frequent changing of tissues becomes unnecessary. Their diet consisted of mealworms, chrysalids, flies, maggots, etc., with intermediate feeds of Avivite moistened with milk and to which was then added finely chopped watercress, comfrey, dandelion or any brassica, grated cheese, steamed and minced ox heart and liver or steamed freshwater fish, the latter as and when brought to me by the guilty angler as his form of atonement. The maggots and mealworms were well powdered with calcium lactate and a high vitamin content animal food supplement, after a few drops of a liquid multi-vitamin product had been added to them, so forming a thin film over their entire surface; if caught unprepared with no calcium lactate, then finely crushed cuttlefish will prove adequate.

Reed Warbler

Acrocephalus scirpaceus

By Bryan Reed

Plate donated by Palaquin Fine Arts
London

No signs of rickets ever seem to occur if these precautions are taken and the continued growth, on this occasion, of bone structure, flesh and plumage gave every reason to believe the birds were progressing quite normally. As was to be expected, the young birds grew up remarkably tame, even climbing one's clothes in Tree Creeper fashion at the weaning stage; they all took to the softfood mixture (now minus the milk) quite readily, in fact seemingly preferring this to gentles, although their taste for flies, chrysalids and mealworms never lessened. With the late autumn the whiter throats and subdued song practice of two intimated that we might have two pairs; one pair was given the freedom of a sheltered outdoor aviary for the winter and the other housed with a pair of Black Redstarts which, although fed and housed mainly in a large indoor flight, did have access to an outside flight throughout the winter. Despite an electric lighting system arranged in the outdoor enclosure to provide extra light for feeding time, extended to enable feeding between 6 a.m. and 8 p.m. during the short winter days, plus the fact that this pair of birds roosted within inches of the bulb and its warmth, the birds died the following February/March within a day or so of each other: the remaining pair was, in the following April, given an outdoor enclosure which covered half a small goldfish pond and approximately a square yard of reeds. In early May both birds were observed carrying small strips of dead reeds; however, instead of taking this material to the reed bed, the female proceeded to build the normal nest but in a clump of fir and heather between four and five feet from the ground. It was solely the hen which built while the male seemed to sing from morn till night. The enclosure itself measured about eight feet square by six feet high, two thirds of the area being water and bog; the aviary had been built around an old apple tree which grew at the side of the garden pool and almost the only solid ground was at the base of this tree, the remaining soil being peat overflowed copiously with the excess water from the pool. Perhaps due to my own inquisitiveness or maybe a visiting field mouse, no eggs were laid in this first nest and it was only when I failed to see the hen one day that I searched and found her incubating three green/blue and heavily blotched eggs that I realised a further nest had been built, this time almost six feet from the ground in dead twigs from the previous year and barely hidden by the leaves of a low apple branch only just inside the aviary wire and in such a manner that, once aware of its presence, we could peep into it from outside the enclosure. Not knowing the exact dates the eggs were laid I can give no definite hatching time but it seemed extremely short, no more than twelve days and possibly a little less; my notes show that I found three eggs on the 2nd June, 1949, and two young were first seen in the nest on the 12th of that month with a further one appearing the following day; another egg was eventually discovered weeks later embedded in the base of the nest. Apart from

the natural insect life of the pond and surrounding wet peat, we provided the diet previously described with extra mealworms, these being selected as small as possible for the first week, from our own insectary, plus two or three handfuls daily of old bees' comb, alive with wax moth larvae; this has always proved most popular with my stock. The record card for this breeding is rather smudged and blurred, hence the date for nestlings emerging is indistinct, and it appears to be June 24th, but could be the 27th; however, I well recall being amazed at that time just how small and mouse-like they seemed in their climbing, also at their short stay in the nest. Having proved so useful on numerous occasions, I feel that mention should be made here of the importance of keeping record cards, so much data regarding nesting materials, dates, food taken, courtship displays, etc., can be thus referred to in later years. These three youngsters, regardless of their earlier minute appearance, grew to be exactly like carbon copies of the parent birds; eventually I found the three to be one male and two females.

My only further comments on this bird are that despite the somewhat sombre plumage, it is well worth keeping and studying at close quarters; the song so loud and boisterous when delivered throughout the breeding season can, when one's eyes are closed, conjure up the beauty of old waterside haunts of years gone by for those of us who are now forced to live in towns. The diet can be coarser than that which I have used, but caring for a number of more delicate species, I do tend to use a standard base food and endeavour to create variety in the food intake by additives of proven value to humans and by live insects. All the five birds were liberated during May 1950 near a small backwater adjoining a local watercress bed and without being over-sentimental I would venture to comment that I received great satisfaction from frequent visits to this site just to hear the song continued in the wild. Whether from our stock we will never know, but the Reed Warbler certainly returned there each spring for at least another four years whilst I lived in that district, breeding successfully on each occasion, but only one nest as compared to the two we recorded whilst under controlled conditions. Today I have two pairs of the Great Reed Warbler *Acrocephalus arundinaceus* which I hope may breed in the future. Their song is very similar to the smaller birds' but with the volume as powerful as that of a Song Thrush. Perhaps mention also ought to be made of the nest materials used by the birds which bred in 1949; when inspected at the end of the season, the nests were found to be constructed of thin pieces of reed, grasses, fine roots, moss, a few feathers and a great deal of dog hair; it is reasonable to imagine the last as not being a normal material to these birds, but having accumulated much of this from our dogs' brushings we offered it, as is our normal habit each year, to most of our aviary inmates.

BREEDING THE PINK-CRESTED TOURACO AT
JERSEY ZOOLOGICAL PARK

By D. GRENVILLE ROLES (Deputy Curator of Birds)

One of the most beautiful species of the whole family, the Pink-crested Touraco *Tauraco erythrolophus* is found in suitable localities throughout Zaire and Angola. Our specimens came from the vicinity of Luanda in Angola, arriving in May 1971.

Lovely birds about the size of a pigeon with long, fan-shaped tails, they possess the curious hairy plumage so typical of the family. The face is white, neck and breast a shade of light green, belly and vent sooty black. The mantle and wing-coverts are iridescent emerald, back and rump black, shot with emerald, and the tail is violet. Remiges are crimson, while the rounded crest is red with a white tip at the apex. The large brown eyes are surrounded by a thin red wattle, accentuated by short narrow black stripes both above and below. The bill is bright yellow, greenish basally, and the legs are black.

After initial quarantining the birds were rung and housed in a large aviary 12 ft. x 24 ft. x 7 ft., well planted and grassed with an open shelter at the rear (which they shared with a pair of Satyr Tragopans).

The birds settled in very well, coming through their first winter, fortunately a very mild one, without experiencing any difficulty.

The following season, 1972, came and went without any noticeable change in the birds' behaviour being noted until January 1973, when two of them appeared to be pairing up. Aggressive behaviour by these birds was also seen to develop towards the others until they were split in June, when both pairs were transferred to a new range of aviaries.

Their new aviaries had the advantage of enclosed shelters at the rear, into which chicks could be shut for safety until they were reasonably independent. Each of the aviaries was particularly well planted and housed pairs of Palawan Peacock Pheasants. Flights were 12 ft. x 20 ft. x 7 ft., with the 4 ft. wide shed running the width of the aviary. The sheds were built on a brick base and had concrete floors. The birds were fed and watered in the shed which also contained nesting platforms and boxes for both touracos and pheasants.

The birds behaved perfectly, with courtship feeding seen to take place a number of times (though mating was never observed) and soon they laid their first egg, on the 7th July, and a second on the 9th. These were incubated by both birds but after a month were deserted and found to be infertile. A second clutch of four eggs was started on the 18th August, but the clutch size and its again proving infertile led me to believe that the "pair" were two hens. Now, however, the second pair looked as if they were going to, "do something", with much twig carrying and aggressive behaviour to a neighbouring pair of Schalow's



Pink-crested Touraco *Tauraco erythrolophus*. *Phillip F. Coffey*



Phillip F. Coffey

Pink-crested Touraco chick.

Touracos, so Pair 1 were kept together and not tried with different mates.

A third infertile clutch was produced by the first pair in late September, the second pair producing nothing at all. The pairs were kept as they were until the 11th May, 1974, when, after a further infertile clutch from the first pair and no breeding activity from the second, the pairs were split.

The move proved successful with the resident hen/new cock pair, which produced the first egg of a fertile clutch of two eggs on the 25th May—only a fortnight after they had been introduced.

Remarkably, absolutely no aggressive behaviour was shown by either of the resident birds to their new mates, much to our relief.

The incubation period lasted for 23 days from the laying of the first egg, when on the 17th June both eggs were found to have hatched. The brooding hen sat very tightly on both eggs and chicks, refusing to leave when the shed was entered for servicing—unlike her mate who fled whenever the door was opened. This hen would even allow her eggs to be inspected without fleeing—pecking the intruding hand very hard while she spread and raised her wings in the typical threat posture. It was only by a change in the female's brooding posture—sitting "high" on the nest instead of squatting that we had any indication that the chicks had hatched—which we quickly confirmed.

The chicks were pink-fleshed and covered in thick black down. Their legs were pinkish-grey and the bill (apart from its black tip) and facial skin were white. Mouth lining was bright pink and tiny white claws were visible on each alula.

The chicks developed at the usual rate, by comparison with the other species we have bred (Roles, 1973) and at 18 days were well covered with thick black down. Both tail and wing quills were starting to erupt and both legs and bill had a pinkish hue.

At 23 days the crimson of the remiges was apparent, and pin feathers were evident on the neck and breast.

At 25 days both chicks left the nest never to return. They were not seen to be brooded any further by either parent, but solicited feeding every time a parent approached.

When 45 days old the chicks were still very dark with a few green feathers opening on the neck and breast. The wings were showing darker emerald than the adults with a much reduced area of crimson. The tail was violet and the first red, white-tipped crest feathers were opening. A small white patch also appeared over the ear-coverts.

The chicks were separated from their parents at 79 days when still slightly smaller than the adults; they possessed comparatively greyish faces, rather duller bills, and smaller crimson areas in their wings, but otherwise were almost identical.

A second clutch of two eggs was started on the 17th August. Both

eggs were fertile and hatched, but one chick died on 30th August, with fatty degeneration of the liver being found on examination.

While the birds had chicks in the nest, an additional 8 a.m. feed was provided consisting of soaked dried fruit, finely chopped lettuce, finely chopped banana and tomato, the whole covered with a liberal sprinkling of Vionate, a multivitamin supplement.

The "main course" feed, provided around 11.30–12.00 a.m., contained quantities of all fruits available and our bread/milk/nectar mixture and minced boiled egg.

The birds during the year 1974 reared to independence three fine strong young birds, which we believe to be a first successful breeding in the U.K.

REFERENCE

ROLES, D. GRENVILLE, 1973. Breeding Schalow's Touracos at the Jersey Wildlife Preservation Trust. *Avic. Mag.* 79, p. 75.

As described, the Pink-crested Touraco *Tauraco erythrolophus* has been bred at the Jersey Zoological Park and this is believed to be a first success. Anyone knowing of a previous breeding of this species in Great Britain or Northern Ireland is requested to inform the Secretary or Editor.

* * *

BREEDING THE BLACK-HEADED SIBIA

Heterophasia capistrata

By RAYMOND FRANKLIN (Chesham, Buckinghamshire)

In vol. 79 No. 4 AVICULTURAL MAGAZINE I described the nesting of the Black-headed Sibia with the fledged young dying—presumably of cold. This season (1974) I have had better results from the same parents, the original pair purchased in February 1971. In March 1973 they were put into an outside flight 4 x 2 x 2m. which is thickly planted with two clumps of bamboo and honeysuckle growing up the wire. No attempt was made at nesting at all during 1973 so they were once again brought into my bird room in October for the winter. As the winter turned out to be fairly mild I could probably have left them out all winter, but with small foreign soft-bills I consider it best if they are kept inside during the worst months. In April this year I again put them into the open flight and as nothing happened during the early summer, I thought it would be another fruitless year, but to my surprise on the 8th July I saw the cock displaying with a strand of fibre in his beak—the same fibre from the Chusan palm *Trachycarpus fortunei* which I usually supply for nesting material. Nest construction

took about three days of the second week of July, both birds doing the work in a clump of bamboo about 2 ft. above the ground. On the 1st August I photographed the two eggs which in appearance are rather like a Greenfinch's egg, but a trifle larger. Both parents took turns to sit and two young were hatched on the 16th August. Providing the essential live food was not such a problem as I had expected—mainly because it has been a good year for wasps. In the period from 16th August to about the end of September they must have consumed several thousand wasps which are attracted to the aviary by a dish of jam and honey etc. It is interesting to note that the few bees that came were not touched in any way. Another interesting way in which wasps were encouraged was that under the bamboo leaves are hundreds of tiny green aphids which exude a sticky substance which attracts flies which in their turn attract wasps so is altogether a quite convenient food chain. Incidentally the adults always remove the sting from the wasp before feeding it to the young. On the 31st August the babies came out of the nest; the following week the weather was appalling with heavy rain and terrific winds, but I was pleased to see the young birds huddled together at night under a piece of glass placed over the roof to keep off the rain. On the 18th September the young were seen to feed on a few pieces of cut up grape, but the adults were very good and continued to supply live food. On the 30th September the babies were still begging to be fed—flapping the wings after the manner of young Blackbirds. I removed them from the parents on the 1st October as the father was beginning to get aggressive. I would guess that the young are a true pair; they roost close together at night and this has probably been the reason they survived this late part of the season. With regard to appearance and colour they are exactly like the adults with perhaps a little lighter brown across the back.

* * *

BREEDING THE PALAWAN PEACOCK PHEASANT AT
JERSEY ZOOLOGICAL PARK

By DAVID JEGGO (Jersey, Channel Islands)

The Palawan Peacock Pheasant *Polyplectron emphanum* is endemic to the island of Palawan in the Philippines and is sparsely distributed over the island. Although as yet no detailed study has been carried out on its status in the wild, this species is considered to be rare and is listed in the I.U.C.N. RED DATA BOOK as endangered.

Inhabiting the damp tropical forest at moderate altitudes, the Palawan Peacock Pheasant is under increasing pressure, due to the continuing clearance of its habitat. The island is some 300 miles in length and up to twenty or so miles wide and the exact range of habitat favourable to this species is not known. A number of specimens exist, in collections in America and Europe, but in most cases they are isolated pairs or single birds. However, Dr. K. C. Searle maintains a number in the aviaries of the Botanic Garden, Hong Kong, where many young have been bred, and as he wished to establish another nucleus he presented six pairs to the Jersey Wildlife Preservation Trust. The first birds, an unrelated pair, arrived on 1st September, 1972, followed by three immature pairs on the 28th December, 1972, and a further two pairs on 5th April, 1974.

ACCOMMODATION

While new accommodation was being constructed three pairs were housed in existing aviaries which measure 6.5 x 1.8 x 1.8 m. high, with shelters of 1.8 x 2 x 1.75 m. high. These aviaries were planted with a variety of shrubs with grassed areas, the remainder being sanded. Between each was a division of opaque rigid perspex to a height of 1 m. to prevent visual contact, thereby eliminating fighting between different males. These aviaries were unheated but the birds were confined at night during the winter months, to the inside areas, which had concrete floors to exclude rodent predators, a layer of sand being spread over the floor. The remaining birds were housed in the tropical bird room in a cage measuring 5.6 x 2.2 x 2 m. high which was heated at 20-22° C. and kept at a fairly high relative humidity.

In the spring of 1973 the Howard Aviaries (presented to the Jersey Wildlife Preservation Trust by two members, Mr. and Mrs. Howard) were constructed. These six aviaries were designed to house one pair of Palawan Peacock Pheasants each in association with one pair of touracos Musophagidae of various species, to inhabit the upper level. Each aviary consists of an outside area measuring 6 x 4 x 2 m. high with an unheated shelter 4 x 1.2 x 2 m. high, to which the birds can be confined during winter nights. The outside areas are landscaped with boulders of Jersey granite and planted with a wide variety of

shrubs, grasses and creepers, thus making an attractive setting and providing cover where the birds have a degree of privacy and open lawn areas where they can be easily viewed.

DIET

Up to December 1973, poultry layers' pellets were fed, substituted by pheasant breeder pellets in the breeding season. Turkey breeder pellets are now fed throughout the year and mixed seed is also available. Every six months in April and October the birds are wormed with I.C.I. Game Bird wormer, given in the drinking water.

DESCRIPTION

The Palawan is perhaps the most beautiful species of the genus *Polyplectron* and the male is a fine looking bird; the black of the neck extends down throughout the underparts, the mantle is an iridescent blue/green, many of these feathers being variously edged and patterned with black. The primaries and secondaries are a dark brown/black. The back and rump are a dark grey-brown speckled with rows of tiny pale golden blotches producing a banded effect. The broad moderately long tail is comprised of 22–24 rectrices and both rectrices and long upper tail-coverts decreasing in length from the centre outwards. The rectrices and coverts are a dark grey/brown speckled with tiny pale cream blotches, these forming a distinct pale narrow band at the tip of each feather, then leaving a clear dark band, which gives way to random speckling over the rest of the feather. On either side of the rachis towards the distal end of each of these feathers is a metallic ovate turquoise "eye" with a surround of black, then cream. Passing outwards over the tail feathers the ocelli on the inner web gradually degenerate. The whole structure gives the effect of a beautiful striking eyed fan when spread in display. The colour of the head is black shot with a blue/green sheen, apart from a white lanceolate cheek patch and in some specimens also a white superciliary stripe which can join at the nuchal area (such specimens are sometimes referred to as Napoleon's Peacock Pheasant). This variation seems to occur at random and apparently is not regional; all the adult males at Jersey exhibit the stripe. A thin elongated wedge-shaped black/blue crest lies raised at a slight angle from the head, curved up a little towards the rear. The iris is dark brown with a narrow surround of red skin on the eyelids. Bill and legs are black; the latter possess 2–3 small sharp spurs.

The female is a smaller (400 mm. against 500 mm. for the male, the tail accounting for about 80 mm. of this difference) and drabber bird, having a general body colour of dull bronzy brown. The wings have some dark markings and on the tail there are traces of ocelli, the cheeks and superciliary area are pale grey merging into brown and in most specimens a small depressed dark crest is present. Immature birds closely resemble the female, males not obtaining their adult plumage until the second year and are often not in full colour until the third

year, although they can usually be distinguished by their greater size and slight difference of marking at a few months.

The moult into adult plumage happens gradually during the second year, the tail and cheek patches being usually the first to appear along with occasional black feather on the breast and blue in the mantle. Immature birds at Jersey exhibit fully developed adult tails and white cheek patches with crest, the rest of the body still having the immature coloration.

The head and mantle of the chick are a gingery brown with a dark brown stripe extending down from the crown to the nuchal area where it broadens out. The under parts are the same gingery brown, shading to a much paler colour on the belly. Down the back and rump is a broad stripe of deep rich burnt umber, bordered on either side by a thin stripe of pale yellow ochre which is separated from the pale belly colour by a narrow stripe of dark brown. The bill is deep chestnut brown in colour, paler at the tip and has an area of dark grey around the cere; the legs are dull pink.

BREEDING

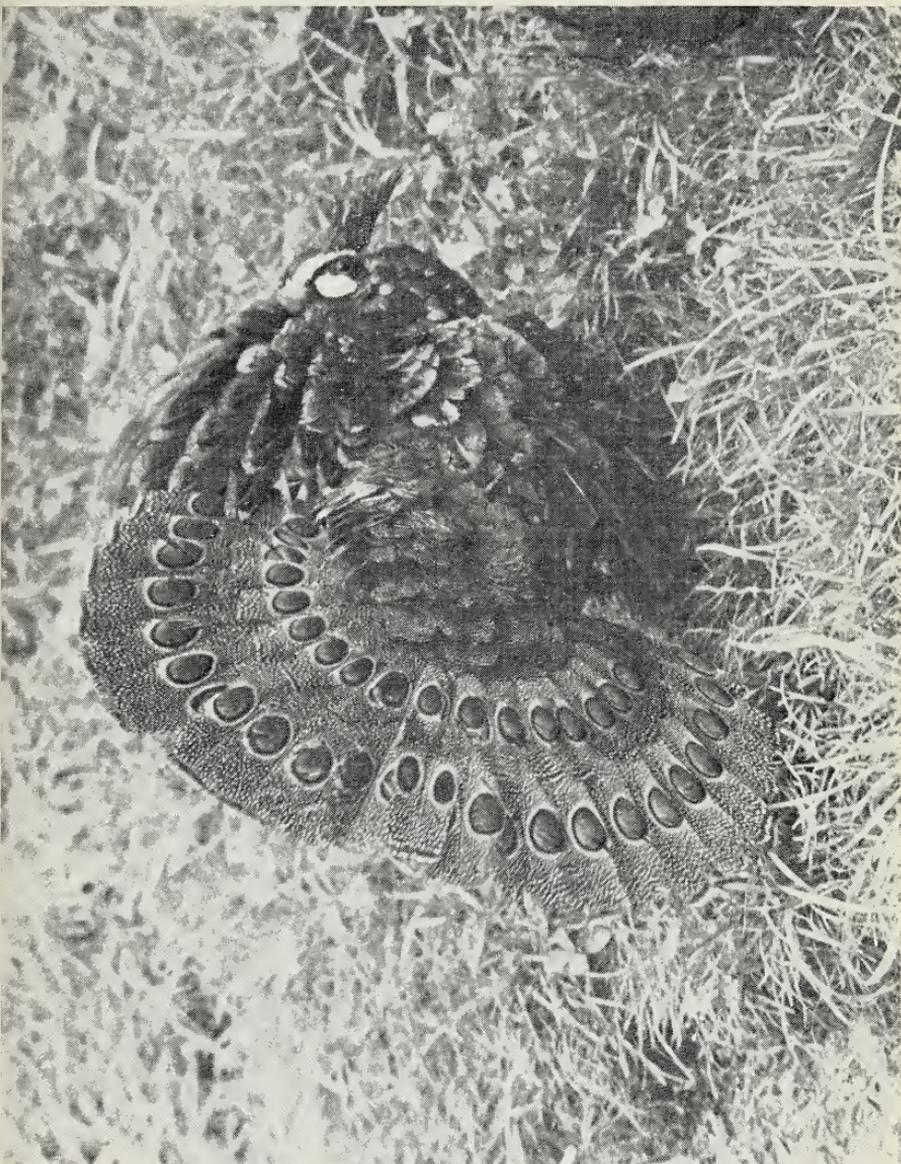
The Palawan Peacock Pheasant is strictly monogamous and therefore only one breeding pair is housed in each aviary.

A lateral courtship display has often been observed in adult and immature males and on occasions in females, gaining frequency through the new year to become most intense at the end of March and beginning of April. The male calls up the female to feed then ruffs and fans his plumage, tilting the colourful and beautifully patterned dorsal surface towards her as he circles around her (see illustration).

Potential breeders are provided with boxes measuring 44 x 30 x 22 cm. deep completely open at the top and half filled with hay, fixed at height of 1.5 m. to serve as elevated nest sites. These are used, but there seems to be little preference, a scrape in the ground among cover being equally favoured.

Laying at Jersey commences at the end of March, one or two eggs forming the normal clutch. They are white in colour and the average size from a sample of ten eggs was 49 x 36.5 mm. which is a little larger than that quoted by Delacour (45 x 36 mm.). The incubation period of 18 days is constant. The eggs are collected as soon as found and set under a broody bantam when the clutch is complete in a maximum of three days.

The smallest and steadiest broody bantams available are used because of the small clutch size and the eggs and chicks so small and delicate. From the first small chip in the shell to complete hatching has been observed to take only two hours. When completely dry and walking at about 24 to 36 hours old, chicks and hen are transferred inside to a box. These boxes are unheated and measure approximately 60 x 50 x 40 cm. high. Three sides, floor and lid are plywood and the front is of



Phillip F. Coffey
Courtship display of the Palawan Peacock Pheasant.

glass to admit light; there is a perforated zinc panel in the lid for ventilation.

The basic rearing diet consists of live food (crickets and mealworms) chick crumbs and a little mashed hard-boiled egg yolk. Getting chicks to feed at first is a little more difficult than in most other pheasants, as they rely on their parent to feed them. The presence of the broody bantam helps in this respect, calling up the chick much as the natural parent would, but often she consumes the food when the chick does not respond quickly. Newly hatched Golden Pheasants *Chrysolophus pictus* have been introduced for the Palawan to mimic their feeding habits. However, all the Palawan chicks have at first been offered mealworms held just in front of the bill, between thumb and forefinger (tweezers being equally good), and usually quickly learning to take these; one reluctant feeder was picked up and force fed to start with. To encourage chicks to pick up food for themselves, crumbs as well as live food are scattered all over the floor; also a little Savel No. 1 dog biscuit can be sprinkled about, its bright yellow colour encouraging them to peck at it.

Birds have usually learned quickly, thereafter having crumbs and egg available in a small shallow dish with another for water, live food being dropped in every few hours throughout the day.

At the age of about 2–3 weeks the chicks are transferred outside with the broody bantam to rearing coops. These are box like constructions 275 cm. x 60 x 75 cm. high, the first 75 cm. is totally enclosed the remaining 200 cm. has an open wire mesh front and no floor, the coop being moved to a fresh patch of short grass daily. The two sections communicate by a small slide enabling the birds to be confined to the house part when necessary. The food is placed in a small box which projects from the front of the house; light is let into this through a wire grid on the front. Chicks are usually moved out of these when well feathered, but can be left for longer.

In 1973 on 12th July a chick a day or two old was observed with its parents. This had hatched from an overlooked egg and was reared to maturity by its parents. The chick obtained much of its food from what could be found naturally in the aviary but in addition a few mealworms were cast in several times a day and the normal pellet ration was replaced by chick crumbs. Both parents called and fed the chick. The chick development was very much the same as the artificially raised ones. At first it spent much time brooded by the mother under cover, the father often in close attendance. Although coming out in the open progressively more as it grew, much time was spent under cover, coming out to feed when called but quickly returning to safety. It perched the first time when 13 days old: before the mother had brooded it on the ground close to the nest site, the father roosting up on a branch.

BREEDING ANALYSIS

1973—During 1973 seven eggs were laid by two pairs, the adult pair laying three clutches of a single egg and a second year pair (still in juvenile plumage) laid three clutches, two of a single egg and one of two eggs. The first was laid on the 28th March and the last in late June. Of the seven eggs one was thin-shelled and broken, one damaged by the broody bantam, one infertile and one contained a dead embryo. Three hatched, one from each pair by a broody bantam and one female Palawan incubated and reared her own.

1974—A total of 15 eggs were laid in 1974, all four pairs in their second year (or over) laying, the males of the three second year birds being in partial adult plumage. All clutches were of single eggs; the first was laid on 22nd March and the last on 12th August and all eggs were given to broody bantams for incubation. Three eggs were broken before collection possibly through egg-eating; one egg was infertile. Of the eleven fertile eggs, one contained a dead embryo, two were squashed by the hen, five were dead in shell (one was deformed and another malpositioned in the shell) and three hatched, two chicks to the original adult pair and one to the pair that bred in 1973.

During the first two years of the Palawan Peacock Pheasant breeding programme six pairs have been imported and from these six young produced. It is hoped that they are now fully acclimatized and well settled in Jersey, so in future years many young will be produced, thus helping to strongly establish the species in avicultural circles, ensuring its survival and possibly providing stocks for re-introduction into its natural habitat should this seem prudent and likely to be successful.

The Jersey Wildlife Preservation Trust is grateful to Dr. K. C. Searle for presenting the original stock and for all his help and support. To Mr. and Mrs. Howard who so kindly donated the funds for the aviaries to be constructed; also to Philip Wayre for his advice on husbandry and to B.O.A.C. who flew the birds free of charge from Hong Kong.

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THE AMETHYST WOODSTAR HUMMINGBIRD, WITH
OBSERVATIONS ON THE ECLIPSE PLUMAGE

By A. J. MOBBS (Walsall, Staffs.)

The Amethyst Woodstar *Calliphlox amethystina* can be found in eastern Ecuador, north-eastern Peru, northern Bolivia, eastern Venezuela, the Guyanas, the greater part of Brazil, Paraguay and north-eastern Argentina (Peters, 1945).

The male has the fastest wing beat (80 per second) so far recorded for a hummingbird (Greenwalt, 1960). It also has the highest metabolic rate of all known vertebrates (Ruschi, 1973).

Adult males, which are approximately $3\frac{1}{2}$ inches overall length, have the upperparts shining bronze-green; throat and sides of neck glittering rosy red bordered with dull white, remainder of underparts dull bronzy green washed with grey. The tail which is deeply forked, has the central feathers shining olive; remainder dusky violet tipped pale grey. Noteworthy is the fact that when the bird is at rest, the tail feathers are held in a crossed position (see plate).

Females are like the males on the upperparts but have a whitish throat with the remainder of the underparts greyish washed with rufous on the sides. The tail is short and square, central feathers green, remainder black tipped with cinnamon. Due to the shorter tail feathers, females have an overall length of approximately 3 inches. Bodywise, however, they are slightly larger than the males.

Immature males are very much like the females, but are deeper grey on the abdomen, have longer tail feathers without the cinnamon tips and have the throat whitish heavily mottled with grey.

Adult male Amethyst Woodstars have a non-breeding dress in that, at certain times of the year, the glittering throat feathers are replaced with whitish feathers heavily mottled with grey. This non-breeding dress appears to be retained for six to eight weeks only, after which the bird goes into a complete moult and the glittering feathers reappear. I have no idea as to why the species should have a non-breeding dress, especially as it appears to be kept for so short a period. The males I have owned and those owned by friends, have all gone into this eclipse plumage usually during late summer or early autumn.

Adult males in non-breeding dress are easily distinguished from immature birds as they not only have longer tail feathers, but also have much more green on the underparts.

Although it is most unusual for a hummingbird species to have a non-breeding dress, the Amethyst Woodstar is not unique in this respect as out of the breeding season the Peruvian Sheartail *Thaumastrura cora* loses the glittering throat feathers and the extremely long, white tail feathers (Johnson, 1967). Also Ruschi (1973) mentions that the

Blue-tufted Starthroat *Heliomaster furcifer* has a non-breeding dress. As can be seen, however, Ruschi is not correct in thinking that birds from the genus *Heliomaster* are the only ones from the Trochilidae with an eclipse plumage phase.

Perhaps it is worth mentioning that although I have, or have access to most of the works appertaining to the Trochilidae, I have been unable to find any mention of the non-breeding dress in *C. amethystina*. It is possible therefore, that this occurrence is unknown to ornithologists. Although widespread, the Amethyst Woodstar is rarely brought into Britain and the few which do come in are often in a state of exhaustion and therefore require special attention if they are to survive. Being very small, it is preferable to house these birds in a cage (pairs will live together amicably). However, once fully established, it is possible to house them in small flights with other species of similar size.

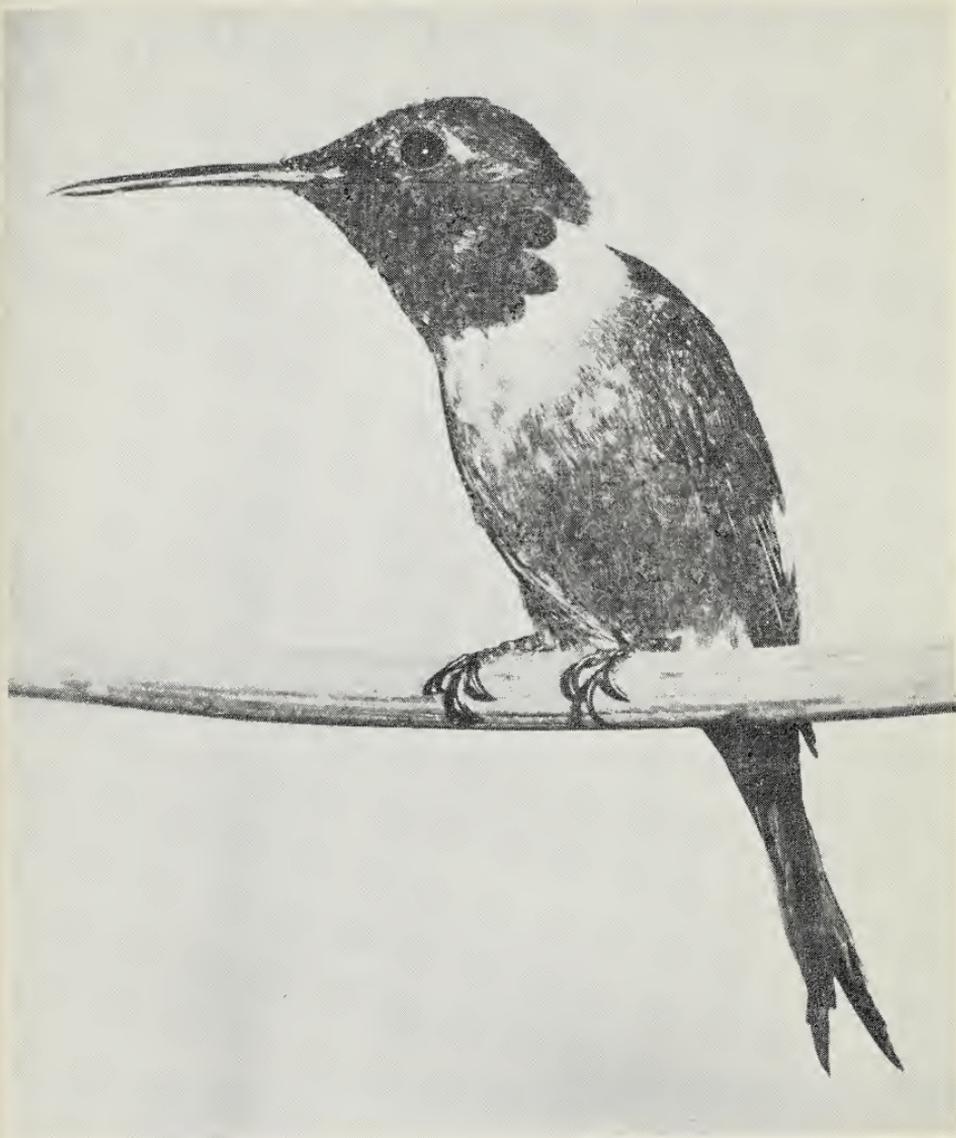
I have found the species to be somewhat lethargic whilst in immature plumage, but once adult plumage is attained, the birds appear to take a much greater interest in life.

The display of the adult male consists of the throat feathers being puffed out, the deeply forked tail being spread and held under the body and the head and body being held stiffly with the beak pointing directly at the female. The male then flies very slowly (even though the wings are beating faster than in normal flight) towards the female. When the male's beak is almost touching the female, he reverses, again very slowly. Each time the male thrusts itself forward, the wings make a cracking sound like that of a whip.

I have yet to hear a woodstar sing; however, they do have a monotonous piping call-note which can be heard whenever they become agitated for some reason.

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Male Amethyst Woodstar Hummingbird
Calliphlox amethystina
Approximately one and one-third actual size

R. J. Elgar



Male Mountain Bluebird
Sialia currucoides

BEHAVIOUR AND BREEDING OF THE
MOUNTAIN BLUEBIRD IN CAPTIVITY
Sialia currucoides

By BENEDICT C. PINKOWSKI (Washington, Michigan, U.S.A.)

The bluebirds of the New World (genus *Sialia*) represent an endemic genus of thrushes (family Muscicapidae, subfamily Turdinae) consisting of three species often compared to the Eurasian Redstarts *Phoenicurus*. The redstarts and bluebirds are similar in size, and in general behaviour and nesting habits.

The Eastern Bluebird *Sialia sialis* is the best known of the three bluebirds and has been reported (Butler, 1907) to breed in captivity. Wallace (1972) noted that it is compatible with other species when kept in confinement. The Mountain Bluebird *Sialia currucoides* is not as well known, but it is closely related to its eastern relative and the two species do hybridize (Lane, 1968). The most apparent difference between the two is probably in plumage. The male Mountain Bluebird lacks the orange of the breast of the male Eastern Bluebird, and the blue and orange of females of the latter are replaced by grey and brown in Mountain Bluebird females. The Mountain Bluebird is also slightly larger, has a proportionately longer wing chord, and is perhaps a bit more pugnacious than its relative.

I collected four Mountain Bluebirds in the Badlands, South Dakota, U.S.A., during June 1972. Three were taken as nestlings, one as a fledgling, and were hand-reared to independence, at which time they were placed in a large cage (6 ft. x 12 ft. x 5 ft.) until completion of their post-juvenal moult. At that time they were transferred, pairwise, to breeding units which consisted of a large cage (120 cubic ft.) connected to a smaller cage (approximately 60 cubic ft.). This arrangement was designed to reduce aggression and permit additional exercise, and previously had worked well for my Eastern Bluebirds (Pinkowski, 1974).

Nest-boxes of the standard type were supplied, except that one of the (wooden) sides was removed and replaced with screen to permit observation. The openings measured 1.5 inches in diameter, and the birds entered readily despite the claims by Haecker (1948) that an opening of that size is too small for this species. Photoperiods were manipulated by employing inexpensive timers; each change was of the order of 15 minutes, but the overall pattern corresponded closely to natural changes in daylength. Food consisted of mealworms (*Tenebrio*), crickets (*Acheta*), insects obtained by "sweeping" and various types of traps, and fruit. I found that the birds are very fond of peanut hearts, which also have been used to trap Eastern Bluebirds (Fast, 1955).

Since little information is available on the Mountain Bluebird in captivity, I am setting forth some of my observations in the following.

During the years 1973 and 1974 seven nests of this species were attempted by the four birds referred to above. The observations are based on these birds as well as one juvenile reared to 10 days by one pair and subsequently taken over and hand-reared by me for more careful observations.

FORAGING BEHAVIOUR

The development of self-feeding behaviour patterns was observed and apparently involves a sequence of five steps which may be summarized as follows: (1) observation of prey (especially moving insects) from a distance, but with no predation attempt (common almost immediately after nest departure, at 18 days); (2) seizing and mandibulating prey, which is not thoroughly prepared and is usually discarded (19-20 days), although very small items may be ingested; (3) consumption of prey after mandibulation but with little preparation otherwise (21-23 days); (4) mandibulation and thorough preparation of prey, the latter involving gradually perfected behaviours of "scissoring" and "hammering" (Krieg, 1971) the prey (24-26 days); and (5) perfection of the self-feeding behaviour patterns (27-28 days) so that the limbs, elytra, and wings of large prey items (*e.g.*, crickets, beetles) are systematically removed, the prey is taken to a large flat surface for preparation, and some selectivity is demonstrated with regards to what is taken.

Although these behaviours emerge gradually, they appear innate and are influenced only to a minor extent by learning. Mueller (1974) made similar observations on the American Kestrel (*Falco sparverius*). The most notable result of this gradual progress in the direction of independence is seen in the bird's increased ability to exploit larger prey items. At independence (35-45 days) the complete spectrum of prey normally consumed by the species is available.

Nearly all types of insects are accepted by Mountain Bluebirds, although crickets, beetles, moths, and caterpillars seem preferred. The Mountain Bluebird is more insectivorous than the Eastern Bluebird (see Beal, 1915), and fruit was never an important part of the diet of the captive birds, especially during the breeding period. Sumac *Rhus typhina* was the most common fruit eaten, and it was preferred over more succulent fruits (*e.g.* cherries *Prunus* and some dogwoods *Cornus*).

Although "hovering" (searching for prey while remaining on the wing) is a common type of foraging employed by Mountain Bluebirds in the wild (Power, 1966), it was not common in captivity, even when for brief times I allowed the birds to enter larger quarters. Hovering was not noted until the young were at least 35 days old, and was accomplished expertly by one young 37 days old and another 43 days old. Thus this more complex foraging behaviour emerges 2 to 3 weeks after the birds normally begin first taking food for themselves (at about 21 days). Simultaneously with the acquisition of the ability to hover the birds are capable of executing "controlled falls"; *i.e.*, food morsels

dropped from a perch during preparation are seized before they reach the ground as the bird quickly descends to retrieve the item, usually in mid-air.

DRINKING AND BATHING

Although Power (1966) did not observe wild Mountain Bluebirds drinking water at any time, the captive birds took water at least once daily. Bathing was also common in captivity, and was observed from one fledgling only 23 days old. Although Potter and Hauser (1974) suggested that bathing is more common in Eastern Bluebirds during the period of the moult, I found no evidence for this in the captive Mountain Bluebirds.

Ants of several species were offered to the birds from time to time, and although these were readily eaten, the Mountain Bluebirds were not seen anting. *Sialia* is apparently the only genus of New World thrushes which does not ant (Whitaker, 1957).

ROOSTING

The Mountain Bluebirds were unusual in their roosting habits in several respects. When the main series of lights was extinguished in the aviary rooms and a set of dim lights remained on for a time in order to permit the birds to reach their roosting sites (or to permit the brooding hen to enter the nest-box), an interesting complication arose. This procedure had previously worked well for Eastern Bluebirds, but the Mountain Bluebirds persisted in remaining active, even in the faintest light. I could find no satisfactory explanation for this, although since numerous workers (Criddle, 1927) state that this species is vocally active at dawn and dusk, I must conclude that it is simply the normal habit of the bird. In the end a special switch to dim the lights gradually (as well as my presence and a certain measure of patience for their antics) was required for the birds to settle down completely.

The fledglings often roosted side by side (adults rarely did this), usually in the highest spot available. Twittering calls ensue from these juveniles before they go to the roost, an unusual behaviour noted for other hole-nesting species (Kilham, 1974). Some individuals displayed an acute awareness of the "time of the day" and would begin prospecting for roost sites shortly before the lights were extinguished, often flying nervously while giving loud "location calls." Although nest-boxes were always available, they were seldom used for roosting.

SINGING

Overall, the Mountain Bluebird is much quieter than the Eastern Bluebird. However, with the advent of the breeding season two song types were distinguished. One, which is not unlike that of the American Robin *Turdus migratorius*, is most often sung in the dim light of early morning but was also heard in complete darkness in the captive birds and has been reported at night in the wild (Weydemeyer, 1934). This song is loud and emphatic, but is sung infrequently.

A second song is more properly classified as a repetitious warble, a soft, continuous "eee-ee-e" totally unlike anything I have noted from our other native species. This warble is common at all times of the day and may go on for many minutes consecutively.

COURTSHIP AND NEST-BUILDING

Courtship behaviour in Mountain and Eastern Bluebirds is remarkably similar, a fact which no doubt permits the hybridization between the two species. Males precede females in nest site inspections and during the courtship period the cock regularly feeds the hen, often taking a morsel into the nest cavity first in an apparent attempt to encourage her "interest" in the nest. Some males are very persistent in their attempts to courtship-feed their females, forcefully poking at the female's beak with items and returning several times to attempt a feeding if she is unreceptive. These feedings continue throughout the nesting cycle. Once nest-building is underway (only the female builds), the male may enter the cavity and mandibulate or remove bits of grasses, a behaviour which invariably attracts the female's attention and may prompt a bout of nest-building by her.

Nests are built of dry grasses for the most part, with finer material placed in the lining of the nest cup, where a few small feathers may be added as well. Nest-building takes longer for first nests of a season (11 and 14 days) than for second nests (4 and 5 days) as observed in one female during two consecutive years. During two separate observations of nest-building, the hen entered the box a total of 66 times with material during 142 minutes (about once every 2 minutes), and spent 6 to 21 seconds inside the box per trip (depending largely on whether or not she would re-shape the nest while inside).

For one female, nest-building commenced at daylengths of 14.75 hrs. and 13.25 hrs. during her first and second seasons respectively (the daylight period on the increase in each case).

EGG-LAYING

One young female laid her first egg at an age of 255 days (approximately 8½ months). An egg was laid each day in four of five clutches, with one day skipped during the second clutch of the second season. Clutch sizes were: 5, 5 (during first year), 8, 4, 5 (during second year), for an average of 5.4 eggs per clutch.

The eggs are a pale blue colour, lighter than those of the Eastern Bluebird. Maxima and minima recorded for the eggs of the above five clutches were: 23.0 and 20.8 (length), and 18.6 and 17.0 mm. (diameter).

INCUBATION

The incubation period lasted 13 days in one case and 15 days in another. Only the hen incubates, but the cock may enter the box during the hen's absence and may stay in for a time, leaving when she is ready

to re-enter. While in the box the male may poke at the grasses, occasionally removing a blade or two, or he may perform cup-shaping motions (which have been noted in wild males; see Murie, 1934). The male does not warm the eggs, however.

I observed one female regularly during the incubation periods of her first nests of two seasons, and her times spent on and off the nest were recorded. She averaged 34.4 minutes on the nest each time she entered, and 4.5 minutes off the nest each time she left. The corresponding figures reported by Power (1966) for wild incubating birds were 25.6 and 7.0 minutes. Therefore the captive birds spent a greater percentage of time on the eggs (88.4 percent) than did the wild birds (79.9 percent). The percentage difference was accounted for equally by a 35.4 percent decrease in the average inattentive time, and a 34.4 percent increase in the average attentive time. The captive birds had a constantly available source of food and thus spent less time searching for food while inattentive. The longer attentive periods are related to more feedings of the incubating hen by the male (discussed below), which may also be due to food availability.

The variation in time spent on and off the nest per trip is summarized for the entire incubation period in Table I. While the total percentage of time spent on the nest remains fairly constant (at 85 to 92 percent) throughout the incubation period, the average duration of each increases until about midway through incubation, at which time both level off and remain fairly constant thereafter. I should note that the longest record of a single "sitting" occurred on day 8 (155.4 minutes), while the second longest record came on day 14 (118.8 minutes).

Occasionally I would find the female on the eggs before the clutch

TABLE

VARIATION IN AVERAGE TIME SPENT ON AND OFF
THE NEST DURING INCUBATION

Days of incubation	Number of periods observed	Average time on (minutes)	Average time off (minutes)	Total % of time on eggs
1- 2	16	19.66	3.03	86.6%
3- 4	13	19.97	2.98	87.0%
5- 6	8	41.37	6.97	85.6%
7- 8	11	51.58	4.93	91.3%
9-10	17	41.06	5.23	88.7%
11-12	12	29.87	4.94	85.8%
13-14	8	53.31	4.74	91.8%

was completed. This happened during the day, as incubation at night always began after the clutch was completed. For seven periods when the female entered and left the nest before cessation of laying, her attentive periods were near normal (averaging 25.0 minutes), but her inattentive periods were often greatly prolonged.

One other factor was found to influence the amount of time spent on the nest per attentive period by the hen, namely the number of times she was fed by her mate. If the female was not fed at all, she averaged only 25.1 minutes on the nest; if fed once or twice, this increased to 41.6 minutes; finally, if she was fed three or more times (a maximum of seven feedings during one sitting was recorded), she spent an average of 78.5 minutes on (sample sizes for the three groups are, respectively, 56, 16, and 7).

It could be argued that the longer the female is on the nest, the more likely the male is to feed her, and thus her sitting for a longer time causes the male to feed her more instead of the converse. Evidence against this is seen by the fact that the longest attentive period by the hen when she was not fed was only 66.2 minutes, which is probably near the maximum amount of time which she can go without food. Moreover, the hen fed on practically every occasion when she left the nest, often at once but sometimes pausing to stretch or scratch first. Lack (1940) did not consider the possibility that courtship feeding may increase the amount of time the female may spend on her eggs, but that appears to be the case here.

CARE OF THE YOUNG

Both the male and female feed the young, although only the female broods. Most of the grit required by the nestlings (small stones and bits of egg shell were kept in the cages for this purpose) is supplied by the female.

At one nest the hen spent 351 of 630 minutes (55.2 percent) brooding during the first 48 hours after hatching; during the succeeding 48 hours this decreased to 221.5 of 460 minutes (48.2 percent) and for the third 48 hour period 184.5 of 461 minutes (40.0 percent) were spent brooding. During this period the female increased the percentage of food which she brought to the nestlings, although the male continued to supply the greater amount of food. At the end of the first week I took charge of the single nestling that remained, hoping that the adults would nest again (they did, but not successfully). This was the closest I came to a successful breeding of this species.

An unusual behaviour known as "tremble-thrusting" was described for Eastern Bluebirds by Hartshorne (1962) and was also observed in these Mountain Bluebirds. The female, in performing a tremble-thrust, stands on the rim of the nest cup and forcefully vibrates her beak against the floor of the box. In the Mountain Bluebird I noted this behaviour late in incubation, but it becomes most common after the young hatch. Its possible function is discussed by Pinkowski (1974), and it would be interesting to know which Old World thrushes, if any, perform tremble-thrusts.

DISCUSSION

It was suggested above that the similarities between the courtship

behaviour of Eastern and Mountain Bluebirds permit hybridization between the two species. The courtship displays of these species can be readily analyzed because many relate to the nest cavity which is necessarily an important element in the reproductive cycle of the two species. Since the males of both species court females by various displays in and around potential nest sites, we would expect that these displays would act as releasers bringing about subsequent nesting activities in the females of both species.

Krieg (1971) has presented a complete and thorough analysis of the courtship displays of the Eastern Bluebird. It is not surprising that many of these are duplicated precisely by Mountain Bluebirds. These include the following: (1) sexual chasing; (2) symbolic nest-building (by the male); (3) butterfly flight (slow, unsteady flight to nest site by male); (4) nest demonstration (male at nest entrance with blue back, coloured similarly in both species, displayed); (5) various "sleek" postures; (6) male calling while inside nest cavity, often while holding food in bill; (7) copulation invitations (by the female), including posture, movements, and calls; (8) wing-lifting and wing-waving; (9) courtship-feeding; and (10) face showing (male looks out cavity entrance while inside).

The importance of these displays in permitting hybridization can be realized when one considers the fact that the vocalizations of the two species are remarkably dissimilar. Their primary songs are totally unlike, and the location calls are only superficially alike. Alarm notes in the Eastern Bluebird (a "chuck" or "chatter" and a "whine"; see Pinkowski, 1971) do not even remotely resemble those of the Mountain Bluebird (a higher-pitched "tink" being perhaps most common). Knowing this, it is hard to imagine how a hybrid would be capable of functioning in either system.

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BREEDING THE IRIS LORIKEET

Psitteuteles iris

By RAY KYME (Kirton, Boston, Lincolnshire)

In the past three or four years several species of Indonesian parrots have been reintroduced to aviculture, among them the Iris Lorikeet of Timor and Wetar—a small island to the north of Timor. Timor is sufficiently large an island (200 x 60 miles) to be subdivided politically into two "halves" and a "bit", between Portugal and Indonesia and it lies about 180 miles to the north-west of Northern Australia. The Varied Lorikeet *P. versicolor* of Australia and the Iris Lorikeet are so very similar in general appearance that it is probably safe to assume that they have diverged recently from one another. Forshaw (1973) has put the member species of *Psitteuteles* into *Trichoglossus*. While not denying that this is perfectly reasonable, there are some differences shown between members of these two genera other than differences in colour, which have led me to retain *Psitteuteles*. Mrs. Johnstone's Lorikeet *P. johnstoniae* (Johnstone 1907) and the Varied Lorikeet (Forshaw 1969) have been reported to bring nesting material into the nest chamber which is so both for the Yellow-and-Green Lorikeet *P. flavoviridis* and the Iris Lorikeet (pers. obs.). The *Psitteuteles* lorikeets take seeds as readily as they do nectar and Mr. G. A. Smith tells me that the skulls of *Psitteuteles* lorikeets, because of the breadth of the upper mandible, the roundness and structure of the skull, show some similarity to lovebirds *Agapornis* and are not simply a smaller "version" of a *Trichoglossus* skull. This might not be relevant were it not that otherwise, except for size, one genus of brush-tongued parrots' skull is exactly like another.

DESCRIPTION

Iris Lorikeets are small, being about as big as the Abyssinian Love-bird *A. taranta* but having a slightly longer tail than that bird. The basic colour is green with a reddish bill and a red front extending back into a cap. There is a spread of purple over the ears and the pale green belly is cross-streaked with dark green. In the two fertile, and therefore definite, pairs which I know (Mr. and Mrs. Bob Grantham have a hand-tame pair) the male is slightly larger with a bolder head and the red cap is larger and more brightly coloured. The difference isn't particularly well defined and for quickness I find myself looking at the feet, for my hen lacks some toenails.

BREEDING

In January 1973 I bought four freshly imported birds, one of which died very shortly afterwards with aspergillosis. They were kept in cages in an unheated birdroom until the end of April when the two which looked to be a pair were put into a small aviary measuring 8 x 3 x 6 feet high. They were provided with a natural log which was almost immediately inspected by both birds and used as a dormitory at night. The nectar mixture contains Farex—a baby cereal, condensed milk, honey, Vitamin B₁₂, yeast mixture in water; sunflower seed is also provided. They also have a slice of apple and some spinach beet daily. Food is held in the foot as a hand.

Courtship display is mutual. They bow the head down and hiss through the open bill. During bowing the feathers over the shoulders are raised. Perhaps the male is slightly more demonstrative in the display than the female; certainly he is the dominant character and bickering fights are very frequent. The male was seen to pair with the hen several times mounting with both feet. I have not seen the female feed the male and most feeding did in fact take place inside the nest.

The first egg was laid on the 28th June and the second on the 1st July. The egg that hatched did so on the 23rd—the other was infertile. The chick grew well but died on the 21st August; it was not subjected to a post-mortem examination and the cause of death remains obscure. No further signs of nesting were shown that year.

They wintered in the aviary and continued to sleep inside the log at nights which protected them from the weather; otherwise I would have brought them indoors. They next nested on the 4th May, 1974, the second egg being laid on the 6th, the eggs hatching on the 27th and 29th May—a 23-day incubation period. During incubation the female could be heard frequently calling the male to feed her. Iris Lorikeets are very fond of soft fruit and the youngsters were probably mostly reared on raspberries, indeed they ate these at such a rate that my wife had trouble salvaging enough for the house and jam-making. The chicks left the nest on the 2nd August at 65 and 67 days old. A few days before this they were seen in the nest by Mr. Ken Russell and

after they fledged by Mr. G. A. Smith. Like most baby lorries they were a little feather plucked by the parents on emerging but these feathers were soon made good.

The chicks are smaller, duller and have black beaks which makes them easy to separate from the parents.

They returned to the nest the same day as they left it and have so far always gone back inside when the weather is unfavourable. The parents have not re-nested. Both parents and young regularly water-bathe, I have not seen them sun-bathe, or rain-bathe. Mrs. Rosemary Grantham tells me of a pair which, when on the ground, alternately jump up and down so that as one is up the other is down. I have not seen this in my own birds and have only seen jumping in males of other species of parrot and these two birds could therefore be males.

One very good point of the Iris Lorikeet is the fact they are not noisy birds, in fact they are the least noisy of all the lorries I have kept and I might say I have kept a few, thanks to a very good friend.

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As described, the Iris Lorikeet *Psitteuteles iris* has been bred by Mr. R. T. Kyme and this is believed to be a first success. Anyone knowing of a previous breeding of this species in Great Britain or N. Ireland is asked to notify the Secretary or Editor.

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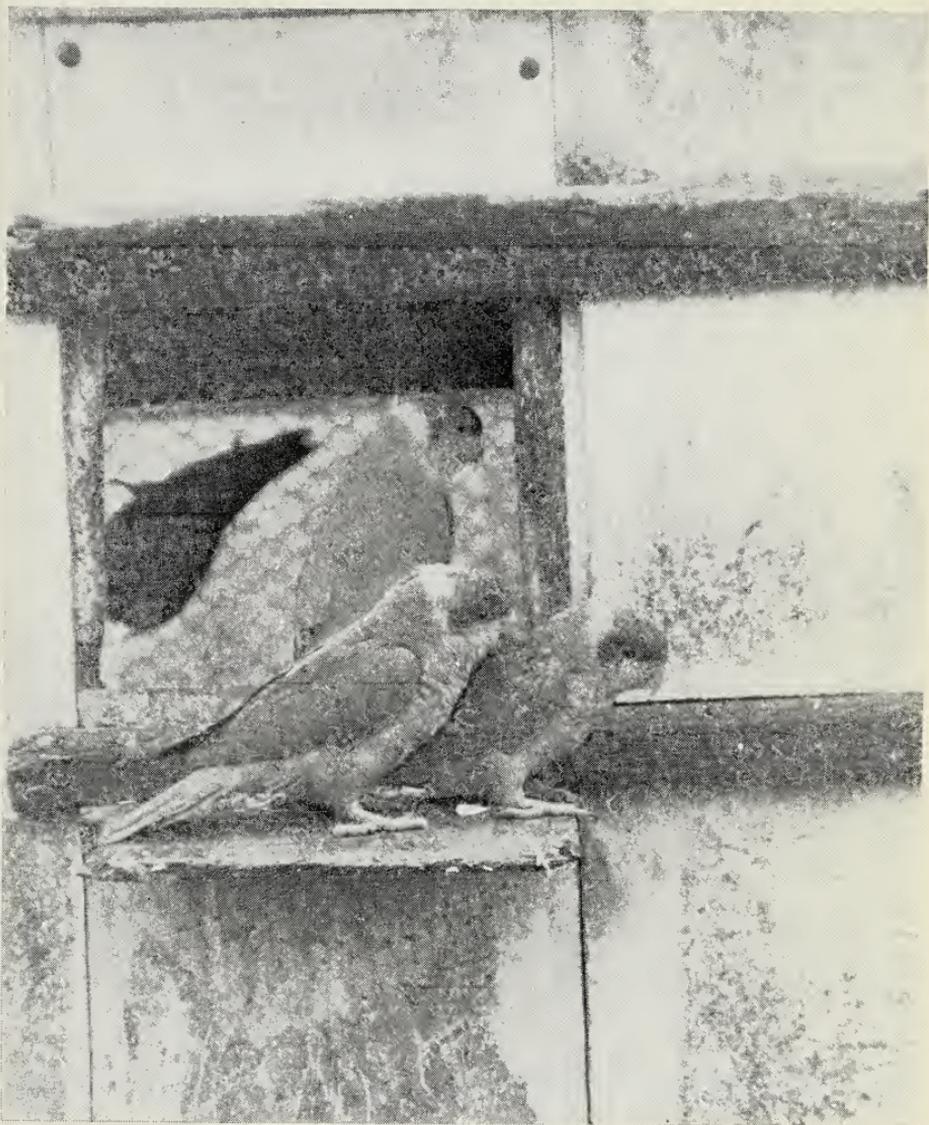
THE SPOTTED MORNING WARBLER

Cichladusa guttata

By MALCOLM ELLIS (London)

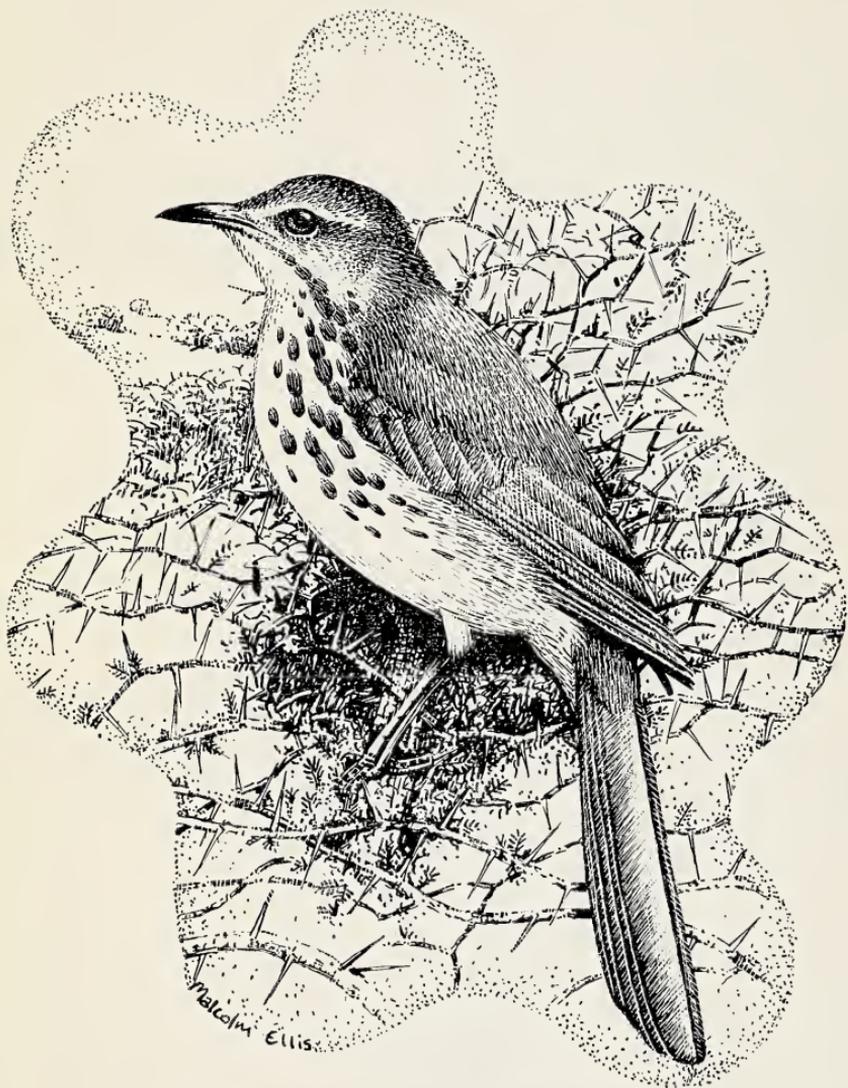
The November–December, 1973, Magazine contained two accounts of the breeding of the Spotted Morning Warbler, *Cichladusa guttata*; one at Birdland, Bourton-on-the-Water and the other at Winged World. Two colour photographs illustrate the Birdland account; one shows the top of the head of a bird in its deep mud nest, the other a short-tailed, immature bird, though this is not made clear by the caption.

My drawing portrays an adult Spotted Morning Warbler in a typical stance, while these notes attempt to add a little more information about the species. The second account mentioned above gives the size of the species and a good description of the colours, and lists its distribution in eastern Africa, but does omit Somalia.



Iris Lorikeets. The parents and young (right).

R. T. Kyme



Spotted Morning Warbler *Cichladusa guttata*.
From a drawing by Malcolm Ellis.

I know this bird from Kenya, although I have seen it only rarely, for it is a shy, skulking species. It spends much of the day in thick scrub, occasionally leaving to feed from the ground below. Where I have seen it, the country has been covered with thick, fairly low thorn scrub, and has been very hot and dry for most of the year.

Williams (1972) describes it as a common bird of the semi-desert areas of northern Kenya and adds that it also inhabits palm tree scrub and dense coastal bush.

A few years ago, while I was staying beside Lake Baringo, at the home of Mrs. Betty Roberts, a Spotted Morning Warbler used to sing regularly early each morning from the cover of a small thorn bush close to the house; the species also sings at dusk.

Mackworth-Praed and Grant (1957) and Williams mention that it mimics the calls and songs of other birds, without stating which these are. I sought the opinion of Tim Barnley of Kitale, Kenya, who kindly replied that the species it mimics vary in different localities. For West Pokot to Lake Baringo, which is an area he knows better than anyone and is where the warblers in this country originate from, he suggests—Red-chested, Emerald and Klaas's Cuckoos, Lizard Buzzard, Pale Chanting Goshawk, Madagascar Bee-eater, Freckled Nightjar, White-browed Robin Chat and Black-headed Oriole, plus some snatches of sub-song from various sparrow-weavers and finches, etc.

The drawing was made from a bird at London Zoo. This bird lives in an indoor aviary which houses mostly small seed-eaters. Although it is considerably bigger than most of its companions, I have never noticed any aggressive behaviour from it. I would, however, expect it to react differently to other thrush-like birds. It arrived from Kenya during 1968 and was the first of its genus, containing three species, to be represented in the collection.

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THE SUBFAMILY LORIINAE—3

By BERNARD C. SAYERS (Chelmsford, Essex)

DUIVENBODE'S LORY *Chalcopsitta duyvenbodei duyvenbodei*
(Dubois)

This species was named after Maarten Dirk van Renesse van Duivenbode (1832 or 1833—1881 or 1882) who, together with his son, Lodewijk Diederik Hendrik Alexander, ran flourishing trading enterprises and plantations at Ternate, Moluccas and Manado, Celebes. This trading partnership handled large numbers of bird skins collected in the East Indies. Many were destined for the French millinery trade, but it would appear that notable collections were also presented to museums; Leyden and the Belgian Royal Natural History Museum in particular.

It would seem that a collection of skins from this source was presented to the Belgian Royal Natural History Museum in 1883 or 1884 and the describer, M. Alph. Dubois, decided to dedicate this new species to Duivenbode the elder, although inexplicably Dubois quotes the initials M.C.W.R. for Duivenbode: this fits neither father nor son.

Chalcopsittacus duyvenbodei—Dubois, Bull. Mus. d'Hist. Nat. Belgique, Vol. III, page 113, plate V (1884). Also T. Salvadori, Mem. R. Accad. Sc. Torino, Ser. 2, page 170 (1889) and in Cat. of Birds in Brit. Mus., Vol. XX, p. 16.

Hon. Walter Rothschild, Novitates Zoologicae, Vol. I, Sept. 1894, page 677.

Moniapura duyvenbodei—Tom Iredale, Birds of New Guinea, Vol. I, page 151 (1956).

DISTRIBUTION

Northern coast of western New Guinea between the Mamberano and Tami Rivers.

DESCRIPTION—MEASUREMENTS

Length 10 in. Wing $6\frac{3}{8}$ in.

COLORATION

Predominantly the colour of this species is dark olive brown. The feathering of the lores and bordering the base of the bill is golden yellow. The lanceolate neck feathers are also golden yellow towards their tips and along the centre. The outer surface of the primary and secondary wing feathers is black; the undersides of these feathers are gold shading to dark chocolate at the tips. The lower part of the back and rump are violet blue. The basal areas of the breast feathering are yellow and this gives the impression of a golden suffusion on the breast. The upper surface of the tail is deep purple and the underside golden olive. The naked areas of skin adjacent to eyes and bill are blue. The bill, cere and feet are greyish black.

ORNITHOLOGY

As with so many species of lory, I can find very little first hand information recorded about its habits in the wild. It is said to only be moderately common throughout its range and is encountered in pairs or small parties of between six and eight individuals, these usually being

observed in the forest canopy.

AVICULTURE

The first record that I can trace of a living example of this species reaching Europe is that of a single bird imported by Mr. J. Spedan Lewis in November 1929, this lory was presented to the London Zoological Society. Shortly after this Mr. St. Alban Smith obtained three Duivenbode's Lories in Singapore; two were presented to the London Zoological Society and the third was sent to Mr. Herbert Whitley's collection at Primley Park, Paignton.

It would seem that this species remained an extreme avicultural rarity until 1972 but since then small groups have been imported regularly; however it is still uncommon and commands high prices.

It is to be hoped that our members who now have this attractive lory represented in their collections, will submit papers on the behaviour, display and idiosyncrasies to this magazine, as to date very little detailed information is recorded.

There is a coloured plate opposite page 125 in the 1931 (Vol. 37) AVICULTURAL MAGAZINE.

OTHER SUBSPECIES

AUGUSTA LORY *Chalcopsitta duivenbodei intermedia* Auber
Chalcopsitta duivenbodei intermedia Auber—Anz. Orn. Geo. Bayern, 2, 1934, page 314.

The subspecific name literally means intermediate.

DISTRIBUTION

New Guinea. Known from the upper Sepik River, Berlin Bay and the Maeanderberg.

DESCRIPTION

I have been unable to trace a skin of this race and others who have make no mention of any difference in coloration, markings or size between this and the nominate race. It would seem that the Augusta and Duivenbode's Lories are almost indistinguishable and that the validity of this subspecies is somewhat doubtful.

LILAC-NAPED LORY *Chalcopsitta duivenbodei syringanuchalis*
Neuman

Chalcopsitta duivenbodei syringanuchalis—Neumann, Orn. Monatsb., 23, 1915, page 179.

The subspecific name is derived from *Syringa*, the botanic name for Lilac, and *nuchalis* refers to the nape of the neck.

DISTRIBUTION

Northern coast of eastern New Guinea about Astrolabe Bay.

DESCRIPTION

This subspecies is said to differ from the nominate race in that the nuchal feathering has a deep violet sheen.

REMARKS

It would seem that in the past scientists were inclined to be over

generous in awarding birds subspecific status and “splitters” seem to have played a particularly prominent part in the nomenclature of the Lariinae. The reasons for differentiating the above two subspecies from the nominate race would seem to be tenuous and from the available evidence their subspecific status is open to question.

* * *

SPANISH NOTES—3

By ROBIN L. RESTALL (Caracas, Venezuela)

HAND-REARING THE ROLLER *CORACIAS GARRULUS*

During 1971 I had some very interesting experiences with Rollers. My journal for the 23rd May of that year contains this brief entry: “Bought Roller, one adult in superb condition as part of a job (trapper’s) lot. Placed it in a roomy cage whereupon it immediately took all the mealworm beetles. Subsequently it took mealworms and pupae. Trapper says it takes worms, so I dug up a few large ones and gave these along with chopped chicken livers all rolled up in Sluis Universal. All food taken.”

The next month the same trapper brought a brood of nestlings to me. I had doubts about the morality of accepting them, but, as every aviculturist knows, the desire for ownership frequently overcomes common sense. A second brood turned up a few days later and I knew for sure that I should have been stronger. I took the second brood, making loud and strong noises that I would not take any more. I was offered more of course, but managed to refuse. This man carefully and expertly hand-reared three further broods and only managed to sell them with great difficulty when they were feeding independently. He has never taken any more Rollers—and my conscience is a little easier now.

My journal entries were precise and detailed, and are repeated here on the offchance that they may be a help to somebody at some time.

“18th June, 1971.

Received three babies; 1st *very* small, eyes closed, naked; 2nd twice as big, naked, eyes closed but fractionally open at times; 3rd a little bigger, a few rows of pinheads showing, able to open eyes about half-way.

19th.

Smallest died. The larger, named A, weighed 2 oz., while B weighed 1 oz. Fed them on Beechnut brand high protein baby food from jars, by means of a hypodermic syringe. This food had some scraped cuttlefish bone added, plus a few drops of Abidec multivitamin. I also gave a few mealworms from time to time. At each feed I give a pellet of minced raw lean beef mixed with fresh cream cheese.

23rd.

Both birds growing very well and satisfactorily. Eyes are open. A is showing a lot of pinheads and tiny paintbrushes, while B is just beginning to. They seem to be 2 days apart in age, which would make them respectively 2, 4 and 6 days old on the 18th.

25th.

Received three more nestlings, named C, D and E in size order, being (probably) 6, 4 and 2 days old respectively. They were fiendishly hungry and begged like lunatics. The smallest was in fact rather weak but pulled through the night.

26th.

The biggest baby took 5 cc. of food in one straight shot! Their droppings (the newcomers) are very smelly indeed and have a blackish hair texture. I suppose the parents must have fed a lot of the giant black Spanish Bumblebees. The cloth lining the box has to be replaced every two hours.

27th.

E found dead this morning. Obviously taken too young. Sorry. Have my doubts about D now.

29th.

A very active now (could be 15 days old). Yesterday I put him on the table top beside the nest box and he climbed back in through the hole. This morning he is walking around his box pecking at things, following flies with quite rapid movements of his head. I think that he would peck at one if it came within reach. All the nestlings attempt to preen themselves. A raises head feathers a lot, stretches wings, etc. . . . Feeding today Beechnut with rice, spiced with powdered cuttlefish and mashed hard-boiled egg. I give mealworms. They cope with these easily; the skins occasionally show up in the droppings but very soft and pulpy and completely squeezed out. Am also giving minced meat, flies, beetles, mealworm pupae and beetles. All four recognise me personally, and the syringe. Today separated A and B from C and D since the latter two frequently seemed to be squashed and browbeaten, especially D.

30th.

D has put on a lot of weight and his feathers have broken through at last.

1st July.

All four preen regularly, scratch their heads with their feet over the wing (which an older Magpie seems not to be able to do yet). Menu today is Beechnut, mixed vegetables with liver, mixed with minced meat, calcium, hard-boiled egg.

6th.

At today's weigh-in I noticed that A and B had greenish crowns and yellowish feet. C has a brownish sheen to its blue crown, while D is just regular blue. Both C and D had pink feet as babies. Food today Gerber powder ('5 cereals with Vitamins') mixed to a stiff paste with water, mixed with chopped hard-boiled egg and cream cheese.

Easy to tell the birds by size and head colour.

7th. a.m.

Brownhead (C) sitting fluffed up and miserable today. Most unsettling. No weight gain. D not looking too bright either.

p.m. A jumped out of the box this afternoon, yodelling quite a lot. Birds enjoy looking out of box, all around. All four preen quite well. Food same as yesterday funnily enough both Magpie and Crow hate it, and spit it out!).

9th.

Yodelling calls quite clear now, mainly from A and B. Only happens when hungry—i.e. 2 to 3 hours after a feeding. Lot of wing flapping. No doubt that in the wild by now these birds would be on the sticks outside the nest, at least A and B would be. A and B identical body size but A has tail 1 cm. longer. Both have greenish head and whitish lores and supercilium. C is definitely more brownish on the crown and the throat is more striated. I would have to group D with A and B. C is more retiring, and hides under the others if alarmed.

Compared with the adults (by then I had three) they are about half adult size. I estimate that their respective ages are probably around:

- A—25 days (weighing 6 ozs.)
 B—23 days (weighing $6\frac{1}{4}$ ozs.)
 C—21 days (weighing $5\frac{3}{4}$ ozs.)
 D—19 days (weighing $5\frac{1}{2}$ ozs.)

However, to look at them A, B, C now look identical in size, with D only a little bit smaller. So far no attempt by any bird to fly. Today's menu was Gerber plus egg, 'Dayamineral', minced meat, and a lump of cheese each. Droppings are perfectly normal and free from smell. I give a few drops of water two or three times each day now, this is appreciated and is taken eagerly.

10th.

Came down to find one bird missing. I had left them on the kitchen table. It had got out, flown to the sink and on seeing me howled for food.

15th.

The four young Rollers are now kept in a large all-wire flight cage on a table in the garden. A escaped today causing a great deal of trouble. He called all the time yodelling like a Green Woodpecker (the Spanish name for the species is *Carraca*, which also means rattle or clacker). I placed one of the adults in the cage with the three remaining youngsters in the hope that it might be stimulated to call, and this might strike a responsive chord in the breast of the prodigal. The adult ignored the three immatures, pecking irritably at them if they got in the way, and in any case was too big for the cage. While I was returning it to the birdroom the wanderer returned. A is a very capable flyer, with no sign of weakness or ineptitude.

Each of these four has its own individual character. A is adventurous, highly strung, and will fly off readily unless newly fed and content. B is placid and can't be bothered to fly even when all the conditions seem right, and he rarely bothers to call for food. C is a great yacker, equal to A but very nervous and always trying to escape from me, and generally seems unhappy in a cage. D is the smaller one. His plumage is slightly barred all over suggesting perhaps an irregular diet. He is very steady, dislikes gaping but swallows well. He yacks also, but in a high falsetto.

The legs of all four birds are now yellowish.

18th.

A escaped again, and I returned at breakneck speed across a sleepy summer-time Madrid to attempt rescue. It apparently flew off determinedly but was located at the top of a very tall pine tree in the next door garden. Flew to our (flat) roof top above the studio, across to weather cock on house opposite. Each time it obviously selected a perch that afforded a fine all-round view. I settled myself down upon the studio roof, three floors up) and called to it. It was rattling a great deal, and as hunger became more acute the calls obviously became louder and more frequent. The behaviour between this fledgling and the other birds being hand-reared at this time was most noticeable. The young Magpie and Carrion Crow (both free flying by now) would come instantly in response to my call. The distance made no difference, as long as they heard me. They would both happily follow me about, exploring what I appeared to be doing, and instantly begging if what I was up to appeared in any way to be associated with food.

The passive attention-calling behaviour of the Rollers was in marked contrast, and very frustrating for me. After an hour and a half—during which time I nearly cooked alive on the open roof (it was 100° F. in the shade)—I crouched hidden below the parapet and managed to call the Roller over. It landed on the wall and while still yacking for food was grabbed."

That completes the notes in my journal, apart from a calendar of weights which is as follows :

Weighing at 11 o'clock every evening (in ounces).

		Bird A	B	C	D
June	19	2	1		
	20	2½	1½		
	21	2½	2		
	22	2¾	2½		
	23	3¼	2¾		
	24	3½	3¼		
	25	3¾	3½	3	2½
	26	4¼	4	3½	2¾
	27	4½	4½	3¾	2¾
	28	4¼	4	3½	2¼
	29	4½	4½	3¾	2½
	30	4¾	4½	4	3
July	1	5	4¾	4½	3½
	2	5¼	5	4¾	3¾
	3	5½	4¾	4¾	4
	4	5½	5	5	4¼
	5	5¾	5½	5¾	5
	6	5¾	5¾	5¾	5¼
	7	6	6	5¾	5½
	8	5½	5½	5½	5
	9	6	6½	5¾	5½
	10	5½	5½	5½	5½
	11	5½	5½	5½	5½
	12	5½	5½	5½	5½
	13	5½	5½	5½	5½

At this point I gave up weighing them. However, for comparative purposes I weighed the three adult Rollers—and each weighed more or less 5 ozs., and they were strong, healthy birds.

Unfortunately I do not have details on the weaning off period. I remember placing a large bowl with grasshoppers, mealworms and beetles in the cage and these were eventually sampled. Soft food in the shape of small lumps of chicken meat, balls of minced meat and everything mixed with soft food was eventually taken. The birds passed into the hands of an ASPEBA member, but no news of them since.

A final note on feeding the adults. These birds were given a dozen or so mealworms each day, plus a dozen or so locusts or crickets (the size of your thumb, and they bite!) plus a few regular grasshoppers and anything else I could find that moved. They would take earthworms, and eventually meat balls in Sluis insectile food. On one occasion—for three days—I had no mealworms and the car was out of action; also no locusts (I drove 13 miles out into the country every morning at 5.30 in the morning, to spend 30 minutes frantically swatting still-cold insects). I had to hand-feed raw ox heart and chicken liver, plus minced meat balls (laced with everything). Two of these birds took this fare willingly, but one had to be force-fed.

CONCLUSIONS

I have already mentioned one of the differences between hand-

rearing Rollers and crows. Another difference well worth taking into account is the method of nest sanitation. A young crow will take food, then turn and offer its tail-end to its benefactor, neatly extruding a waste sac. The Roller has no such refinement. The nest is obviously kept clean by the nestlings reversing towards the light source (entrance hole) and when the wall of the nest touches the raised abdomen the excreta is ejected under high pressure. In the wild this would be very efficient. In a posh executive's office in an international advertising agency it is less suitable!

Rollers are fairly passive birds, not really suitable for cages or small aviaries. I have no doubt that an ideal aviary would be quite long with simple perching at either end and plenty of grassy tangle-growth in between. The function of this latter would be to shelter and encourage the grasshoppers, etc. that ought to be thrown in at regular intervals. This would encourage natural behaviour and enable the gorgeous colouring of the birds in flight to be seen to advantage.

"Meating-off" is not too difficult, but I suspect that natural food-seeking behaviour may be linked to breeding behaviour and maturing of sex glands.

CANARY ISLANDS INTERLUDE

During my time in Spain, I managed to get two week-long business trips to the Canary Islands. Whilst this might at first sound marvellous, I have to relate that my foot never touched a beach! However, the opportunities of touring around with a salesman on several occasions meant that I was able to visit the markets, find all the pet shops and more. On both Tenerife and Gran Canaria I managed to find a salesman who was also a bird fancier.

If the reader is intent on taking a holiday on either of these islands, he should know beforehand that the pet shops only sell domesticated species (mostly the Spanish breeds of Canary) and imported birds, mostly from Africa. However, they do buy South American birds that are often smuggled in by sailors. The most sought after and the most expensive are the *Cardenal* or *Cardenalito*—or Hooded Red Siskin as we would call it (*Carduelis cucullatus*). In the markets, however, the scene is quite different. The most popular cage bird is the Goldfinch and several dealers make a good living by selling them. Do not be misled into thinking that these may be the Canary Islands race; oh! that they were. No, they are definitely imported from the Spanish peninsula.

I tried very hard to find the local race. Eventually, in the homes of two fanciers, I found in each a single old male. The local subspecies is larger (though not as large as the Siberian race) and noticeably darker. The Spanish "race" incidentally is marginally smaller and brighter than the British bird. The Goldfinch in the Canaries has been so popular for so long that it has been trapped almost into extinction.

Another species that has all but disappeared on the islands, thanks to the trapping, is the Linnet. It is not imported from the peninsula and has achieved a status locally of almost legendary proportions. I was told breathlessly of one man who still had one (I did not recognize it by name, and the word description led me to expect a seed-eating Redbreast-Nightingale), which turned out to be the oldest, saddest, long-toenailed finch I had ever seen.

A bird that the observant visitor cannot fail to come across is *Rhodopechys (Bucanetes) githaginea*, the Trumpeter Bullfinch. Single males are kept in cages hanging in the doorways of shops and, for some reason, seem to be a favourite of greengrocers. These birds are usually cage-moulted and have lost the lovely soft pinky-grey plumage and reddish flush of the wild bird; instead they are an even dull, dark warm grey. The heavy vermilion bill, however, remains unchanged. These birds are invariably fascinating characters and will respond to a finger poked through the wire by fluffing out, lowering wings and charging, butting the offending digit fiercely.

Enquiries for the *Camachuelo Trompetero* (the name in Spanish books) will draw blank looks. Each island has its own set of names. The commonest is *Moro* which could mean either "Moor" (being a bird of the desert like the Moors) or "large bill". During my travels, I was taken to the home of a wily old fancier who had a couple of males that he was keeping in order to cross them with Canary females. The fanciers there rank the value of wild finches strictly according to their ability to produce Canary hybrids. These two birds were cage-moulted and were the dull grey of the birds that I'd already seen in the greengrocers' shops. I was able to buy them at a fair price and must admit to having felt rather elated. My friend, Herbert Murray, once told me that he had always had a longing to try the species and I promised to look out for it for him. Some two years later, Herbert admitted that they were nothing like the image that he had cherished.

A few days later I visited the market at the airport end of Las Palmas where we met a Goldfinch seller called Senor Delgado who admitted to having some *Moros* at home. Apparently it is forbidden to offer wild birds for sale during the breeding season, which is why he had not brought them with him. That afternoon, we drove out some 42 kilometres to a finca in the middle of a banana plantation. Here, Sr. Delgado's father lived alone, looking after a collection of, he claimed, some 3,000 birds.

It was easily the most astonishing collection of birds that I have ever seen. There were hardly any regular flights as we would recognise them, but every courtyard, patio, terrace, veranda and alleyway had been covered with wire mesh and partitioned off. There were birds of many kinds from every continent and often in rather bizarre mixtures—Gannet, Golden Pheasant and Black Kite for instance. I was led

through a labyrinth of on-joining aviaries, some having flights over others, until we came to one containing local finches. In it were the pair of Spanish Sparrows (see A.M. vol. 80, p. 4) which I have already written about, together with a beautiful pair of Trumpeter Bullfinches.

These two birds bore no resemblance to the others; they were perhaps marginally smaller and a lovely clean, richly washed fawn. The male was quite reddish. The bills were more vermilion than scarlet. I managed to get these four birds back to England where, not surprisingly, the two paler birds were taken for hens and divided. One each to go with one each of the grey males. The female went off to Dr. Harrison who managed to breed them in a cage and the two odd males to Mr. Murray. Colin Harrison bred a young male, whereupon the female died, so, if any reader knows the whereabouts of a female Trumpeter, please let either of these gentlemen know.

For the interested reader, I can say that the two older birds were very like the Heinzel plate in the Collins' Guide, while the lighter pair were like Barruel's illustration in Etchecopar and Hue's BIRDS OF NORTH AFRICA.

I found all four very easy to maintain in singing condition in a 7 ft. indoor flight cage. There was no fighting between the three males over the one female, neither was there any squabbling with their companions (Wild Canaries, Serins, Short-toed Larks). They seemed to be content with a commercial canary mixture and millet seeds: in the islands, they seem to be fed simply on millet.

In the same aviary as the sparrows and bullfinches were a pair of Teydea Chaffinches. These are the most beautiful birds and guaranteed to set any finch specialist afire with enthusiasm. Sr. Delgado would not part with them; he had trapped them especially to breed with, he said. He offered to let me have them later in the year or he would get some more for me.

It is not easy to find the Wild Canary in the Islands. All the pet shops will attempt to sell a green marked domestic canary as the real thing. However, one can nearly always buy one or two in the open market. The sum total of my two visits, combing the markets and tempting fanciers to spare the odd bird, was five pairs. Included among these was an old male in paranoic full song, who had successfully paired to a female Belgian Fancy of all varieties, and an adult female that had been reared by a domestic female—a clutch having been taken from the wild. On one of my flying trips to London in August 1973, I was able to take four pairs over for ASPEBA study, keeping one pair for myself. Accidentally, I chose the wrong male, leaving myself with a very well coloured, but too young bird to pair with the old female. Frank Meaden kept a pair for himself and the other three pairs were distributed, so come on you ASPEBA members, let's hear how things went! (ASPEBA is, of course, the Association for

the Study and Propagation of European Birds in Aviaries, founded in 1965.—*Ed.*)

The Canary Islanders are very much against taking Wild Canaries during the breeding season. They maintain that they are more sensitive and delicate and, unless the pair is taken, a single bird will die of sadness. Whatever the reason may be I am sure that there is something in this, for it is true of Serins.

The old female that I kept built a fine nest and laid three clutches, sitting on each until about the 16th day before becoming restless and unhappy. They naturally breed in January to March in the Islands, according to the locals (I have not confirmed this with Bannerman), so if my male was a bird of the year, it was unlikely to be more than six months old. It sang little and feebly.

Among the interesting birds in Sr. Delgado's collection was a Canary Island Corn Bunting. This bird was the size of a saltator; it was enormous and browner than our British bird: apparently it is extremely rare there. He also had a lot of Lesser Short-toed Larks. Unfortunately, these lovely little birds, which become inordinately tame very quickly, had been kept in a long flight with seed-eaters and had no soft food at all. They also had their feet balled with collected mud and droppings from the concrete floor of their enclosure. It was not easy to tell an old man, who was successfully keeping an incredible amount of birds alive, that he was doing something wrong. He just laughed at me and told me not to worry.

* * *

NOTES FROM CLÈRES AND FROM BRAZIL

By J. DELACOUR (Clères, Seine Maritime, France)

The weather was again very unusual in western Europe during 1974. After a very mild winter and a warm, sunny early spring, it turned cold and dry early in April and this disagreeable period lasted well into June. It was at last replaced by rains and warmer weather at the end of that month. July and August were mild and not too dry, but a chilly rain started in mid-September and continued till the end of the autumn. It made it all very difficult with tropical birds. It was, however, good to witness the end of a four years' drought and to see once more springs flow normally, for it put a term to our anxiety over the wintering of our flamingoes. Never since 1920 have we had to take them in during the winters, not even the coldest ones. They are really indifferent to cold, but they cannot stand ice, as they must have access to open water. So far we always had a sufficient flow to keep the river and most of the lake partly unfrozen, but a combination of a drought and of cold weather could have been fatal. The return of normal moist conditions has greatly relieved us of our worries.

The exceptional chilliness of the spring resulted in very poor breeding results with many tropical species. Usually reliable breeders such as touracous, various ground pigeons, Fairy Bluebirds and Superb Spreos failed to rear their broods. Splendid Glossy Starlings, however, raised two young, the first born in captivity to our knowledge. There were also four Kookaburras and five Orange-headed Thrushes.

Pheasants and waterfowl were only moderately successful. A pair of Bare-faced Curassows produced three chicks in two broods, first two females, then a male. Sexes can be recognised very early, as the females immediately grow heavily barred feathers.

We had no Rheas, most of the eggs being infertile, but we raised 28 Emus from two pairs.

We did fairly well with cranes. One pair of Sarus gave us four young in three clutches of two, one and two eggs. Two pairs of Dark *pavonina* Crowned Cranes laid three eggs each, their normal clutch, and four young were reared as well as one Demoiselle. So far only one pair of Dark Crowned Cranes had nested each year in July. The last two years these birds had driven away from their territory (about six acres of a meadow south of the lake) the other two pairs of Dark and three pairs of Grey Crowned Cranes *regulorum* living with them in the park, as soon as they began to breed. Another pair of *pavonina* laid this year, for the first time, before them: they made their nest along the garden fence, in short grass, but they never bothered other cranes. Soon the old pair started nesting as usual in large clumps of water irises, about nine hundred feet to the west, and they in turn did not drive others away as they had done the two previous years. It all went on very peacefully. One has difficulties in understanding and interpreting certain birds' behaviour as it changes from year to year. All our young cranes are hatched in an incubator and hand-reared, each separately until fully developed, as they will fight savagely until some six months old.

I was in Rio de Janeiro, Brazil, from 12th November till 3rd December, 1974, enjoying the hospitality of my old friend Dr. E. P. Béraut as well as his beautiful tropical birds and plants. His collection of rare insectivorous, frugivorous and nectar-feeding birds continues to be excellent. He keeps large numbers of them, but not to the point of overcrowding his numerous, well planted aviaries. There are some rare parrots, and waders roam his garden; also herons, ibises, trumpeters, cranes and flamingoes. Mr. C. Cordier had recently brought him species from Bolivia, particularly three Blue-eyed Cocks of the Rock *Rupicola peruviana saturata* and several Sappho Hummingbirds *Sappho sparganura*, resplendent with their long, metallic scarlet, forked tails. Many species of manakins, some trogons and jacamars are particularly attractive and there are also Old World birds such as sunbirds,

kingfishers and birds of paradise. I particularly noticed two unusual Brazilian cuckoos of great interest: a tame, hand-reared Squirrel Cuckoo *Piaya cayana* and a large, beautiful Ground Cuckoo *Neomorphus geoffroyi* from the state of Bahia, a very scarce bird of the vanishing primeval forests. It was interesting to realise how close they are in shape, ways and behaviour to the Indo-Malayan cuckoos of the genus *Phoenicophaeus*.

It was, as always, a treat to inspect the collection of Mr. Mario Ventura. His numerous tanagers, sugarbirds, manakins, hummingbirds and other local difficult species are in perfect condition and seem to live for ever in their rather small, but very well sheltered and cosy aviaries. He also keeps in cages certain seed-eaters for their song or their abnormal plumage.

We saw two fine collections of pheasants in the vicinity of Rio, belonging to Mr. Arthur Ribeiro and to Mr. Antonio Bretta. The tropical species do well in the warm Brazilian climate. It is regrettable that so few of the South American game birds, curassows and guans, are kept in their own countries.

There are some excellent private collections of parrots and parrakeets at São Paulo, where many South American as well as other species are reared. We saw remarkable lutino conures *Aratinga acuticauda* and *A. auricapilla*, which have retained the pink wash that underlies the bluish parts of the normal green plumage. There is also a beautiful hybrid Hyacinthine x Green-winged Macaw, with well defined, handsome dark blue, green and deep scarlet markings. Any ornithologist, had he found such a bird in the wild state, would have not hesitated to describe it as a new species!

The São Paulo Zoo continues to develop and both accommodation and collection have still improved a great deal since my last visit four years ago; they are altogether spectacular and interesting.

A visit to Iguazu Falls, as a guest of Dr. Autuori, the Zoo director, proved once more highly enjoyable. The largest and finest waterfalls in the world, they remain utterly unspoilt, as they are situated in the middle of large national parks, both in Brazil and in Argentina. Birds are numerous in the neighbourhood and it was all the more delightful that an excellent hotel has been built since my visit there 16 years ago.

THE TROPICAL BIRD GARDENS, 1974

By D. H. S. RISDON (Rode, Somerset)

1974 has been a mixed year as far as breeding results are concerned. This is due not so much to the weather as to the fact that we are concentrating on rearing the more valuable and therefore the less commonly bred.

Much as we would like to breed every species of bird on the place, it is just not possible without increasing the staff and then the whole thing becomes economically out of the question.

It is a pity, but that is the situation today. In spite of this we do rear a limited number of the commoner pheasants and waterfowl, largely to keep up the numbers of those at liberty.

Parrots now outnumber other groups at Rode, both in individuals and species, and our stock of macaws now includes six breeding pairs and about a dozen non-breeders, mainly immature home-bred birds. Practically all these are liberty day fliers trained to return to their respective aviaries at night. The adult pairs cannot always all be let out together, especially when breeding, and the keepers have to use their discretion as to who flies with who. Once they have settled down for the season and established their flight lines, most of them get on quite well.

The immatures are the best show as they fly in groups and don't quarrel so much; the old pairs tend to stick together and fly less frequently.

This year we have reared eleven young macaws which I should think must be a record numerically, at any rate for this country. These consist of six Blue and Yellow from two pairs and five Scarlet from two pairs. Another pair of Blue and Yellow and one pair of Green-winged only produced infertile eggs.

Our old original breeding pair of Blue and Yellow had three, making their grand total 23 in nine years.

Greater Patagonian Conures reared only one young one which was attacked by the others the moment it left the nest, and had to be removed. My wife took it over and under her care it has become an affectionate if noisy pet. It takes daily flights round the garden and returns to her wrist when called, as well behaved as a trained falcon. Incidentally, these birds have a remarkably hawk-shaped silhouette when in flight.

Patagonian Conures are such friendly and intelligent characters that I had long cherished the notion of letting our colony of nine fly at day liberty. Accordingly a special trap section was designed in part of their aviary so that one bird at a time could be released and could return without letting the others out. I was thankful that we took this

precaution, for the first one out made two circuits round the tree tops, disappeared and was located two days later 60 miles away! So much for that dream! Colony breeding with these birds is not a success. They seem to agree well enough but only one or two pairs actually lay and the young are attacked by the others as soon as they leave the nest. The original pair—the parents of the colony—reared three or four young each year when kept on their own.

Leadbeater's Cockatoos have been disappointing; the old pair reared one young one—a poor effort after their earlier years when they used to raise three at a time. A home-bred hen mated to an unrelated cock laid an egg from the perch for the first time this year and she must be five or six years old.

Roseate Cockatoos have done nothing since the old breeding hen died several years ago. We kept a number of her progeny but after years of trying to get them to breed I have reluctantly come to the conclusion that they are all cocks, even though the eyes of some of them are a shade browner than those of others.

Citron-crested, and Umbrella Cockatoos laid but failed to rear. At last I think we have managed to obtain a hen Moluccan; at any rate she has a small head and dark brown eyes, but she is very shy and wild and will, I fear, take some time to settle down.

We have managed to acquire from different sources two specimens of the Spectacled Amazon Parrot. I had hoped that they might be a pair but as they took little notice of each other to begin with I had my doubts; however, they have more recently been seen preening each other so I may well be wrong.

1974 has been the year of the long-legged birds; we have reared three Sarus Cranes, a Demoiselle Crane, a White Stork, a Little Egret and two Sacred Ibises. The cranes were all reared under bantams and there seems little doubt that this is the best way to do it.

The parent birds incubate the eggs well enough but from then on are hopeless. They refuse to feed their chicks artificial food and consequently in their ceaseless search for insects they walk them about too much and don't seem to have the sense to protect them when it rains.

Last year the Sarus hatched two young but lost them in this way when they were about ten days old. This year they again hatched both eggs and all went well for a few days when one chick was seen to be failing, so it was taken away and put under a brooder lamp with a broody bantam for company. It soon recovered and from then on never looked back whereas the chick which we left with the parent cranes died a few days later after a heavy shower of rain.

Within a few weeks the old birds had laid again and this time we let them sit out their time and transferred the eggs to a bantam when they were on the point of hatching. The result was one chick successfully hatched and reared.

Surprisingly the old birds laid yet a third time and again using the same technique we have reared a fine youngster, so we have ended up with more than we should have had even if the parent Sarus had reared their first two chicks.

One of our pairs of Demoiselle Cranes laid their two eggs on the bare ground under a large chestnut tree without even an apology for a nest. Since it was in a spot where people walk about, we wired off the whole area and the birds settled down to incubate steadily. We adopted the same procedure as with the Sarus; one chick hatched and has been reared without trouble.

It was interesting to note that after the first few days the little cranes slept by the side of their foster mothers rather than under them. The heat of the brooder lamp seemed to be sufficient and the bantam provided company more than anything else.

There was no trouble in getting the chicks to take artificial food; it was offered from the fingers initially and they soon cottoned on and learned to pick it from the ground. Maggots and earthworms were used at first to attract their attention and after a while they picked up the worms themselves as the soil was turned with a spade. From then on they were no trouble; they grow at a fantastic rate, seeming to put on inches daily, and we have ended the season with some really beautiful steady young birds as big as their parents.

Our Crowned Cranes raised our hopes by mating and going through the motions of nest-building but that was as far as they got.

The White Storks actually hatched three chicks, as I reported earlier, but two disappeared after a week or so. The remaining one is a fine young bird and its beak and legs are now (October) slowly turning from black to red.

There were five storks in the enclosure and all had always got on well. In fact another pair nested close by the breeding pair although they never actually laid and there was never any trouble until the young one was ready to leave the nest, when the parents turned on the others. Before it was realised what was happening they drove one of them so that it became wedged between two fences where it must have died of shock; the other two were rescued in time.

Sacred Ibises reared two; Scarlet Ibises were disappointing, for they had several nests and young were heard calling but none were reared.

Four Grey Peacock Pheasants were reared and some Swinhoe's Pheasants. Malayan Argus Pheasants raised our hopes when the hen laid one egg in April, but that was all she did; the egg was infertile.

Among the waterfowl, Emperor, Lesser Whitefront, Barnacle and Bar-headed Geese were reared, as well as Mandarin, Carolina, Red-crested Pochard, Pintails and Australian Wood Duck (Maned Geese).

An interesting pair of new arrivals this year have been the African Ground Hornbills. At a distance these large black birds remind one of

caricatures of crows with overgrown beaks and we are treating them as paddock birds rather than enclosing them in an aviary. The larger area of ground space enables them to show off their paces as they have an amazing turn of speed; even so they spend quite a part of the day perching above ground preening themselves and they always use their shelter at night. At first they were kept in a paddock which has a stream running through it and contains waterfowl, but they were suspected of killing half-grown ducks, so now they share a paddock with Secretary Birds and storks.

* * *

NEWS FROM THE BERLIN ZOO

(July—December 1974)

By HEINZ-GEORG KLOS (Scientific Director)

Birds bred :

16 Rheas *Rhea americana*, 4 Southern Red-billed Whistling Ducks *Dendrocygna autumnalis discolor*, 9 Fulvous Whistling Ducks *Dendrocygna bicolor*, 4 Black Swans *Cygnus atratus*, 4 Black-necked Swans *Cygnus melanocoryphus*, 5 Pacific Brent Geese *Branta bernicla orientalis*, 4 Black-backed Radjah Shelducks *Tadorna r. radjah*, 5 Ruddy Shelducks *Tadorna ferruginea*, 2 Laysan Teal *Anas platyrhynchos laysanensis*, 7 Tufted Ducks *Aythya fuligula*, 1 Lesser Scaup *Aythya affinis*, 2 European Flamingos *Phoenicopterus ruber roseus*, 6 Chilean Flamingos *Phoenicopterus ruber chilensis*, 4 Silver Pheasants *Gennaeus n. nycthemerus*, 7 Chukar Partridges *Alectoris graeca chukar*, 8 Ocellated Turkeys *Agriocharis ocellata*, 3 Oystercatchers *Haematopus ostralegus*, 3 Crested Quail Doves *Geotrygon versicolor*, 2 Olive Pigeons *Columba arquatrix*, 4 Peach-faced Lovebirds *Agapornis roseicollis*, 4 Fischer's Lovebirds *Agapornis fischeri*, 2 Grey-breasted Parrakeets *Myiopsitta monachus* and 3 Laughing Kingfishers *Dacelo novaeguineae (gigas)*.

New arrivals :

1 Crested Serpent Eagle *Spilornis cheela*, 1 Kestrel *Falco t. tinnunculus*, 2 Swan Geese *Anser cygnoides*, 1 Ruddy Shelduck *Tadorna ferruginea*, 1 Indian Whistling Duck *Dendrocygna javanica*, 4 Teal *Anas c. crecca*, 2 European Wigeon *Anas penelope*, 2 Common Eider *Somateria m. mollissima*, 3 Red-crested Pochard *Netta rufina*, 1 Common Pochard *Aythya ferina*, 11 Mandarin Ducks *Aix galericulata*, 10 North American Wood Ducks *Aix sponsa*, 2 Red-crested Wood Partridges *Rollulus roulroul*, 6 Californian Quail *Lophortyx c. californica*, 3 Tawny Owls *Strix a. aluco*, 2 Blackheaded Conures *Nandayus nenday*, 2 White-crested Laughing Thrushes *Garrulax leucolophus*, 1 Orange-headed Ground Thrush *Geocichla citrina*, 4 Blue Sugar Birds *Cyanerpes cyaneus*, 2 Red-crested Cardinals *Paroaria cucullata*, 2 Three-coloured Tanagers *Tangara seledon*, 2

Paradise Tanagers *Tangara chilensis*, 2 Blue and Black Tanagers *Tanagraella cyanomelana*, 3 Siskins *Carduelis spinus*, 4 Goldfinches *Carduelis carduelis*, 4 Rose-breasted Grosbeaks *Pheucticus ludovicianus*, 2 Red-whiskered Bulbuls *Pycnonotus jocosus*, 1 Golden-fronted Chloropsis *Chloropsis aurifrons*, 2 Red-headed Marshbirds *Amblyramphus holosericeus*, 1 Paradise Whydah *Steganura paradisaea*, 1 Napoleon Weaver *Euplectes afra*, 2 Gouldian Finches *Chloebia gouldiae*, 1 Red-cheeked Cordon Bleu *Uraeginthus bengalus*, 1 Blue-headed Waxbill *Uraeginthus cyanocephalus*, 2 Bank Mynahs *Acridotheres ginginianus*, 1 Crested Mynah *Acridotheres cristatellus*, 2 Common Mynahs *Acridotheres tristis*, 1 Grey-headed Mynah *Temenuchus malabaricus*, 2 Black-headed Mynahs *Temenuchus pagodarum*, 2 Andaman Starlings *Temenuchus andamanensis*, 2 Cambodian Starlings *Temenuchus cambodianus*, 6 Rosy Pastors *Pastor roseus*, 1 Mandarin Mynah *Sturnia sinensis*, 1 Purple Glossy Starling *Lamprolornis purpureus*, 1 Lesser Hill Mynah *Gracula religiosa*, 2 Pileated Jays *Cyanocorax chrysops*, 1 Jay *Garrulus glandarius*.

BREEDING OF THE LAUGHING KINGFISHER

In 1972, the Berlin Zoo obtained two Laughing Kingfishers *Dacelo novaeguineae (gigas)* and these were put with a single bird already in the collection, all three being put into an outdoor cage at the bird house. This cage measures 4.70 m. long, 3.00 m. wide and 2.70 m. high and faces south. The ground area is mostly of grass with a small pool and there is a single perch and a stout branched tree. There are two tree stumps in the aviary, one hollow. The birds are fed on a soft food (also given to pheasants) minced horseflesh, once weekly minced beef, heart cut into small pieces, mice, naked baby rats, sparrows cut into pieces, small fish, mealworms and sometimes a vitamin compound and Vita-Kalk.

In 1974 the kingfishers began to breed and chose the hollow tree for a nesting place. In June three white eggs were laid, but these were infertile. They weighed 20, 24 and 25 g. and were 4.5 x 3.6 cm. in size.

In July another clutch of three was laid and after an incubation period of 27 days there hatched on the 22nd, 23rd and 25th of August three grey-coloured chicks that were well cared for by the mother. Sparrows cut into small pieces were a favourite food at this time. Chopped mice were also provided and minced beef three times weekly. All the young thrived and on September 23rd the first of them left the nest.

REGISTER OF BIRDS BRED IN BRITAIN DURING 1974

Compiled by PETER BROWN

The breeding records for 1974 have been gathered and make a total of 360 species. Thanks are recorded for all those who sent me their breeding results and especially those who made the effort to send the results of their acquaintances and friends.

The success of this depends naturally on the support of bird breeders, and the more complete are the breeding results, the more useful is the information in this register. We are particularly low on breeding of British birds, for I know that a good many species are successfully bred each year. Perhaps next year those who were successful with British birds will be more forthcoming.

Whilst there are one or two known successful breeders who have not submitted results, the majority of those who took part last year have done so, plus several more, giving us a good many more species in the list than last year.

To highlight some of the more interesting results, it is particularly good to see three forms of flamingo being bred. Twelve Trumpeter Swans by the Wildfowl Trust is an excellent result. Red-breasted Geese seem to have had a good year with several people breeding more than ten, and geese generally have done well, the breeding of 59 Hawaiian Geese at Slimbridge being particularly outstanding.

With ducks, the list is long and full. It was nice to see that we have breeding records of ten Radjah Shelduck, several Baikal Teal, Goldeneye, Bufflehead, Merganser and Smew. Perhaps the pick of the waterfowl this year is the breeding of a Maccoa Duck by the Wildfowl Trust.

Diurnal birds of prey with the exception of Kestrels are all worthy of note. Ferruginous Rough-legged Buzzard, Merlin and Lanner are all outstanding breedings by the Falconry Centre as is the breeding of twelve Cabot's Tragopans and twenty-nine Koklas Pheasants by the Pheasant Trust. It is a pity that this latter bird which is bred regularly at the Trust does not seem to be successfully propagated elsewhere. The breeding of an Imperial Pheasant by London Zoo is notable for surely this must be the only pair in Britain. It was nice to see that the White Eared Pheasant has now been bred somewhere other than Jersey.

Of the several cranes, the Stanley breeding is particularly noteworthy and it is good to see that Chester Zoo are still regularly breeding the Weka Rail. In the pigeons, perhaps most outstanding are the Nicobar Pigeon and of course the Victoria Crowned Pigeons bred at Bristol Zoo.

The list of parrot-like birds is almost as long as the waterfowl, indicating their great success as subjects for aviculture. A good many

lories and lorikeets were bred with the Dusky Lory of Birdland and the Iris Lorikeet by R. Kyme being particularly outstanding. I have not heard of Deplanche's Lorikeet having been bred before. Cockatoos did not do particularly well for we only have records of four species being successfully bred. To my mind one of the great successes was the rearing of five Scarlet and six Blue and Yellow Macaws by Rode.

Another interesting breeding in this family is the rare Cloncurry Parrakeet bred by the late Lady Baillie and by P. Paris who also bred the Timor Crimson-wing.

Jersey Zoo's breeding of the Pink-crested Touraco is very notable and once again, as last year, many species of owl were bred; strangely enough, the only one missing from last year's list is the Tawny Owl. Of those bred perhaps the most unusual are the three Collared Scops Owls bred by H. Smith.

We now come on to the majority of the so-called "softbills". It is difficult to single any out for special mention for I consider all softbills are difficult and any bred are a credit to the breeder. The Jackson's Hornbill bred by London Zoo could well be a first breeding. Derrick England has been particularly successful with his barbets this year, a splendid example of the rewards of specialisation.

Birdworld's breeding of three Shamas is worthy of note; likewise the four Indian Robins by R. E. Owen and the motmots by both Birdland and Winged World.

Whilst we have very few records for British "hardbills", the foreign, particularly Australian grassfinches and waxbills from Africa are well represented. Several canaries and siskins bred by P. Paris are of particular note. Chester Zoo are to be congratulated on having bred two species of whydah, both difficult to breed, being brood parasitic.

A good many species of starling were successfully reared, it is nice to see that Amethyst Starlings, always a difficult species were reared by two people. Spreo Starlings have done well as has the Rothchild's Mynah and another of the year's highlights as far as I am concerned is the breeding of no less than eighteen of this endangered species by Jersey Zoo.

This is, then, a very brief summary of the breeding results I have received for 1974, as yet far from complete, but more full than last year.

If we can keep this annual register going and build on it year by year with breeders being proud to send me their results rather than being badgered for them, I hope in some small way it will encourage aviculturists to redouble their efforts to at least attempt to breed from every pair of birds in their possession; surely this is their duty.

I am anxiously seeking co-workers to help me accumulate as many breeding records for 1975 onwards. If anyone would like to help, I would be most grateful.

- Ostrich**
Struthio camelus. Chester 2.
- Rhea**
Rhea americana. Kilverstone 2, Marwell 7, Whipsnade 5.
- King Penguin**
Aptenodytes patagonica. Whipsnade 1.
- Gentoo Penguin**
Pygoscelis papua. Edinburgh.
- Rockhopper Penguin**
Eudyptes crestatus. Birdland.
- Humboldt's Penguin**
Spheniscus humboldti. Birdland, Harewood 3, Whipsnade 1.
- Black-footed Penguin**
Spheniscus demersus. Birdland, Paignton 6.
- Little Egret**
Egretta garzetta. Rode 1.
- Night Heron**
Nycticorax nycticorax. Flamingo Park 1.
- White Stork**
Ciconia ciconia. Rode 1.
- Sacred Ibis**
Threskiornis aethiopica. Chester 1, Cotswold W-P. 2, London Zoo 2, Rode 2.
- Chilean Flamingo**
Phoenicopterus ruber chilensis. Slimbridge 17.
- Rosy Flamingo**
Phoenicopterus r. ruber. Whipsnade 4.
- Greater Flamingo**
Phoenicopterus r. roseus. Slimbridge 2.
- Fulvous Whistling Duck**
Dendrocygna bicolor. W. Bolton 4, G. C. Dean 30, D. Denett 10, G. Holmes 21, P. G. Schofield 3, K. Bromley 20, T. Simpson 6.
- Cuban Whistling Duck**
Dendrocygna arborea. J. O. Death 8, Miss Locker Lampson 13, Slimbridge 18.
- White faced Whistling Duck**
Dendrocygna viduata. K. Bromley 6.
- Northern Red-billed Whistling Duck**
Dendrocygna autumnalis. B. Boning 2.
- Spotted Whistling Duck**
Dendrocygna guttata. Slimbridge 2.
- Black Swan**
Cygnus atratus. W. Bolton, 2 B. Boning 4, Bristol 3, Flamingo Park 3, F. Mosford 2, Whipsnade 1.
- Mute Swan**
Cygnus olor. Chester 2, Flamingo Park 2.
- Whooper Swan**
Cygnus c. cygnus. Flamingo Gardens 3.
- Trumpeter Swan**
Cygnus c. buccinator. Peakirk 6, Slimbridge 6.
- Bewick's Swan**
Cygnus colombianus bewickii. Bentley 1, Flamingo Gardens 1, Slimbridge 2.
- Swan Goose**
Anser cygnoides. B. Boning 11, F. Mosford 2, K. Bromley 3.
- Greylag Goose**
Anser a. anser. Flamingo Gardens 8, Flamingo Park 5, Riber Castle 6.
- White-fronted Goose**
Anser albifrons. W. Bolton 4, F. Mosford 3, K. Bromley 3.
- Greenland White-fronted Goose**
Anser albifrons flavirostris. B. Boning 12.
- Lesser White-front Goose**
Anser erythropus. B. Boning 11, G. Holmes 9, F. Mosford 1, Norfolk W.P. 1, Rode 4.
- Western Bean Goose**
Anser f. fabalis. Norfolk W.P. 9.
- Tundra Bean Goose**
Anser fabalis serrirostris. Norfolk W.P. 2.
- Pink-footed Goose**
Anser fabalis brachyrhynchus. B. Boning 5, F. Mosford 4, Norfolk W.P. 1.
- Lesser Snow Goose**
Anser c. coerulescens. B. Boning 12, Chester 1, Flamingo Gardens 33, I. Grahame 2, Harewood 4, F. Mosford 4, Whipsnade 6, P. G. Schofield 1, T. Simpson 2, K. Bromley 5.
- Greater Snow Goose**
Anser coerulescens atlanticus. B. Boning 3, London 1, Riber Castle 1.
- Ross's Snow Goose**
Anser rossii. B. Boning 9, J. Hay 4, Stagsden 2, T. Simpson 4.
- Emperor Goose**
Anser canagicus. W. Bolton 8, B. Boning 17, I. Grahame 1, Harewood 1, Flamingo Gardens 3, Rode 4, Whipsnade 4, K. Bromley 3, Jersey 1, T. Simpson 13.
- Bar-headed Goose**
Anser indicus. W. Bolton 4, B. Boning 5, Chester 2, Flamingo Gardens 5, I. Grahame 5, Harewood 3, F. Mosford 6, Rode 2, Whipsnade 4, T. Simpson 2.
- Hawaiian Goose**
Branta sandvicensis. J. O. Death 3, Slimbridge 59, K. Bromley 4.
- Moffitt's Canada Goose**
Branta canadensis moffitti. Flamingo Gardens 1.
- Giant Canada Goose**
B. c. maxima. Flamingo Gardens 8.
- Lesser Canada Goose**
B. c. parvipes. Flamingo Gardens 1.
- Taverner's Canada Goose**
B. c. taverneri. Flamingo Gardens 1.
- Dusky Canada Goose**
B. c. occidentalis. Flamingo Gardens 4.
- Richardson's Canada Goose**
B. c. hutchinsii. Flamingo Gardens 5.
- Cackling Canada Goose**
B. c. minima. W. Bolton 2, B. Boning 6, Flamingo Gardens 22, G. Holmes 3, T. Simpson 13.
- Barnacle Goose**
Branta leucopsis. Birdworld 5, W. Bolton 20, B. Boning 21, I. Grahame 21, Harewood 3, Kilverstone 1, London 1, Norfolk W.P. 6, Rode 4, T. Simpson 7.
- Red-breasted Goose**
Branta ruficollis. Bentley, Lt. Col. & Mrs. G. J. Dean 2, Flamingo Gardens 12, I. Grahame 2, J. Hay 11, Mrs. J. C. Laidlay 13, Norfolk W.P. 7, J. Prentice 2, T. Simpson 8, Slimbridge 9, Stagsden 4, Whipsnade 9.
- Pacific Brent Goose**
Branta b. orientalis. B. Boning 23, Flamingo Gardens 10, K. Bromley 2.
- Cereopsis Goose**
Cereopsis novaehollandiae. Bristol 1, Harewood 3, Stagsden 3, Whipsnade 2, Jersey 10, K. Bromley 1.
- Andean Goose**
Chloephaga melanoptera. Peakirk 13, K. Bromley 2.
- Ashy-Headed Goose**
Chloephaga poliocephala. Coombe Abbey, Flamingo Gardens 1, K. Bromley 1.
- Lesser Magellan Goose**
Chloephaga picta picta. Coombe Abbey, I. Grahame 4.
- Greater Magellan Goose**
Chloephaga picta leucoptera. K. Bromley 10.
- Ruddy-headed Goose**
Chloephaga rubidiceps. K. Bromley 1.
- Abyssinian Blue-winged Goose**
Cyanochen cyanopterus. K. Bromley 1.
- Australian Shelduck**
Tadorna tadornoides. I. Grahame 1.
- Paradise or N.Z. Shelduck**
Tadorna variegata. I. Grahame 1, G. Holmes 4, T. Simpson 4.
- Radjah Shelduck**
Tadorna radjah. Miss Locker Lampson 2, K. Bromley 8.
- South African Shelduck**
Tadorna cana. I. Grahame 12, K. Bromley 10, Jersey 3.
- Ruddy Shelduck**
Tadorna ferruginea. W. Bolton 2, H. Smith 6, K. Bromley 11.

Common Shelduck

Tadorna tadorna. W. Bolton 10, B. Boning 17, Riber Castle 6, I. Grahame 2, Rode 2, N. Steel 4, T. Simpson 9.

Crested Duck

Lophonetta specularioides. K. Bromley 3.

Marbled Teal

Anas angustirostris. G. Holmes 2, K. Bromley 10, T. Simpson 8.

Hawaiian Duck

Anas platyrhynchos wyvilliana. Slimbridge 23, K. Bromley 3, Jersey 2.

Laysan Teal

Anas platyrhynchos laysanensis. Birdworld 3, W. Bolton 38, B. Boning 11, G. C. Dean 12, I. Grahame 1, G. Holmes 7, Kilyerstone 1, P.G. Schofield 10, Slimbridge 24, K. Bromley 19, Jersey 12, T. Simpson 8.

Mexican Duck

Anas platyrhynchos diazi. Slimbridge 4.

Philippine Duck

Anas luzonica. K. Bromley 3.

Chestnut-breasted Teal

Anas castanea. W. Bolton 5, G. Holmes 11, K. Bromley 18.

Chilean Teal

Anas flavirostris. K. Bromley 5.

Common Teal

Anas c. crecca. T. Simpson 14.

Green-winged Teal

Anas crecca carolinensis. W. Bolton 6, B. Boning 12, G. Holmes 5.

Baikal Teal

Anas formosa. J. Hay 1, Mrs. J. C. Laidlay, Mrs. Slasebrook, T. Simpson 5.

Falcated Teal

Anas falcata. W. Bolton 20, G. C. Dean 6, I. Grahame 5, G. Holmes 9, Norfolk W.P. 2, R. Pryor 2, Whipsnade 3.

Gadwall

Anas strepera. G. C. Dean 6, Norfolk W.P. 18, K. Bromley 7, T. Simpson 8.

European Wigeon

Anas penelope. T. W. Bolton 7, W. Bolton 21, B. Boning 14, Cotswold W.P. 3, D. Denett 2, Lilford 12, F. Mosford 8, Norfolk W.P. 5, K. Bromley 3, T. Simpson 12.

American Wigeon

Anas americana. B. Boning 1, G. Holmes 3, F. Mosford 4.

Chiloe Wigeon

Anas sibilatrix. W. Bolton 17, B. Boning 13, Cotswold W.P. 2, I. Grahame 2, G. Holmes 5, Marwell 2, Rode 5, Whipsnade 4, K. Bromley 4, T. Simpson 10.

Bahama Pintail

Anas bahamensis. W. Bolton 8, G. C. Dean 12, Flamingo Gardens 6, G. Holmes 21, Jersey 4, K. Bromley 12.

Chilean Pintail

Anas georgica spinicauda. Lilford 9.

Pintail

Anas acuta. W. Bolton 25, B. Boning 10, Riber Castle 2, G. C. Dean 12, D. Denett 1, Norfolk W.P. 5, R. Pryor 3, Rode 4, Marwell 3, I. Grahame 18, N. Steel 3, K. Bromley 6, T. Simpson 8.

Bronze-winged Duck

Anas specularis. K. Bromley 12.

Cape Teal

Anas capensis. W. Bolton 23, G. C. Dean 1, G. Holmes 17, K. Bromley 6.

Puna Teal

Anas versicolor puna. G. C. Dean 5, G. Holmes 9, K. Bromley 5, T. Simpson.

Hottentot Teal

Anas punctatus. W. Bolton 12, K. Bromley 3.

Garganey

Anas querquedula. W. Bolton 4, I. Grahame 2, G. Holmes 9, T. Simpson 9.

Blue-winged Teal

Anas discors. W. Bolton 15, B. Boning 2, F. Mosford 6, I. Grahame 7, K. Bromley 9, T. Simpson 5.

Cinnamon Teal

Anas cyanoptera. W. Bolton 49, B. Boning 2, G. C. Dean 4, I. Grahame 9, G. Holmes 23, K. Bromley 10, T. Simpson 3.

Shoveler

Anas clypeata. W. Bolton 12, B. Boning 10, Lilford 7, Norfolk W.P., K. Bromley 10, T. Simpson 8.

New Zealand Shoveler

T. Simpson 2.

Red Shoveler

Anas plataea. W. Bolton 5, G. Holmes 1, T. Simpson 7.

Ringed Teal

Anas leucophrys. G. C. Dean 8, G. Holmes 9, Stagsden 6, K. Bromley 26.

Eider Duck

Somateria mollissima. B. Boning 12, Flamingo Gardens 2, I. Grahame 3, G. Holmes 3, Norfolk W.P. 3, Rode 1, K. Bromley 6.

Red-crested Pochard

Netta rufina. W. Bolton 26, B. Boning 6, Coombe Abbey, Cotswold W.P. 2, G. C. Dean 12, G. Holmes 11, Norfolk W.P. 4, Rode 6, K. Bromley 3, T. Simpson 9.

Rosybill

Netta peposaca. W. Bolton 4, G. C. Dean 7, T. Simpson 7.

Southern Pochard

Netta erythrophthalma. G. C. Dean 6.

Canvas back

Aythya valisineria. Miss Locker Lampson 3.

European Pochard

Aythya ferina. B. Boning 16, Coombe Abbey, Rode 4, K. Bromley 6, Jersey 10.

White-eyed Pochard

Aythya nyroca. Norfolk W.P. 5, K. Bromley 16.

Tufted Duck

Aythya fuligula. W. Bolton 9, B. Boning 21, Coombe Abbey, G. C. Dean 20, Flamingo Park 12, I. Grahame 3, Lilford 11, Norfolk W.P. 7, Rode 2, K. Bromley 9, T. Simpson 10.

Baer's Pochard

Aythya baeri. G. Holmes 9, K. Bromley 16.

New Zealand Scaup

Aythya novaeseelandiae. B. Boning 5, G. Holmes 12, K. Bromley 6.

Lesser Scaup

Aythya affinis. G. Holmes 5.

Greater Scaup

Aythya marila. Coombe Abbey, K. Bromley 8, T. Simpson 3.

Brazilian Teal

Amazonetta brasiliensis. W. Bolton 11, I. Grahame 4, G. Holmes 8, K. Bromley 20, T. Simpson 8.

Maned Goose

Chenonetta jubata. W. Bolton 6, Flamingo Gardens 3, Rode 7, T. Simpson 8.

Comb Duck

Sarkidiornis melanotos. K. Bromley 1.

White-winged Wood Duck

Cairina scutulata. Slimbridge 29.

European Goldeneye

Bucephala clangula. Bristol 1, Flamingo Gardens 6, G. Holmes 3, K. Bromley 2.

Bufflehead

Bucephala albeola. Slimbridge, K. Bromley 8.

Hooded Merganser

Mergus cucullatus. Miss Locker Lampson 2.

Red-breasted Merganser

Mergus serrator. Miss Locker Lampson 5.

Smew

Mergus albellus. Slimbridge.

North American Ruddy Duck

Oxyura j. jamaicensis. Miss Locker Lampson 4, K. Bromley 4.

- Maccoa Duck**
Oxyura maccoa. Slimbridge 1.
- Red-tailed Hawk**
Buteo jamaicensis. Mr. Horsfield 2.
- Ferruginous Rough Legged Buzzard**
Falconry Centre 1.
- Kestrel**
Falco tinnunculus. Falconry Centre, D. Masters 6, Norfolk W.P. 5, P. Smith 3.
- Merlin**
Falco columbarius. Falconry Centre 4.
- Lanner Falcon**
Falco biarmicus. Falconry Centre 1.
- Californian Quail**
Lophortyx californica. D. Denett 11, Harewood 43, Lilford 10, P. Schofield 9, Southport 15.
- Bobwhite Quail**
Colinus virginianus. Chester 6, P. Schofield 7.
- Red-legged Partridge**
Alectoris rufa. D. Minchin 6.
- Red-necked Francolin**
Francolinus afer. Jersey 14.
- European Quail**
Coturnix c. coturnix. J. Holmes 51.
- Painted Bush Quail**
Cryptopteron erythrorhynchum. Winged World 9.
- Chinese Bamboo Partridge**
Bambusicola thoracica. Pheasant Trust 2, Stagsden 15.
- Cabot's Tragopan**
Tragopan caboti. Pheasant Trust 12.
- Satyr Tragopan**
Tragopan satyra. J. Rowlands 2, Stagsden 6, Jersey 6.
- Koklas Pheasant**
Pucrasia m. macrolopha. Pheasant Trust 29.
- Monal Pheasant**
Lophophorus impeyanus. I. Grahame 3, T. Lovel 5, Pheasant Trust 22. Winged World 1.
- Red Junglefowl**
Gallus g. gallus. Paignton 1.
- Ceylon Junglefowl**
Gallus lafayettei. I. Grahame 1, P. Schofield 1.
- Sonnerat's Junglefowl**
Gallus sonnerati. I. Grahame 2, Stagsden 25.
- Green Junglefowl**
Gallus varius. I. Grahame 8, N. Steel 9.
- Nepal Kalij**
Lophura l. leucamelana. N. Steel 9.
- White-crested Kalij**
Lophura l. hamiltonii. I. Grahame 6, G. Lupton 1, N. Steel 7.
- Black-crested Kalij**
Lophura l. melanota. I. Grahame 2.
- Lineated Kalij**
Lophura l. lineata. N. Steel 8.
- Edwards's Pheasant**
Lophura edwardsi. D. Minchin 3, T. Lovel 2, Pheasant Trust 8.
- Swinhoe's Pheasant**
Lophura swinhoei. T. W. Bolton 11, D. Denett 9, Harewood 4, R. Houlston 7, London 3, D. Minchin 7, Rode 6, G. Lupton 4.
- Siamese Fireback**
Lophura diardi. I. Grahame 21.
- Imperial Pheasant**
Lophura imperialis. London 1.
- Blue Eared Pheasant**
Crossoptilon aurtum. Birdworld 3, G. Holmes 14, G. Lupton 6, D. Minchin 4, Pheasant Trust 5, Rode 1, J. Rowlands 6, Jersey 1.
- White Eared Pheasant**
Crossoptilon crossoptilon. Hayle 4, Jersey 18.
- Brown Eared Pheasant**
Crossoptilon mantchuricum. Pheasant Trust 5, Jersey 2.
- Cheer Pheasant**
Catreus wallichii. T. W. Bolton 1, Chessington 3, G. Lupton 12, Pheasant Trust 15, R. Pryor 4.
- Elliot's Pheasant**
Syrnaticus ellioti. I. Grahame 5, R. Houlston 13, London 1, T. Lovel 1, N. Steel 8.
- Hume's Bar-tailed Pheasant**
Syrnaticus humiae. I. Grahame 7, D. Minchin 35, T. Lovel 9, Stagsden 7.
- Mikado Pheasant**
Syrnaticus mikado. I. Grahame 14, R. Houlston 10, T. Lovel 14, N. Steel 5.
- Copper Pheasant**
Syrnaticus soemmerringii. I. Grahame 13, T. Lovel 5, G. Lupton 16, N. Steel 9.
- Grey Peacock Pheasant**
Polyplectron bicalcaratum. I. Grahame 8, Pheasant Trust 2, Rode 4.
- Palawan Peacock Pheasant**
Polyplectron erphanum. Jersey 3.
- Green Peafowl**
Pavo muticus. Bristol 7.
- Sarus Crane**
Grus antigone. Flamingo Park 1, Rode 3.
- Lilford's Crane**
Grus grus lilfordi. Miss Locker Lampson 1.
- Demoiselle Crane**
Anthropoides virgo. Rode 1, N. Steel 2.
- Stanley Crane**
Anthropoides paradisea. J. O. Death 1.
- Blue breasted Banded Rail**
Rallus striatus. Chester 2.
- Cayenne Wood-rail**
Aramides cajanea. Birdland, Paignton 5, Twycross 3.
- Ypecaha Wood-rail**
Aramides ypecaha. Harewood 3.
- Weka Rail**
Gallirallus australis. Chester 4.
- Grey-headed Gallinule**
Porphyrio poliocephalus. Harewood 5.
- Coot**
Fulica atra. Marwell 1.
- Lapwing**
Vanellus vanellus. Norfolk W.P. 1.
- Spur-winged Plover**
Vanellus spinosus. Winged World 32, Norfolk W.P. 5.
- Curlew**
Numenius arquata. B. Boning 17.
- Redshank**
Tringa totanus. B. Boning 22.
- Golden Plover**
Charadrius apricarius. B. Boning 10.
- Thicknee sp.**
Burhinus sp. Birdland.
- Oystercatcher**
Haematopus ostralegus. B. Boning 18, London 1.
- Herring Gull**
Larus argentatus. Riber Castle 7.
- Grey-headed Gull**
Larus cirrocephalus poiocephalus. London 3.
- Black-headed Gull**
Larus ridibundus. Riber Castle 2.
- Lesser Black-backed Gull**
Larus fuscus. Riber Castle 10.
- Jerdon's Imperial Pigeon**
Ducula badia cuprea. London 2.
- Speckled Pigeon**
Columba guinea. Paignton 6, Jersey 2.
- Picazuro Pigeon**
Columba picazuro. London 2.
- Pigmy Dove**
Columbigallina minuta. Kilverstone 2.
- Collared Dove**
Streptopelia decaocto. Norfolk W.P. 4, Pencynor 3, Riber Castle 2.
- Vinaceous Dove**
Streptopelia v. vinacea. London 1.
- Necklaced Dove**
Streptopelia chinensis. London 1, Pencynor 4.
- Palm Dove**
Streptopelia senegalensis. Lilford 6.
- Barred Ground Dove**
Geopelia striata. Southport 5.

- Mountain Witch Dove**
Geotrygon versicolor. Birdland.
- Crested Pigeon**
Ocyphaps lophotes. Paignton 1.
- Bleeding Heart Dove**
Gallicolumba luzonica. Birdland.
- Nicobar Pigeon**
Caloenas nicobarica. N. Steel 1.
- Victoria Crowned Pigeon**
Goura victoria. Bristol 2.
- Kea**
Nestor notabilis. Jersey 1.
- Dusky Lory**
Pseudeos fuscata. Birdland.
- Red Lory**
Eos bornea. Lady Baillie 4.
- Ornate Lorikeet**
Trichoglossus ornatus. Birdland, F. Skaith 1.
- Edward's Lorikeet**
Trichoglossus haematod capistratus. K. J. Lawrence 1, F. Skaith 7.
- Deplanche's Lorikeet**
T. h. deplanchei. G. Blundell 4.
- Mitchell's Lorikeet**
T. h. mitchelli. Birdworld 2.
- Swainson's Lorikeet**
T. h. moluccanus. Birdland, Lady Baillie 4, Chester 2.
- Scaly-breasted Lorikeet**
Trichoglossus chlorolepidotus. Chester 2, Lady Baillie 3.
- Chattering Lory**
Domicella garrula. Pencynor 1.
- Plain Lorikeet**
Trichoglossus euteles. Birdland.
- Salvadori's Lory**
Domicella lory salvadorii. Birdland.
- Iris Lorikeet**
Psittacops iris. R. Kyme 2.
- Lesser Sulphur-crested Cockatoo**
Kakatoe sulphurea. Pencynor 1.
- Leadbeater's Cockatoo**
Kakatoe leadbeateri. Rode 1, C. Smith 1.
- Roseate Cockatoo**
Kakatoe roseicapilla. Lady Baillie 3.
- Blue-eyed Cockatoo**
Kakatoe g. ophthalmica. Chester 1.
- Blue & Yellow Macaw**
Ara ararauna. Paignton 1, Rode 6.
- Scarlet Macaw**
Ara macao. Rode 5.
- Red & Blue Macaw**
Ara chloropterus. J. Rigge 3.
- Illiger's Macaw**
Ara maracana. Miss Plumber 2.
- Hahn's Macaw**
Ara halmi. Birdland.
- Maximilian's Parrot**
Pionus maximilliani. Birdworld 2.
- Golden-crowned Conure**
Aratinga aurea. D. Denett 3.
- Quaker Parakeet**
Myiopsitta monachus. Chester 8, Lilford 9, Jersey 11, B. Bertram 5.
- Nanday Conure**
Nandayus nenday. Chester 4, Kilverstone 3.
- Thick-billed Parrot**
Rynchopsitta pachyrhyncha. Jersey 1.
- Lesser Patagonian Conure**
Cyanoliseus p. patagonus. Chester 2.
- Greater Patagonian Conure**
Cyanoliseus p. byroni. Rode 1.
- Brown-eared Conure**
Aratinga pertinax. Pencynor 1.
- Double Yellow-headed Amazon Parrot**
Amazona o. oratrix. K. Dolton 1.
- African Grey Parrot**
Psittacus erithacus. Chester 2, C. Smith 1.
- Grand Eclectus Parrot**
Lorius r. roratus. Chester 1, Southport 2.
- Red-sided Eclectus Parrot**
Lorius roratus pectoralis. Chester 2, Mr. & Mrs. Grantham 1.
- Indian Ringneck Parakeet (muts)**
Psittacula krameri manillensis. Lady Baillie 7, Cotswold W.P. 3, Harewood 2, J. E. Hargreaves 2, P. Paris 5, Mrs Partridge 12, Rode 14, N. Steel 1, R. Kyme.
- Derbyan Parakeet**
Psittacula derbyana. Chester 2, Lady Baillie 2, Pencynor 2.
- Rock Pebbler Parakeet**
Polytelis anthopeplus. Mrs Partridge 3, C. Smith 1.
- Barraband's Parakeet**
Polytelis swainsoni. C. Bates 5, Chester 2, Mrs Partridge 3, Pencynor 3, D. Spilsbury 3, N. Steel 1.
- Princess of Wales' Parakeet**
Polytelis alexandrae. Lady Baillie 3, C. Bates 9, K. Dolton 4, P. Paris 5, Mrs Partridge 6, C. Smith 1.
- Crimson-winged Parakeet**
Aprosmictus erythropterus. C. Bates 5, Chester 1.
- Timor Crimson-wing**
Aprosmictus jonquillaceus. P. Paris 2.
- King Parakeet**
Alisterus scapularis. Lady Baillie 3, K. Dolton 1, P. Paris 7.
- Peach-faced Lovebird**
Agapornis roseicollis. G. Blundell 12, T. W. Bolton 12, M. Bushell 5, Chessington 8, Chester 9, D. Denett 3, K. Dolton 3, Harewood 5, J. Rigge 10, Rode 10, Southport 5, C. Spendlove 2, Jersey 3, B. Bertram 6.
- Fischer's Lovebird**
Agapornis fischeri. G. Blundell 5, M. Bushell 1, Chester 13, D. Denett 2, Harewood 4, London 8, Mr & Mrs Moss 10, R. Heppenstall 6, A & M Pullan 5, J. Seymour 1, B. Bertram 4.
- Masked Lovebird**
Agapornis personata. G. Blundell 8, M. Bushell 1, Chessington 2, Mr & Mrs Moss 4, Pencynor 3, Rode 3.
- Abyssinian Lovebird**
Agapornis taranta. P. Higgins 1.
- Pennant's Parakeet**
Platyercus elegans. Lady Baillie 4, J. Hargreaves 4, D. Spilsbury 3, N. Steel 4.
- Golden-mantled Rosella**
Platyercus eximius ceciliae. G. Blundell 2, C. Palmer 2, Mrs Partridge 5, J. Rigge 7, Rode 11, B. Bertram 4.
- Mealy Rosella**
Platyercus adscitus. Lady Baillie 4, Rode 4, N. Steel 3.
- Stanley Parakeet**
Platyercus iterotus. Lady Baillie 5, Mrs Partridge 6, Pencynor 2, Rode 9.
- Port Lincoln Parakeet**
Barnardius z. zonarius. C. Bates 10, Lady Baillie 2.
- Twenty-eight Parakeet**
Barnardius zonarius semitorquatus. Lady Baillie 4.
- Barnard's Parakeet**
Barnardius b. barnardi. Lady Baillie 7, C. Smith 2.
- Cloncurry Parakeet**
Barnardius b. macgillivrayi. Lady Baillie 3, P. Paris 7.
- Pileated Parakeet**
Purpureicephalus spurius. Lady Baillie 3, Mrs Partridge 1.
- Blue-winged Grass Parakeet**
Neophema chrysostris. J. R. Hodges 12.
- Elegant Grass Parakeet**
Neophema elegans. Lady Baillie 1, C. Bates 20, J. Hargreaves 11, P. Paris 7, Pencynor 2, Mr & Mrs C. Wright 5.
- Turquoise Grass Parakeet**
Neophema pulchella. Lady Baillie 6, M & Mrs Boynton 3, Mrs Maurice 1, P. Paris 16, Pencynor 4.

- Splendid Grass Parrakeet**
Neophema splendida. Lady Baillie 8, M. D. England 3, J. E. Hargreaves 7, J. R. Hodges 16, P. Paris 2, D. Spilsbury 35.
- Bourke's Parrakeet**
Neophema bourkii. Lady Baillie 8, T. W. Bolton 10, R. Heppenstall 4, Mrs Maurice 4, D. W. Morgan 5, Mrs Partridge 3, A. & M. Pullan 4, Mr & Mrs C. Wright 6.
- Yellow-fronted New Zealand Parrakeet**
Cyanoramphus auriceps. K. Dolton, 3.
- Knysna Touraco**
Tauraco corythaix. London 4.
- Pink-crested Touraco**
Tauraco erythrolophus. Jersey 2.
- Barn Owl**
Tyto a. alba. Falconry Centre 8, Harewood 2, Hayle 3, J. R. Holmes 5, B. Sayers 8.
- Scops Owl**
Otus scops. London 3, Norfolk W.P. 4.
- Collared Scops Owl**
Otus bakkamoena. H. Smith 3.
- Great Horned Owl**
Bubo virginianus. Jersey 1.
- Great Eagle Owl**
Bubo b. bubo. Falconry Centre, Lilford Hall 1, P. Smith 2, Winged World 3.
- Savigny's Eagle Owl**
Bubo b. ascalaphus. London 1.
- Bengal Eagle Owl**
Bubo b. bengalensis. L. Simmons 5.
- Turkmenian Eagle Owl**
Bubo b. zaisanensis. P. Smith 5.
- Spotted Eagle Owl**
Bubo a. africanus. London 1.
- Abyssinian Eagle Owl**
Bubo africanus cinerascens. P. Smith 3.
- Kenya Eagle Owl**
Bubo capensis mackinderi. London 3, Whipsnade 2.
- Snowy Owl**
Nyctea scandiaca. Bristol 1, Harewood 2, London 4, Jersey 1.
- Little Owl**
Athene noctua. G. Blundell 2, Lilford 3, Norfolk W.P. 1, P. Smith 4.
- W. African Wood Owl**
Ciccaba woodfordii nuchalis. London 1.
- Red-backed Mousebird**
Colius castanotus. Paignton 4, Jersey 6.
- Swainson's Motmot**
Birdland.
- Blue-crowned Motmot**
Momotus momota. Winged World 1.
- Hoopoe**
Upupa epops. Chester 2.
- Green Wood Hoopoe**
Phoeniculus purpurea. Winged World 2.
- Black and White Casqued Hornbill**
Bucanistes subcylindricus. Birdworld 2.
- Jackson's Hornbill**
Tockus deckeni jacksoni. London 1.
- Red & Yellow Barbet**
Trachyphonus erythrocephalus. M. D. England 6.
- Red-headed Barbet**
Eubucco boucierii. M. D. England 4.
- Kisadee Flycatcher**
Ptilangus sulphuratus. Winged World 4.
- Blue-backed Manakin**
Chiroxiphia pareola. London 1.
- Crested Lark**
Galerida cristata. H. Murray 2.
- Red-whiskered Bulbul**
Pycnonotus jocosus. Chester 2.
- Red-vented Bulbul**
Pycnonotus cafer. Chester 1, Paignton 1.
- Shama**
Copsychus malabarius. Birdworld 3.
- Indian Robin**
Saxicoloides fulicata. R. E. Owen 4.
- Wheatear**
Oenanthe oenanthe. Norfolk W.P. 2.
- Mistle Thrush**
Turdus viscivorus. Norfolk W.P. 3.
- Spotted Morning Warbler**
Cichladusa guttata. Birdland.
- White-eye**
Zosterops palebroza. B. D. Allt 2, Chester 3, Cotswold W.P. 5.
- Yellow-rumped Tanager**
Ramphocelus icteronotus. H. Murray 2.
- Blue-crowned Chlorophonia**
Chlorophonia occipitalis. Miss M. Gourlay 3.
- Silver Bird**
Empidonax semipartita. Mrs Scamell 10.
- Red-headed Laughing Thrush**
Garrulax erythrocephalus. Chester 1.
- Rufous-chinned Laughing Thrush**
Garrulax rufogularis. Winged World 1.
- Pekin Robin**
Leiothrix lutea. P. Paris 1.
- Blue-winged Siva**
Minla cyanouroptera. C. H. Spendlove 2.
- Red-headed Bunting**
Emberiza bruniceps. Chester 2.
- Red-crested Cardinal**
Paroaria cucullata. Mrs Monro 2, M. Towles 3.
- Green Cardinal**
Gubernatrix cristata. N. Steel 1, Waddesdon Manor 1.
- Virginian Cardinal**
Cardinalis cardinalis. Chester 2.
- White-bellied Canary**
Serinus dorsostriata. P. Paris 2.
- Black-headed Siskin**
Spinus notatus. P. Paris 2.
- Magellan Siskin**
Spinus magellanicus. P. Paris 1.
- Reichenow's Canary**
Serinus reichenowi. P. Paris 2.
- Yellow-rumped Serin**
Serinus atrogularis. P. Paris 3.
- Goldfinch**
Carduelis carduelis. Norfolk W.P.
- Greenfinch**
Carduelis chloris. Chester 10, J. Parke 18.
- Lesser Redpoll**
Carduelis flammea. Norfolk W.P. 2, J. Parke 5.
- Siskin**
Carduelis spinus. Mrs K. Chapman 5, F. Lee 2, H. Murray 1.
- Linnets**
Acanthis cannabina. J. Parke 4.
- Peters' Twinspot**
Hyphantornis niveoguttatus. R. Green 1.
- Cordon Bleu**
Uraeginthus bengalus. Mr & Mrs Boynton 4, Chester 5, D. Cooke 1, Mrs D. Scott 4, J. T. Tupling 3, R. Wilkinson several.
- Red-eared Waxbill**
Estrilda troglodytes. Chester 2.
- Orange-cheeked Waxbill**
Estrilda melpoda. Chester 2, H. Murray 2.
- Sundevall's Waxbill**
Estrilda rhodopyga. Chester, J. Howard 3.
- St. Helena Waxbill**
Estrilda astrild minor. H. Murray 12.
- Yellow-bellied Waxbill**
Estrilda paludicola. K. Lambert 2.
- Red Avadavat**
Amandava amandava. E. M. Carr 3, J. Tupling 2, J. Howard 2.
- Green Avadavat**
Amandava formosa. Chester 1, J. Tupling 2.
- Golden-breasted Waxbill**
Amandava subflava. E. M. Carr 2, Chester 2, Miss M. Gourlay 1.
- Starfinch**
Bathilda ruficauda. M. D. England 2, Mrs S. Smaller 3, J. Tupling 2.
- Cherry Finch**
Aidemosyne modesta. W. Last 1.

- Heck's Grassfinch**
Poephila acuticauda hecki. Mr & Mrs Boynton 1, H. Docherty 2, P. Higgins 16. W. Last 1.
- Long-tailed Grassfinch**
Poephila a. acuticauda. Mrs Jones 2.
- Gouldian Finch**
Erythrura gouldiae. J. Balls, Mr & Mrs Boynton 2, Mr & Mrs Buckberry 28, Miss M. Gourlay 6, J. R. Hodges 1, G. Trinder 2, J. Tupling 6, Mrs S. Smaller 6, D. Wanless 7.
- Firefinch**
Lagonosticta senegala. E. M. Carr 4, D. Cooke 3, H. Murray 2, Mrs D. Scott 3, J. Seymour 2, Mrs S. Smaller 7, R. Stanley 3, J. Howard 3.
- Black-headed Nun**
Lonchura malacca. Chester 2.
- Catthroat**
Amadina fasciata. Chester 11, Cotswold W.P. 5, G. Scurry 2, Southport 4.
- Chestnut-breasted Finch**
Lonchura castaneothorax. J. Tupling 4.
- Grey Singing Finch**
Serinus leucopygius. Miss M. Gourlay 4.
- Green Singing Finch**
Serinus mozambicus. Chester 2, Miss. M. Gourlay 1, P. Paris 3.
- Red-headed Finch**
Amadina erythrocephala. G. Coc 3.
- Rufous-collared Sparrow**
Zonotrichia capensis. Kilverstone 4.
- Spanish Sparrow**
Passer hispaniolensis. H. Murray 12.
- Little Masked Weaver**
Ploceus luteolus. Chester 1, H. Murray 2.
- Red-billed Weaver**
Quelea quelea. Chester 10.
- Orange Weaver**
Euplectes orix. Chester 1.
- Napoleon Weaver**
Euplectes a. afra. Chester 2.
- Pin-tailed Whydah**
Vidua macroura. Chester 1.
- Paradise Whydah**
Steganura paradisaea. Chester 3.
- Bristle-crowned Starling**
Onychognathus salvadorii. Winged World 6.
- Purple Glossy Starling**
Lamprotornis purpureus. Rode 2.
- Blue-eared Glossy Starling**
Lamprotornis chalybaeus. Chester 1, Paignton 1.
- Amethyst Starling**
Cinnyricinclus leucogaster. Chester 1, Cotswold W.P. 1.
- Spreo Starling**
Spreo superbus. Birdworld 1, Harewood 2, K. J. Lawrence 4, London 3, R. Oxley 1, Waddesdon Manor 10.
- Jerdon's Starling**
Sturnus burmanicus. Chester 5.
- Rothschild's Mynah**
Leucopsar rothschildii. Birdland, Chester 3, Hayle 3, Jersey 18, Waddesdon Manor 3.
- Bank Mynah**
Acridotheres ginginianus. Chester 4.
- Jungle Mynah**
Aethiopsar fuscus. Chester 3.
- Andaman Starling**
Sturnus andamensis. Winged World 4.
- Azure-winged Magpie**
Cyanopica cyanus. Norfolk W.P. 3.
- Pileated Jay**
Cyanocorax sp. Southport Zoo 2.
- Wandering Tree Pie**
Dendrocitta vagabunda. Waddesdon Manor 1.
- Chough**
Pyrhcorax pyrrhocorax. Riber Castle 1, Paignton 2.
- Alpine Chough**
Pyrhcorax graculus. London 1, Norfolk W.P. 1.
- Rook**
Corvus frugilegus. Riber Castle 1.
- The late Lady Baillie
Leeds Castle
Maidstone.
J. A. Balls
43, Deppers Bridge
Bishops Itchington
Leamington Spa.
C. Bates
Norton Cottage
Peter Lane
Halifax.
B. Bertram
Linton House
Linton
Cambridge.
Birdland
Bourton-on-the-Water
Gloucestershire.
Bird Paradise
Hayle
Cornwall.
Birdworld
Farnham
Surrey.
G. Blundell
Cockle Dicks Nursery
Southport
Lancs.
T. W. Bolton
Tropical Bird Garden
Harbury Lane
Bishops Tachbrook
Leamington Spa.
W. Bolton
Waterways
Gingerbread Hill
Sandom
Chelmsford
Essex.
B. Boning
Fairland
Wayford
Stalham
Norwich.
Bristol Zoo
Bristol.
K. Bromley
Ashley Manor
Kings Somborne
Hants.
M. Bushell
35, Crestfield Crescent
Elland
Yorks.
Chessington Zoo
Chessington
Surrey.
Chester Zoo
The North of England Zoo Soc.
Chester.
Coombe Abbey
Coombe Abbey Park
Rugby.
Cotswold Wildlife Park
Burford
Oxon.
Lt. Col. & Mrs J. G. Dean
Stockwood
Grange Road
Wareham
Dorset.
J. O. Death
The Grove
Monken Hadley
Barnet
Herts.
D. Denett
45, Heath Road
Ipswich.

- H. Docherty
18a, Baymount
Paignton
Devon.
- K. Dolton
Parklands
Shoulton
Hallow
Worcs.
- M. D. England
Mashobra
Neatishead
Norwich.
- Falconry Centre
Newent
Glos.
- Flamingo Gardens
Weston Underwood
Olney
Bucks.
- Flamingo Park
Kirby Misperton
Malton
Yorks.
- Miss M. Gourlay
Querics
51, Brackendale Road
Camberley
Surrey.
- Major Iain Grahame
Daws Hall
Lamarsh
Bures
Suffolk.
- Mr & Mrs Grantham
13, St. Wilfrid's Road
New Barnet
Herts.
- R. Green
27, Eden Road
Beckenham
Kent.
- J. E. Hargreaves
256, Upper Batley Lane
Batley
W. Yorks.
- Maj. J. Hay
Edinglassie
Glass
Huntley
Aberdeenshire
- Mrs E. Hepenstally
87 Southmere Drive
Great Horton
Bradford.
- Prof. J. R. Hodges
Craignair
Cuckoo Hill
Pinner
Middx.
- Gordon Holmes
Haysfield
Bradwell-on-Sea
Essex.
- J. R. Holmes
9 Haconby Lane
Morton
Bourne
Lincs.
- R. Houlston
Manor Farm
Oulsteen
Nr. Easingwold
Yorks.
- J. Howard
26 Burlington Gardens
Banbury.
- Jersey Zoological Park
Les Augres Manor
Trinity
Jersey, C.I.
- Kilverstone
New World Wildlife Park
Thelford
Norfolk.
- Mrs J. C. Laidlay
Holmwood
Perth.
- Miss E. S. Locker Lampson
Keepers Cottage
Cophthorne
Sussex.
- W. Last
1, Maylands Drive
Queensboro Lane
Braintree
Essex.
- K. J. Lawrence
Greyhounds
The Street
Hatfield Peverel
Essex.
- Lilford Park
Lilford
Oundle
Peterborough.
- London Zoo
Regent's Park
London, N.W.1.
- Dr T. W. Lovel
Garvery
Hurstbourne Tarrant
Andover
Hants.
- G. H. Lupton
Wass Grange
Ampleforth
Yorks.
- Marwell Zoological Park
Golden Common
Nr. Winchester
Hants.
- D. Minchen
Amphora
Crays Pond
Pangbourne
Berks.
- Mrs S. M. Munro
Little Scammells Corner
Blackbrook
Dorking.
- F. Mosford
Sherdley Bank
Hope
Wrexham
Denbigh.
- H. Murray
Bracken
Upper Cornsland
Brentwood
Essex.
- Norfolk W.P. & Pheasant Trust
Great Withingham
Norwich
Norfolk.
- R. E. Owen
13, Dunsmere Ride
Monks Risborough
Bucks.
- R. E. Oxley
2, Suttons Ave.
Hornchurch
Essex.
- Paignton Zoo
Paignton
Devon.
- P. Paris
Boskenna Nurseries
St. Buryan
Penzance
Cornwall.

J. Parke
30, Moor End
Spondon
Derby.
Mrs A. B. Partridge
Lower Haselor
Evesham
Worcs.
Penscynor Bird Gardens
Cilfrew
Neath
Glamorgan.
G. Pryor
Brookside
Calver
Via Sheffield
Yorks.
Riber Castle
Matlock
Derbyshire.
J. S. Rigge
Old Broadgate
Millom
Cumbria.
Rode,
The Tropical Bird Gardens
Rode,
Nr. Bath
Somerset.
B. Sayers
164 Chelmer Road
Chelmsford
Essex.
Mrs K. M. Scamell
Wayside
St. Keverne
Nr. Helston
Cornwall.
P. Schofield
36, Tasmania Road
Ipswich
Suffolk.
Mrs D. J. Scott
Marana
21, Marsh St.
Dunster
Minehead
Somerset.
T. Simpson
Noakes Farm
Kersey
Ipswich.
Slimbridge
The Wildfowl Trust
Slimbridge
Glos.

C. Smith
Heatherlands
Keighley Road
Denholme
Bradford.
H. Smith
Basildon Aviary & Wildlife Centre
Vange
Basildon
Essex.
Stagsden Bird Garden
Stagsden
Bedford.
Southport Zoo
Princes Park
Southport
Lancs.
C. H. Spendlove
32, Valence Wood Road
Dagenham
Essex.
N. Steel
Farwell House
Stoke Flemming
Dartmouth
Devon.
M. Towler
64 Edinburgh Way
Banbury.
P. Thorne
23, Marshall Crescent
Middle Barton
Oxon.
Twycross Zoo
Atherstone
Warwicks.
Waddesdon Manor
Aylesbury
Bucks.
Welsh Mountain Zoo
Colwyn Bay
N. Wales
Whipsnade Park
Dunstable
Beds.
Winged World
Heysham Head
Morecambe
Lancs.
Mr & Mrs C. K. Wright
51, Glenfield Road
Ealing
London W.13.

* * *

AN INTERNATIONAL SYMPOSIUM ON ZOO DESIGN AND CONSTRUCTION

A symposium on the design and construction of zoos, arranged by the Paignton Zoological and Botanical Gardens Ltd., is to take place at Paignton from May 13th-15th.

A session devoted to accommodation for birds is to have M. Delacour as its Chairman and anyone not wishing to attend the whole symposium may go for a part of it.

Full particulars are obtainable from :

The General Manager,
Paignton Zoological and Botanical Gardens,
Paignton,
Devon TQ4 7EU.

NEWS AND VIEWS

Among the successes in rare pheasant propagation reported in The Pheasant Trust's Newsletter are the first captive breeding of Bulwer's Pheasant by Dr. J. E. Lopez of Mexico City, a number of Bornean Argus and White Eared Pheasants in United States collections and twelve Cabot's Tragopans at Great Witchingham, while in the past nine years Dr. K. C. Searle has bred a hundred Palawan Peacock Pheasants in the Botanic Gardens, Hong Kong.

* * *

Mr. K. W. Dolton who succeeded in breeding the Thick-billed Parrot in 1973 writes to say that the parents hatched another chick during 1974, but it survived only four weeks due, he thinks, to the presence in the same aviary of the 1973 bird which may have caused the parents to neglect the young one. He bred during 1974 a Levaillant's, Double Yellow-fronted or Double-fronted Parrot as *Amazona ochrocephala oratrix* is variously called. The mother is one of the two young bred by Mr. Clifford Smith in 1970 and the pair nested in 1973, but failed to rear the one chick that hatched.

* * *

Mr. J. O. D'eath, the organiser and treasurer of the testimonial to Miss Barclay-Smith, writes to advise members of the closure of the fund on April 1st and to say that any further subscriptions will be gratefully received. In due course a list of subscribers will be circulated.

* * *

Mr. M. R. Lubbock, Curator at The Wildfowl Trust, Slimbridge, writes :

The 1974 breeding season at Slimbridge proved to be one of the most successful in the history of the Wildfowl Trust, especially in the breeding of stiff-tails and many of the fish-eating ducks; also the *Bucephala* (Goldeneyes).

As a result of the very mild winter, many of the geese nested earlier than usual and they were caught out by the variable weather until spring finally settled in.

On the whole, a rather dismal number of geese were raised. Although a record number of 60 NeNes were reared, this number should have been nearer 100. Infertility, addling and dead in shell took a heavy toll of the eggs.

The usual large numbers of common species of duck were raised. New ideas on feeding, nests and nest-sittings led to greater success in raising the more difficult species. These were :

14 Bufflehead	2 Red-breasted Merganser
5 Barrow's Goldeneye	16 Hooded Merganser
3 European Goldeneye	21 White-headed Duck
9 American Goldeneye	2 Maccoa (breeding for the first time)

The new propagation quarters and feeding techniques were a great advantage for these difficult ducklings.

It was also a good year for the White-winged Wood Duck with thirty young being reared. One pair produced a second clutch, this being the first time this has happened at Slimbridge.

The Black Swans excelled themselves in 1974 and thirty cygnets were raised. Most of the adult pairs now live in a colony and this is proving to be very successful.

The pair of Bewick's raised three young, the female of the pair now being 26 years old. The pair of Whoopers produced seven cygnets and the Trumpeter Swans also produced well. The Trumpeter cygnets were all females as seems to be the tendency with this species.

Only the Chilean and Greater Flamingos produced young, the Chilean having up to 26 chicks at the height of the season. The last few young to be produced late in the season never seem to grow well like the earlier hatched birds, and they are usually lost. It is the shortening of the daylength which causes a decrease in the amount of time when vitamin D₂ can be built up which seems to be the factor affecting these late-hatched birds. Only two Greater Flamingos were reared.

M.H.H.

* * *

REVIEW

AVIARY BIRDS IN COLOUR. Photographs by Dennis Avon and Tony Tilford, text by Frank Woolham. Blandford Press; London. 1974. pp. 176. 100 colour photographs. £2.25.

The main purpose of this book is the series of colour photographs it contains. There are a hundred of these pictures of birds, mostly single close-ups, sometimes of pairs, in semi-natural settings. They are excellent portraits of various species with all the details sharp and accurate. They range through most of the typical types of foreign birds kept by aviculturists, with emphasis on seed-eaters and other smaller birds but including some parrots, quails and pigeons. Each picture is accompanied by a text on the species' management, breeding and feeding under aviary conditions. The text appears to be sound, although I would be less happy than the author on the subject of acclimatisation of species in open aviaries, even without taking into account the range of climatic difference that the reader may take for granted.

There are two obvious textual errors, an Indian Silverbill being described as the African form, and Assam appearing instead of Ceram in the distribution of the Purple-capped Lory. The very excellence

of the photographs invites a few criticisms. Disarranged feathers become very obvious; one wonders whether the obviously moulting Golden-breasted Waxbill and Red Avadavat should have been included without comment, and where colour is accurate the carotene deficiency in the plumage of the Pekin Robin and the Copper-smith Barbet become apparent.

In general however the book provides a well-illustrated introduction to the keeping of foreign birds.

C.J.O.H.

CORRESPONDENCE

THE BRITISH AVICULTURISTS' CLUB

A meeting was held at the Rembrandt Hotel, Thurloe Place, London, on 13th February, 1946, at which it was decided to form the B.A.C. This club was to be confined to members of the Avicultural Society and was to be of a semi-social nature. Thirty-two members and guests attended, thirty of whom subsequently became members of the club. Unfortunately only nine of the Founder members remain with us:—Miss P. Barclay-Smith, Derrick England, G. T. Iles (Canada), H. J. Indge, Terry Jones, P. H. Maxwell, A. A. Prestwich, Donald Risdon and Sir Peter Scott.

During the first twenty-five years of its existence, nearly everyone interested in birds attended the numerous dinners and meetings:—Field Marshal Viscount Alanbrooke, Sir Norman Kinnear, Sir A. Landsborough Thomson, Sir Philip Manson-Bahr, Raol Shri Dharmakumarsinhji of Bhavnagar, Lee S. Crandall, Professor J. Berlioz, Captain Charles Knight (and "Mr. Ramshaw") to mention just a few.

The present régime apparently considers that the club's interests conflict with those of the Society and it is therefore in the process of being wound up.

Sic transit gloria mundi.

A. A. PRESTWICH

Galley's Wood,
Nr. Edenbridge,
Kent.

INTRODUCED LOVEBIRDS IN MOMBASA

In February/March, 1974, I was fortunate to be able to pay a return visit to the Game Reserves of East Africa, when during this sojourn I identified 186 different species of bird ranging from the Cordon Bleu *Estrilda bengala* to the Bateleur Eagle *Terathopius ecaudatus*. Each Reserve we visited abounded with birds of many species and it was really wonderful to see, in their natural surroundings, the many exotic birds I knew and had read so avidly about; truly a wonderful sight for the bird lover.

At the end of our tour of the Game Parks we spent a resting week at Nyali Beach, Mombasa, where I was able to spend many hours watching, with the aid of powerful binoculars, literally hundreds of Fischer's Lovebirds *Agapornis fischeri* which were constantly in the palm trees in the grounds of the Nyali Beach Hotel—also rows of them sat on the roof of the hotel before flying off in a shrieking flock to forage on the beach. The majority were Fischer's which continually passed overhead in flocks of 30 to 40 echoing their well-known call notes as they flew. In their midst were the odd half-dozen or so Masked Lovebirds *Agapornis personata*—known locally as the Yellow-collared Lovebird, which I personally think a more apt name for this attractive lovebird. When they settled in the palms I was able to observe them at reasonably close quarters and realised that a considerable number of them were hybrid Fischer's x Masked,

easily discernible by their smutty coloured heads. Having bred this hybrid in my aviaries in the past, I am well aware of their appearance and was therefore in no doubt whatsoever of their parentage.

Although I tried very hard to find their nesting sites by scouring the trees for likely nesting holes; also the roof tops of various buildings where they seem to spend a lot of their time under the eaves and around drainpipes, etc., I was unable to observe any nesting activity. Perhaps my visit did not coincide with their breeding season?

In the hotel grounds the Flame Trees were abounding with Golden Weavers *Ploceus subaureus* whose nests festooned the upper branches, and what a noise these attractive and industrious birds created all day long. Each evening as twilight fell the lovebirds were heard calling overhead; they rapidly descended into the Flame Trees and appeared to take possession of the vacant (?) weavers' nests. From the balcony of my bedroom I would see this happen every evening from fairly close quarters, and have no doubt at all that the lovebirds spent the night in the empty weavers nests. Knowing the lovebirds' destructive habits it seemed to me most remarkable that they did not pull the nests to bits, but to the best of my knowledge no damage was done and the weavers did not seem to mind the intrusion.

J. C. BARLASS

Applegarth
Singleton
Lancashire.

LACK OF PROTEIN AS A POSSIBLE CAUSE OF FEATHER PLUCKING IN COCKATOOS

Some time ago I purchased a wild hen "Great White" Cockatoo which had been kept in cramped conditions for some months during which time she had removed all her breast feathers and most of those in her wings and tail. The head feathers including those in the crest were still covered in sheaths for most of their length, as the bird had been unable to remove them. Shortly after arrival the cockatoo was allowed to climb at freedom in the garden where she soon attracted the attention of a male of the same species which had been in residence for some time. With much display and formality the male sidled up to the hen and began to preen the sheaths from her head feathers while she responded by squatting on the branch and quivering her wings. After about twenty minutes the male mounted the hen and mated with her; then followed a long period of mutual preening which did much to improve the hen's remaining feathers.

Housed in a large cage with plenty of freedom in the garden during the day the cockatoo soon began to grow new feathers but she removed these as soon as they were well advanced in the blood-quill stage and ate them. Not content with this she started to remove growing feathers from her mate, so I stepped up the meat intake for the pair, providing minced raw beef and chicken bones together with egg and cheese. All these items were eaten avidly but just how much the cockatoo craved meat was brought home to me in a rather strange way.

Discovering that mice had taken up residence in the bird room I set traps at random and in taking down one these complete with dead mouse from a high shelf I noticed that the hen cockatoo was showing great excitement, approaching the wire front of her cage and fixing her gaze on the dead mouse. I wondered what her reaction would be if confronted by the mouse at close quarters, so when the cockatoo was in the garden I placed the mouse on a nearby branch and withdrew to the house to watch. Within seconds the bird had grabbed the mouse and had removed and eaten the head, holding the animal in one foot. At this stage the male cockatoo approached and tried to grab the mouse but the hen was not having this and removed herself and her meal to another branch and proceeded to skin the body and eat the contents until only the skin and tail remained.

I have since offered the birds three other mice which have been skinned in the same manner and eaten with obvious relish. The general condition of the

hen seems to be much improved and new feathers are appearing in her wings and tail, so maybe she no longer has the urge to destroy her plumage for the sake of the blood she needed.

One reads of cockatoos, kept caged in pairs, who never feather properly and I wonder if lack of sufficient meat in the diet could be the cause of this lack of condition, the birds removing each other's feathers in an effort to balance their dietary needs.

Returning to mice as a food item; it would of course be essential only to provide mice that were free from any form of poison such as Warfarin.

REX A. HARPER

The Rosery
Bolingey
Perranporth
Cornwall.

THE TRADE IN RARE BIRDS

The Magazine takes some time in reaching me and as a result this correspondence is delayed. I would like to reply to Mr. Cooper's letter of the July-August 1974 issue concerning my article "Birds of Paradise in Captivity; a Major Moral Problem".

I received the July-August issue before the March-April and was surprised by Mr. Cooper's comments as, from memory of what I had written (having no copy with me) I felt much had been misinterpreted or misread. With my article now before me, however, I think Mr. Cooper must have read it rather too quickly. In addition I find some of his original statements rather startling. My greatest regret is my current isolation from the numerous relevant works of reference to which I might respectfully have referred him.

Mr. Cooper shares my concern that "avicultural activities might be the reason why some species are becoming very scarce and might even cause their extinction;" however he is "of the opinion that avicultural activities have never been the cause whereby any species of birds has become extinct and that aviculture has not prevented the extinction of a species." The use of the word might is Mr. Cooper's innovation. Of birds of paradise I wrote "This situation must have a serious detrimental effect upon the populations", and "the situation must be made worse by exportation of live birds".

Does Mr. Cooper really consider that aviculture has never actually caused the extinction of a species a saving grace? I feel I made it clear that (in cases of rare birds) things are made worse by the live bird trade. I did not state that aviculture has been, or will be, the sole cause of extinction. This possibility is almost inconceivable. I feel sure, however, there is no need to point out that, at least, some parrot populations have, and do, suffer from the live bird trade. Some of these birds are close to extinction, though of course not solely for this reason. Writing of the St. Lucia parrot *Amazona versicolor*, Fisher, Simon and Vincent (RED DATA BOOK, London 1969) wrote "It is probably under shooting pressure by pigeon hunters; and by live bird hunters, for a high price is paid for any Lesser Antillean parrot in good condition. Many are shot in the hope of their being "wing-tipped". Of the genus *Amazona* the above authors wrote "Every one of the living *Amazona* parrots here mentioned (being all the rarest species only) has been kept in captivity, and even the two extinct ones most probably have". Some (fortunately very few I think) people still hanker after these extremely rare parrots and could not, or would not, resist the dealer who "could have one in the country in a few weeks" for the right price.

Mr. Cooper would underestimate aviculture in both directions if he believes "that aviculture has not yet prevented the extinction of a species". I am sure the Wildfowl Trust and similar institutions would disagree. I refer, of course, to the history of the Hawaiian Goose or Nene *Branta sandvicensis*, perhaps the best known avicultural success.

Mr. Cooper tells us that extra avicultural interest is always directed at a species as soon as it becomes in short supply. He goes on to state this is always associated with a number of causes which he lists whilst excluding, remarkably

enough, the fact that many are in short supply because they have to be smuggled in small numbers.

If of Mr. Cooper's outlook I would certainly give up all hope of the kind of control I would like to see come into practice; but I am not. Who, in this more-than-ever conservation minded world, can state "control of trade and illegal trafficking cannot have any effect", when evidence of very similar situation is so overwhelming. Instances of "a Society in Britain influencing a foreign power with regard to the use it makes of its own fauna" must be very numerous. This I must, however, leave for some better qualified person to comment upon, but I will refer to Mr. Yealland's comments upon the influence of this kind in the hands of the I.C.B.P., an international body but no doubt of modest origins.

My suggestion was that our Society should form a "rare and endangered list" committee, in order to "express the deep concern most of its practitioners have for rare and endangered avifaunas with recommendations of its own". How can other Societies possibly object to another Society placing restrictions upon its own membership? The hope is that they might follow suit. As for other Societies discussing the situation, the more it is 'aired' the better.

That the keeping of rare and endangered species be restricted to persons or institutions with adequate conditions was what I in fact wrote. No discrimination between private keepers and establishments has been made by myself.

Birds of paradise are fully protected on their home grounds and are therefore illegally exported and the point stressed by myself is that the purchasing of smuggled birds is the cause for concern. Odd that Mr. Cooper so readily refers to the Washington Convention (aspects of which presumably originated in the minds of modest Societies and the public at large) when he expresses such a lack of faith in the international influence of concern for faunas.

If Mr. Cooper's hope is to put my mind at rest, may he be more optimistic about the influence men can have upon each other to the benefit of themselves and nature. As for myself I sincerely hope this has not put Mr. Cooper's mind at rest, for I feel the day for such self deceit is far off, certainly in respect of the birds of paradise. The question of seeking and obtaining rare species is often not so much one of illegality as it is an ethical one.

C. B. FRITH

P.O. Box 200,
Phuket Province,
Thailand.

THE LATE K. A. NORRIS

I feel that we should not allow the sad loss of our late member K. A. Norris to pass with no more notice than was possible in the issue of the Magazine following his death.

I am proud to have known Ken Norris for over forty years and remember him as one of the outstanding aviculturists of his time. He was a great example of that all-too-rare combination, a bird keeper who was also an experienced and widely read field naturalist. Most helpful to those whom he felt to be deserving, his knowledge of and interest in all forms of wildlife went far beyond the cage and covered almost the whole world; and perhaps not everyone knew that he was a first-class bird photographer of the old "glass plate, mahogany and brass" school and that his ability to paint birds was of a high order.

It was not given to many to know him well and a delightful sense of humour was often hidden behind a shy and even off-putting manner, since the making of friends was not always encouraged in a somewhat repressive and restricting home life. He is greatly to be admired for his long devotion to elderly parents, and it is sad indeed that the joy of his late marriage was to prove so short lived.

DERRICK ENGLAND

Mashobra
Neatishead
Norwich
Norfolk.

IDENTIFICATION OF SUBSPECIES IN *Trichoglossus haematodus*

Harrison (AVICULT. MAG., 76, 1970, pp. 191-194) has given a thorough discussion of why there is usually little value for aviculturists to pay attention to the subspecific identity of birds, illustrating his arguments with examples from the appropriately named Rainbow Lorikeet *Trichoglossus haematodus*. It therefore comes as a surprise to be presented with a chart to assist the identification of the subspecies of this species, prepared by Rosemary Low, that arrived between the pages of AVICULT. MAG. 80, No. 6, accompanying a note by the same author on pp. 203-204.

Having examined most specimens of *Trichoglossus* in British museums and the extensive material at the American Museum of Natural History, I am convinced that many of the subspecies listed on the chart can only be recognised by comparison with adequate museum material, and that a proportion of specimens can then only be placed in the correct subspecies by reference to the locality where they were collected. With care the following four subspecies can be reliably recognised from single adult birds of unknown origin, *T. h. rosenbergii*, *mitchellii*, *weberi* and *rubritorquis*; the other eighteen subspecies can be identified to subspecies groups as follows: *T. h. haematodus* group (*haematodus*, *berauensis*, *caeruleiceps*, *micropteryx*, *intermedius*, *flavicans*, *nesophilus*, *massena* and *deplanchii*), *T. h. forsteni* group (*forsteni*, *djampheanus*, *mitchellii* and *stresemanni*), *T. h. capistratus* group (*capistratus*, *fortis* and *flavotectus*), *T. h. moluccanus* group (*moluccanus* and *septentrionalis*), (*T. h. caeruleiceps* and *septentrionalis* were omitted from Miss Low's list without comment).

D. T. HOLYOAK

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* * *

NOTICE TO AUTHORS

Council has decided that authors of papers of three or more Magazine pages in length, exclusive of illustrations, shall be entitled to ten free copies of the Magazine in which their papers appear. Extra copies or separates are, of course, available on payment.

Authors wishing to receive the allocation must please say so at the time of submitting articles.

* * *

THE BREEDING OF *COLUMBINA CRUZIANA*

The Gold-billed, Peruvian, Gold-ringed, Croaking or Yellow-billed Ground Dove, Yellow-billed or Peruvian Pigmy Dove, as *Columbina cruziana* is variously known, was bred during 1973 by Mr. J. Trollope and his account of this success appeared in the Magazine (vol. 80, pp. 181-183).

This is possibly a first breeding of this species in this country, but will anyone knowing of others please inform the Secretary or Editor?

REPORT OF COUNCIL MEETINGS—1974

Meetings of Council were held on 20th May and 21st October 1974 at Burlington House.

It was with great regret that Council learned of the deaths of Sir Crawford McCullagh, Vice-President, and Mr. K. A. Norris, Council Member.

The following elections to Council were made :—

Mr. W. Conway	Vice-President
Mr. D. England	Council Member
Dr. C. J. O. Harrison	Council Member
Mr. B. Sayers	Council Member

FIRST BREEDING AWARDS

The Society's Medal was awarded to :—

J. F. Dowling	Ortolan Bunting, <i>Emberiza hortulana</i>
M. D. England	Red and Yellow Barbet, <i>Trachyphonus erythrocephalus</i> .
R. Franklin	Silver-eared Mesia, <i>Mesia argentauris</i> .
Miss M. P. Gourlay	Blue-crowned Chlorophonia, <i>Chlorophonia occipitalis</i> .
H. Murray	Spanish Sparrow, <i>Passer hispaniolensis</i> .
D. G. Osborne	Black-cheeked Waxbill, <i>Estrilda erythro-nota</i> .
Mrs. K. M. Scamell	Silver Bird, <i>Empidonax semipartitus</i> .
Mrs. K. M. Scamell	Black-crested Bulbul, <i>Pycnonotus melanicterus</i> .

The Society's Certificate of Merit was awarded to :—

Birdland	Spotted Morning Warbler, <i>Cichladusa guttata</i> .
Blackpool Zoological Gardens	Banded Pitta, <i>Pitta guajana</i> .
The Wildfowl Trust	Greater Flamingo, <i>Phoenicopterus ruber</i> . Chilean Flamingo, <i>Phoenicopterus chilensis</i> . Andean Flamingo, <i>Phoenicoparrus andinus</i> .

HON. SECRETARY & TREASURER.

THE AVICULTURAL MAGAZINE

The Magazine is published quarterly, and sent free to all members of the Avicultural Society. Members joining at any time during the year are entitled to the back numbers for the current year on the payment of subscription.

ADDRESS OF EDITOR

Mr. J. J. Yealland, 1 Stoneham Cottage, Cemetery Road, Binstead, Isle of Wight.

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NEW MEMBERS

The 22 candidates for membership in the November/December 1974 number of the AVICULTURAL MAGAZINE were duly elected members of the Society.

CANDIDATES FOR MEMBERSHIP

- MR. F. BLANK, 7, Bowness Road, Millom, Cumbria.
MISS F. J. BRUCE, The Oaks, Catfield, Nr. Stalham, Gt. Yarmouth, Norfolk.
MR. R. J. CASEY, 33, Broadclyst Avenue, Leigh-on-Sea, Essex.
MR. C. DACAS, Milford, Merrion Road, Ballsbridge, Dublin 4.
MR. C. FROKICK, 4, Chestnut Close, Alton, Hampshire.
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MR. J. HAGBERG, Moranvagen 26, S-13651 Handen, Sweden.
MR. D. HEAD, 21, Cameron Road, Bromley, Kent.
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MR. C. N. A. HILL, The Red House, Swardeston, Norwich.
MR. P. HOBBS, 35, Yallambec Road, Berowra, N.S.W. 2081, Australia.
MR. G. M. JENNINGS, JNR., 23125, Erwin Street, Woodland Hills, California 91366, U.S.A.
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LADY KIRKBRIDE, to 33 Fernhurst Drive, Goring-by-Sea, Worthing, Sussex BN12 5AU.

MR. J. KUTTNER, to 58, Broadwalk, S. Woodford, London, E.18.

MR. P. H. MAXWELL, to c/o The Old School House, Rudgwick, Sussex.

MR. T. PULLINGER, to 20C, St. Mark's Hill, Surbiton, Surrey KT6 4PT.

MR. D. M. REID-HENRY, to c/o Queen Victoria Museum, Box 8006 Causeway, Rhodesia.

MR. G. D. B. RHYS, to Gether Cottage, King's Ride, Ascot, Berkshire.

MR. M. RILEY, to The Oast House, Birdworld, Holt Pound, Nr. Farnham, Surrey.

MR. J. H. TORKINGTON, to Fenview, Main Street, Rowston, Scopwick, Lincs.

MR. A. R. WOOLFORD, to Flat 6, 11, Gunnersbury Avenue, London W5 3NJ.

MR. R. WYLIE, to 1417, Mautenne Drive, Manchester, MO. 63011, U.S.A.

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The Society entirely depends on Members' subscriptions and donations to maintain standards, and so donations, of whatever amount, are always especially welcome.

Will members please donate their surplus books on birds to the Society?

Members' Advertisements

White Cheeked Touraco—known cock wanted—have two hens both laying eggs for past 3 years.

K. Bastien, Tropical Bird Park, St. Lawrence, Isle of Wight.

Wanted: Tape or disc recordings of talking jackdaws, rooks, magpies, parrots or other talking birds.

Catherine A. Hutlbutt, 1910 South Marion, Denver, Colorado 80210.

Avicultural Magazines bound into volumes. State requirements for quotation.

A. J. Swain, 45, New Road, Bromham, Bedford.

Vol. 80 No. 4 July/August 1974 is now out of print and the Hon. Secretary would be most grateful if any members who no longer require their copies of this issue, would return their copies to him so that new members may have the opportunity of reading it.

The charge for Members' advertisements is 3p per word. Payment must accompany the advertisement, which should be sent to the Hon. Secretary, H. J. Horswell, 20 Bourdon Street, London W1X 9HX. All members of the Society are entitled to use this column, but the Council reserves the right to refuse any advertisement they consider unsuitable.

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Birds

AVICULTURAL MAGAZINE



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APRIL-JUNE
1975



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THE AVICULTURAL SOCIETY

Founded 1894

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Hon. Secretary and Treasurer: Harry J. Horswell, 20 Bourdon Street, London W1X 9HX



R. DAVID DIABY

AVICULTURAL MAGAZINE

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APRIL - JUNE 1975

THE BLUE MUTATION OF THE SPLENDID GRASS PARRAKEET

Neophema splendida

By J. R. HODGES (Pinner, Middlesex)

The last decade has seen the establishment of a number of psittacine mutations. Two particularly attractive grass parrakeet mutations have appeared—the yellow Turquoise and the blue Splendid—and are being bred successfully, although in limited numbers, in aviaries in this and other European countries as well as in Australia, their country of origin.

The existence of a blue variety of *N. splendida* was first brought to my attention more than ten years ago by an article in the AVICULTURAL MAGAZINE in which Mons. J. Delacour referred to the presence, in an Adelaide aviary, of Splendid Grass Parrakeets with much of their green plumage replaced by blue. Later, in AUSTRALIAN AVICULTURE, I read about Mr. D. Ikin's collection in Melbourne, which included a patiently built up stock of what the writer referred to as "Blue Scarlets". I must have been fired with an intense enthusiasm to possess some specimens of this mutation of one of my favourite species and, looking back, I hate to dwell on how much time and effort I spent in an attempt to persuade various Australian authorities to issue a permit for their export. However, my time was not entirely wasted and, about ten years ago, a few pairs arrived at London Airport. One pair went to the London Zoo, where their arrival was recorded in the Magazine, but the hen soon died from infestation with round worms. John Yealland kindly let me have the cock on loan. It was mated to a normal hen but the pair did not breed and the cock, apparently a fairly old bird, died two years later. I had no better luck with my own specimens. One pair nested several times, hatched clutches of five and six chicks, but the youngsters invariably died within 24 hours of hatching. Eventually, two cocks and one hen of the original imported stock were left with no offspring to show for three years of effort. The failure of my birds to rear any chicks appeared to be explained when the

Blue mutation of the Splendid Grass Parrakeet

Female on left, male on right

Plate donated by Palaquin Fine Arts, London.

Australian breeder told me that mating two blue birds together introduced a lethal factor and the fully developed embryos either failed to hatch or died immediately afterwards. I decided, therefore, to pair all my remaining blue specimens to normals. As a result some excellent split blue youngsters were reared which were subsequently paired to unrelated blue parent birds. By 1973 I even reached the stage of having a few surplus youngsters for disposal. One blue pair went to George Smith and almost immediately disproved the "lethal gene" theory by breeding successfully. In spite of this, I am continuing my own breeding attempts using blue birds mated to unrelated split blues—a mating which produces theoretically blue and split blue offspring in equal numbers.

The mutation is due to probably more than one recessive factor since it is possible to obtain, from the same parents, several blue young birds no two of which are identical in colour. In general the green of the normal is replaced by blue, the yellow by creamy-white and the red of the cock by a pinkish-apricot. The blue can vary from almost violet to a greenish-blue, the chest colour from a pale pink flush to orange and the underparts from cream to white. In some cocks the blue of the back and face is particularly intense and the underparts are snow-white with hardly a trace of pink on the chest. Others are greenish-blue on the back, orange on the chest with the abdomen and under tail-coverts very pale yellow. The hens exhibit a similar variation and some have blue chests, bluish-green backs and cream underparts whereas others are deep blue on the chest and back and white on the abdomen and under the tail. When the young leave the nest they are a lovely powder-blue rather like that of the blue Ring-necked Parrakeet. Splendids have a feather texture which appears to be different from that of the other species of their genus and the green feathers of the back and wings have some degree of iridescence. This is particularly noticeable in those mutants in which the blue pigmentation is less intense and they appear blue in dull light and shining blue-green in the sun. I have heard these described as "poor coloured blues" but, with their orange chests, they are quite as attractive as the deeper coloured specimens. There is usually an inverse correlation between the intensity of the blue and the depth of the pinkish-apricot on the chest but, last year, a cock was reared from a pair consisting of a deep blue cock and a split blue hen, which has a dark green back and yellow underparts and an almost completely yellow chest.

"Experts", who usually ultimately admit that they have never seen one, have told me that the blue mutants are weakly specimens. Nothing could be further from the truth. They are as large as most normal Splendids and, more important, they are just as hardy. Mine are kept in aviaries with unheated shelters and many of them persist in roosting in the open flights in the most adverse weather conditions. However,

during the 15 years or so for which I have kept Splendid Parrakeets, I have had many sudden deaths and therefore I would never describe this species as being as robust as the other members of the genus *Neophema*. Like Gouldian Finches, Splendids have the distressing habit of looking perfectly fit in the evening and being dead the following morning from causes which are difficult to determine.

It has not been possible to breed sufficient numbers to consider the blue mutation to be *firmly* established. None of my pairs have been prolific. Fertility has been excellent but the successful breeding pairs have seldom reared more than two or three of the chicks which have hatched. Furthermore, they have a tendency to moult in July with the result that they are usually only single brooded. However, it appears that some have reached the Continent from Australia and perhaps the breeders in Holland, with their avicultural "green fingers", will show us how to establish firmly this truly exquisite mutation. A two-year-old pair is the subject of the plate in this issue of the Magazine. Ron Digby, one of our most talented young bird artists, has skilfully captured the greenish iridescence, which the blue exhibits in certain lights, in this accurate and lovely painting.

MY BIRDS IN 1974

By HERBERT MURRAY (Brentwood, Essex)

From an avicultural point of view, 1974 was one of the most unusual that I have known, being well supplied with events both pleasant and interesting and others that were not so good.

At the beginning of the year I had built up my stock of birds to a fair size, containing many true pairs which I hoped to be able to persuade to nest successfully.

The first bit of trouble occurred in February when a terrific gale damaged part of the roof (which damage was obvious and soon repaired and occasioned the loss of no birds) and the loosening of a piece of netting on the roof which only opened a gap now and then and was not spotted for some time. A few birds were lost here; I knew that something was wrong, for I found some of my birds sitting hungrily outside the main door of the aviary awaiting my arrival and when I went in they came inside at once without trouble.

Early in April I had several visits from a thief who was very difficult to pin down, but by the end of April all gaps were repaired, my unwelcome visitor was in Borstal and it was possible to settle down; however many of my pairs had now become odd birds.

I have never known a season when so many birds decided to attempt to breed. Some of these were not successful, but were very interesting all the same.

CRESTED LARK *Galerida cristata*

I had several of these birds and could not sex them, but in one aviary I apparently had one cock and two hens.

Both hens nested and laid, but I must say that the building of the nest was very different from what I had expected. No natural hollow in the ground was chosen, but a definite hole about the size of a large teacup was dug out by the bird. I saw this done, and the soil was carried out of the hole in the bird's beak: the sides of the hole were smoothed and the nest was built inside, mainly of dry grass and rootlets. Clutches ranged in size from two to four eggs and a number of nests were built, but only one brood of four reared.

One nest was built above ground in a corner, and here the young were reared until fledged: they then disappeared. The young birds were the greatest experts in "freezing" that I have come across. They were fed on insects, but I suspect a fairly wide selection of foods was given.

Larks are curious feeders and if given access to a wide variety of foods, as my birds are, they seem to eat a bit of everything. They certainly eat a lot of seed. I was very pleased to rear these birds, as it was the first breeding for many years.

FISCHER'S SPARROW LARK *Eremopterix leucopareia*

These birds have always interested me, as they differ so widely from the general run of birds that one keeps.

Here again, in the same aviary I had one cock and two hens. I knew that one of the hens was nesting and I knew roughly where the nest was. Other birds were breeding nearby and I did not wish to disturb these, so I did not probe too deeply into the secrets of the finch larks.

Three young were reared, but one subsequently died. Both of the remaining birds, hens, have overwintered well and cannot be seen to differ from the old birds.

Finch larks are queer little birds, with a weak fluttering flight they seldom use. They prefer a mixture of sand and compost on the floor of their aviary and have a habit of burrowing in the earth until their backs are level with the surface. I suspect they sleep in this fashion, but I have not been able to prove this. I have never seen them bathe in water, but they spend a lot of time sand-bathing. Only once have I seen a bird drink water, but I think it likely that they drink at dawn in the same fashion as sandgrouse. After all they come from the same type of country as the sandgrouse.

Here again they eat a wide variety of food, but mealworms are the greatest treat that one can give them. They will use a large door near the ground to go into the aviary shelter, but I always bring them in for the winter. They are so highly specialised for their habitat that they do not seem to possess the usual adaptability of small birds. There is little song that I have heard, indeed the birds are mainly mute. The

main display seems to be the raising of the crown feathers of the cock, but this is not very spectacular. One gets the feeling that there is an awful lot one does not know about these strange, drab little birds.

SPANISH SPARROW *Passer hispaniolensis*

I bred this bird in 1973, but found it much more freely nesting in 1974. Indeed, it would be quite true to say that at the moment I have a surfeit of these birds.

In an aviary they take a long time to settle down, and even when left in the aviary in which they were born they take fright very quickly; however a few generations of aviary breeding should cure that.

According to the books the Spanish Sparrow builds away from towns: my birds nest in holes and crannies and build a typical sparrow's nest, and they have all the bustling rowdiness of our House Sparrow, an efficient exploiter of the human race.

They seem to eat almost anything that is provided, but when rearing young take any live food they can get and failing this they will feed the young with substitutes. In this way they are identical with the African Golden Sparrow.

My Spanish Sparrows had four nests and reared about a dozen youngsters. The first three nests were in holes, but the fourth, built while the weather was hot, was in a bush. In this respect also these birds behave in the same way as House Sparrows.

LITTLE MASKED WEAVER *Ploceus luteolus*

This is a well known and pretty little weaver, and one that is quiet and well behaved with the other birds in the aviary. Its nest differs in some ways from the general run of weavers' nests: it is built of strands pulled from plants, not blades of grass. In my case palm is used; the whole nest is very closely woven and is of great tensile strength. The entrances point downward and the "spouts" are strongly made, with any part likely to loosen being strongly reinforced. Some nests built by the same bird have two entrances and some only one. The nest in which the eggs are laid usually has one entrance. All sitting is done by the hen, but as far as I could see, the cock built the nest.

As the nest is small to start with and the entrance is at the bottom, both eggs and young have a habit of falling out, and rearing is not very common. Two eggs seem to compose the clutch, but out of four nests, only two broods were successfully reared, four young birds in all.

The young birds when they fly are grey, but after a month or so turn into the yellowish-green shade similar to the hen.

It is rather interesting to note that any young birds that fall out of the nest are fit and alive, and it is rather hard to discover the reason why they fall. It may well be that in an aviary some other bird throws them out, but I have no evidence of this. The young are fed on live food, and also possibly by regurgitation but I cannot confirm this. Soft

food is also fed, but this is always carried in the beak.

It is the great strength of the nest that interests me with this weaver, and the finely made and smooth nature of the "fabric". As I said before, I know that strands of palm leaf are used, but I suspect that the fibrous inner bark of branches used as perches may also be pressed into service.

GREY-HEADED SOCIAL WEAVER *Pseudonigrita arnaudi*

Everybody who has looked at books covering birds from Africa has seen illustrations of the nests of these birds and of the Social Weaver *Philetarius socius* which builds the huge communal nests.

Where my birds are concerned, I regret to say that there is a great deal of difference between the illustrations and the performance.

I have a pair of these birds, and they followed the Spanish Sparrows round and took over the sparrows' nests as the sparrows finished with them.

They built a similar nest to the sparrows, and there was no sign of them weaving at all. Unfortunately, although they appeared to hatch young, they did not rear any.

At one time I had several pairs of these birds together and although they never stopped nesting, never once, as far as I could see, did they make an attempt to weave.

PEARL-HEADED SILVERBILL *Odontospiza caniceps*

A pair of these attractive little birds nested all summer, but never finally managed to rear anything. The nearest they got to success was a fully fledged youngster. In essence these birds are born losers. Most of their nests were taken by other birds and they would have been far better if they could have had an aviary on their own.

ST. HELENA WAXBILL *Estrilda astrild*

This was the third season with my little colony of these birds, and although they nested freely, they did not seem to rear as many young as they should have done. Although they are kept in a planted aviary some 54 ft. x 17 ft. which should have been large enough to suit most social breeding birds, there must have been a considerable number of nests which were not successful. It appears that there is a limit to the concentration of even these sociable birds.

Orange-cheeked Waxbills and the Common Firefinch were also bred, while tanagers of various kinds provided a lot of additional interest.

YELLOW-BACKED TANAGER *Ramphocelus icteronotus*

I have a fine pair of these birds and they nested throughout the summer. The first nest was in March, and one young bird was reared and flew. They had several other nests but the final tally was not impressive.

In the same aviary I had an odd hen tanager, probably one of the black tanagers *Ramphocelus flammigerus* and this bird built a nest on

the ground and laid two eggs. She must have mated with the Yellow-backed; one egg hatched and the young bird was reared. At the moment it is not possible to see much of what it will be like, but the youngster is very fit and after its second moult should show signs of adult plumage.

I also had a cock Blue-headed Tanager *Tangara cyanicollis* and this bird paired with a hen Opal-rumped Tanager *Tangara velia*. The hen laid two eggs which hatched and were reared. The young were handsome and very active birds; one was stolen, but I hope to pair the remaining bird back to its father and see what happens.

There were a considerable number of attempted breedings which did not reach full success, but may be of interest to record.

In tanagers *Euphonia mesochrysa* nested and laid two eggs. One hatched, but was not reared. These birds built a strong closed nest and, unlike all other tanagers that I know, sat very closely.

Mrs. Wilson's Tanager *Tangara nigrocincta* nested all summer but reared no young at all. This was due more to their highly specialised nest building than anything else. The nests consisted of a very small quantity of green grass blades placed in the crotch of a branch or small hollow. As the grass dried, it shrunk, the nest virtually disappeared and the eggs usually fell out. What the bird uses in the wild is difficult to imagine.

Schrank's Tanager *Tangara schranki* paired to a cock Emerald Spotted Tanager *Tangara guttata* partially reared a youngster, and a hen Palm Tanager *Thraupis palmarum* and a hen White-winged *Thraupis episcopus* made a nest together; both laid in it and spent the summer sitting happily side by side.

I must confess that two of my biggest disappointments were with buntings.

YELLOW-BROWED BUNTING *Emberiza chrysophrys*

I have a pair of these very handsome birds and they nested all summer, but although they hatched they never reared anything. They built a solid nest and sat very closely, never leaving the eggs unattended for a moment. They did hatch a youngster, but it was not reared.

VERSICOLOR BUNTING *Passerina versicolor*

These birds also laid and hatched young, but did not rear any.

Greatest disappointment of all—two pairs of Cedar Waxwings laid and sat, but again nothing to show for it. Taking it all in all it was an interesting summer.

One point struck me very forcibly and this concerns the actual style of incubation.

As will be seen from the foregoing notes, I had birds nest whose natural ranges run from the tropics to Siberia and Canada. There was a great difference in the incubating patterns between birds from the two extremes, and although the obvious reason for the birds from cold

regions was climatic, I am not too sure that this is the only reason. I suppose one could say that England, last summer, was about an average between the higher northern latitudes and the tropics.

Tanagers, which of course mostly come from the tropics, are very casual when it comes to sitting on their eggs and will often leave them for an hour or more when they feel inclined. Most tanagers come from regions of fast and heavy plant growth, and their nests therefore become completely hidden in a very short time. In spite of the time the tanagers left their nests unattended, not one fertile egg failed to hatch.

On the other hand, birds from the colder regions, in spite of constant incubation, hatched a very much smaller proportion of young.

It has occurred to me that much of the brooding done by birds is not actually necessary to the hatching of the young, but is brought about by the necessity of concealment and protection of the eggs from predators. To put it simply, where a bird has adequate protection for its nest by rapid growth of vegetation, etc. it sits for a relatively short time, and the cock bird seldom helps, but in the case of birds nesting in areas where the vegetation is much sparser and the nest is therefore much easier for a predator to see, the nest is never left and both the parent birds help with incubation. I realise that in the colder regions the temperature varies rapidly and widely, but summer 1974 in England was very different from the tropics; the tanagers who sat very casually had a very high hatching rate in spite of the fact that their eggs were subject to violent fluctuations of temperature.

BREEDING THE RUFOUS-CHINNED LAUGHING THRUSH AT WINGED WORLD

By BRYAN S. WARD (Heysham, Morecambe, Lancs.)

The Rufous-chinned Laughing Thrush *Garrulax rufogularis* is one of the smaller laughing thrushes, being nine inches in length. It is found in the Himalayas from Nepal to northern Burma, where it skulks in the dense shrubby undergrowth. Its general colouring above is rich olive brown and grey, squamated with black. The crown, nape and ear-coverts are black; a large ring around the eyes grey. The lores are white and the chin rufous; the underparts are whitish spotted with black and the tail-coverts are a rich chestnut, the tail feathers rufescent with a subterminal black band and the sexes are alike.

The pair that we have in Winged World were purchased in April 1968 and were released into one of our glass-fronted compartments. They showed no interest in breeding until June 1973, when they laid two eggs in an open wicker basket of the type often used by finches. These eggs disappeared after a few days; a week later the hen laid

again and these too disappeared. The culprits I believe were a pair of Green Wood Hoopoes *Phoeniculus porphyreus*.

The laughing thrushes were then put into our "Free Flight" where there was more cover for nesting activities; they were seen carrying nesting material about but nothing came of it. They subsequently ended up in our "Open Exhibit" which contains mainly waders. A nest basket of the type they had used previously was fixed in a tree *Ficus lyrata* in which they showed immediate interest and they were again frequently seen carrying nesting material about.

In the spring of 1974 the hen was sitting again, but on this occasion also she was unsuccessful as the eggs were thrown out, this time by a pair of Bristle-crowned Starlings *Onychognathus salvadorii*. These were housed in the "Free Flight", but regularly commuted from there across the public concourse into the "Open Exhibit" as and when they felt so inclined. We could not remove them owing to the fact that they had young in the "Free Flight" at that time and so we decided to leave things as they were.

The Rufous-chinned Laughing Thrushes continued to lay clutches of eggs at frequent intervals in this nest over the next few months, but always to no avail, although on one occasion she did manage to hatch two youngsters, these too being thrown out at an early age. When the laughing thrushes were ultimately successful in rearing their youngster we were unable to determine the incubation period, for a close check on them had not been kept, as on the many previous occasions things had turned out so disastrously. We are not even sure of the date that the chick hatched; it left the nest on the 20th July, a much smaller and duller edition of the parents, and we assume that it hatched 12 days earlier as both the cock and hen were seen searching for food at that time. It was reared almost exclusively on the mealworms offered, as far as we could ascertain.

We were surprised to find that when looking up at it from the ground, the youngster could be seen moving about through the bottom of the nest. On checking, after the chick had left, we found that no attempt whatsoever had been made to build, the wicker basket being completely devoid of nesting material. Dr. Harrison (A.M., vol. 68, pp. 188-196) has drawn attention to the problem of supplying nesting material acceptable to this species.

As described the Rufous-chinned Laughing Thrush *Garrulax rufogularis* has been bred at Winged World, Heysham, and this is believed to be the first breeding in this country. Anyone knowing of a previous breeding of this species is asked to inform the Secretary or Editor.

BREEDING EUROPEAN OWLS

By WOLFGANG SCHERZINGER (Waldhauser, Germany)

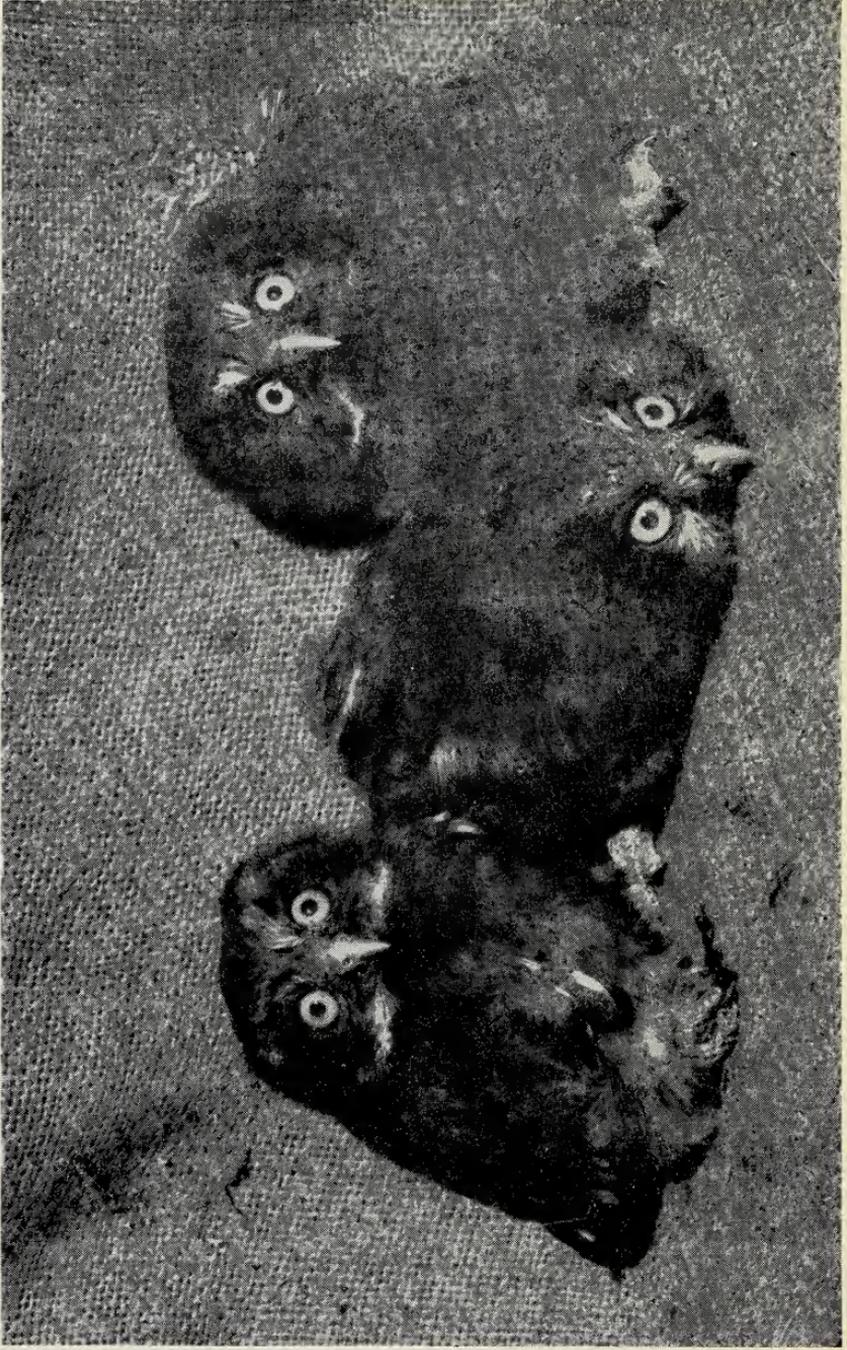
My breeding experiments were started originally for the purpose of scientific observation where this could not be made in the wild, and for this reason I used mostly hand-reared, tame parent birds. Later the importance of rearing offspring of rare species for re-introduction to the wild became a further motive.

It is advisable in breeding to avoid mixing species in an aviary or to have more than one pair of owls in the aviary which should be as large as possible and afford good places of concealment. Only reasonably tame birds breed successfully in small aviaries in my experience.

As owls, naturally, only breed when they are in good condition, a suitable diet is of the greatest importance. Many species are specialised on certain kinds of prey, so that the principle of a varied diet does not apply to owls. Mice, rats, guinea-pigs, sometimes day-old chicks, are most suitable—raw meat only in exceptional cases. Some species also eat fish, insects and other invertebrates, and I have known of captive owls eating vegetable food such as salad. It is not advisable to give sparrows, chicken heads, crows, etc. in view of salmonellosis and the danger of a *Herpes* virus infection. In any case deep-frozen food is inferior to freshly-killed prey, a fact that is reflected in the hatching results. Should the food freeze in the aviary, it is not harmful to the birds, but care must be taken that the small species do not just starve. Doses of vitamins during the display period have proved very beneficial to Pygmy Owl, Tengmalm's Owl and Ural Owl.

To secure the most complete synchronisation of the partners the birds should be kept out of doors the whole year; this ensures their requirements of rain, sun- and sand-bathing. Birds hardened to all weathers must also be given shelter from wind and rain. As most owls are sensitive to disturbance it is advisable to have a protective (screen) facing to at least one of the aviary walls, for some species to the roof as well.

In many cases the nature of the nesting place is the decisive factor for breeding success. Natural holes are often plainly preferred to nest-boxes and it is recommended to offer the owls a large selection of nests of various sizes and types. It is best to bring the breeding pairs together as early as the autumn so that they can be studied intensively during the winter months and, if necessary, one of the partners be changed before the breeding season begins. In some species sex determination is especially difficult as this is only possible through the vocal utterances, which in the case of a pair of young birds, is not always rightly determined by the owls themselves! Individuals that have been hand-reared are mostly imprinted to humans and are often not suitable for breeding purposes.



Tengmalm's Owls at 24 days old.

BREEDING RESULTS

I have kept several owls (Little and Scops Owl) since 1964; my first breeding success was in 1968 with Pygmy Owl. Since then I have been able to breed nine species successfully—in great part thanks to the kind support of my friend, Dr. H. Frey. In the following the species are listed in the order of their size: the cage/aviary dimensions (length and breadth) are given and the height ranged from 1.5 to 3.5 m.

PYGMY OWL *Glaucidium passerinum*: Kept in aviaries of 16 x 6 m., 4 x 3 m. and 2 x 2 m in size. This small owl requires the relatively largest aviary, as it flies very swiftly and, in restricted aviaries, the smaller male can be pursued and killed in a quarrel with the female. It reaches sexual maturity in the first year; the natural holes of Great Spotted Woodpecker and Three-toed Woodpecker are the preferred nesting sites and it also deposits prey there. Day-old chicks as sole nourishment is not sufficient for successful breeding. Only one brood per year; up to now a maximum of nine young per brood. The parent birds were hand-reared and have produced 62 young since 1968.

SCOPS OWL *Otus scops*: The aviary should afford as much shelter as possible. It is even possible to breed this species indoors. The pair should be brought together by March/April at the latest. Although some individuals breed under unfavourable conditions, others cannot be stimulated to do so under the most perfect conditions. The owls accept the most varied types of nest-box. The parent birds were purchased and two young were hatched in 1973.

TENGMALM'S OWL *Aegolius funereus*: Aviaries of 6 x 3 m., 2 x 3 m. and 2 x 2 m. in size. This species seeks cover and should not be disturbed while incubating. Day-old chicks as sole diet is not sufficient; in addition to fresh mice, vitamins should be given, otherwise a high embryo mortality can result. This owl favours deep, roomy holes for breeding, preferably those of Black Woodpecker. As the male, before the breeding season starts, frequently pursues the female, it is sometimes necessary to separate the pair but to keep them in visual contact. The parent birds were hand-reared: one to two broods a year, with a maximum of six young. Sixteen young birds reared since 1969; mostly poor hatching results.

LITTLE OWL *Athene noctua*: It is possible to breed in small aviaries, but these must always offer plenty of shelter, as even hand-reared birds are very wild. Size: 2 x 5 m., 1 x 3 m.; roof and sides covered. The owls reach sexual maturity in the first year and favour deep holes and burrows (horizontal or vertical). Good breeding results can be achieved even if day-old chicks are the sole diet. One brood per year; a maximum of six young per brood. The parent birds were hand-reared and produced 20 young since 1970.

BARN OWL *Tyto alba*: A sheltered, well-protected enclosure is the most favourable. If left undisturbed and given abundant nourishment

the owls nest in very small aviaries, even in a room. They are sexually mature in the first year and have two to three overlapping broods a year. An exclusive diet of deep-frozen food or day-old chicks reduces the hatching results by 70 percent. The parent birds were purchased; broods with a maximum of six resulted in 19 young since 1972.

TAWNY OWL *Strix aluco* : A hand-reared pair was kept in an outdoor aviary from 1968. As I did not take any great trouble with them, the owls did not nest until 1973, in a room (1.5 x 4 m. in size) and reared only one young bird. The nest-box was a wooden case with a roof (30 x 40 cm.).

URAL OWL *Strix uralensis* : Large aviaries are essential as the female often pursues her partner. During incubation the birds are also extremely aggressive towards the keeper and for this reason they should be fed from outside and all cleaning activities in the aviary should be postponed. The aviary must be absolutely free of disturbance so that the female does not leave the clutch too often. High-grade food, with added vitamins, in the period before the eggs are laid is to be recommended. The owls are sexually mature in the first year and accept wooden cases, baskets or hollow trunks as nesting places. The parent birds were purchased; they have brooded since 1970 without success, for which reason the two young in 1973 were reared by hand. In 1974 these two reared one young bird themselves and their parents three young = six altogether up to the present time.

SNOWY OWL *Nyctea scandiaca* : Here the size of the aviary is of less importance than that it should command a good open view. The owls accept all food; they breed in their first year but do not usually efficiently care for the young until the second year. Male and female scratch a nest hollow in the ground, preferably on a little mound with a gravel foundation, if from here the sitting female has a good view over the territory in front of the aviary. Snowy Owls should not be kept in closed, or even worse, in heated rooms. The parent birds were purchased; the broods in 1969 and 1972 were unsuccessful; eight young from 1970 to 1974.

EAGLE OWL *Bubo bubo* : As not all pairs are compatible, it is important to keep them under careful observation to ensure a good breeding pair. It is of advantage to keep them in large aviaries so that parent birds and young have room to retreat when the cage is cleaned. It is advisable to board up at least two sides of the aviary. In order to avoid disturbance in the aviary and injury to the keeper from attacks by the female, it is advisable to feed from outside and to forego all cleaning activities during the breeding period. The female chooses as a breeding site a raised corner of the aviary from which she can survey her surroundings, or a roomy recess with an uninterrupted view. Shelter from the weather should be provided as the owl may breed in February. Although Eagle Owls will accept all food offered, it is not

advisable to feed poultry, pigeons and crows etc., owing to the danger of infection (diphtheria). Hand-reared individuals are mostly imprinted to humans. One brood per year. Parent birds were purchased and had been reared in captivity. Breeding is possible in the first year but parental-care is usually disturbed. Eleven young since 1972.

I am very grateful to Countess Gräfin Westarp for her help with translation.

TWO COLLECTIONS OF BIRDS IN ARIZONA

By J. DELACOUR (Clères, Seine Maritime, France)

There are two remarkably successful bird breeders in the vicinity of the city of Phoenix and I have made a habit in recent years of visiting their aviaries every winter when I am in the western United States. Central Arizona possesses a very favourable climate for tender species—the winter is mild, the temperature very seldom dropping below freezing and it is hot during the summer months. It seldom rains, but extensive areas are irrigated and highly productive, for there is an abundance of underground water.

Aviaries have to be well shaded, but otherwise little shelter from the weather is required. Mr. B. Roer has a long record of successes with a variety of birds—waterfowl, cranes, game birds, pigeons and doves, parrots and parrakeets and a number of passerines. He has reared in recent years, among many other species, Crowned, Demoiselle and Stanley Cranes and also various curassows such as the Great, the Wattled and the Blue-billed; he had partial success with the Nocturnal, a rare species which so far has only been completely reared at the Houston (Texas) Zoo. He raises each year Green Peafowl and he has selectively bred a white variety, the size and shape of the original Green with a straight crest and yellow skin patches on the cheeks. Crowned and Nicobar Pigeons and a variety of doves, Vulturine and Crested Guineafowl, various peacock pheasants and firebacks as well as other pheasants, Ocellated Turkeys, Cereopsis, Orinoco and other geese, Radjah and other shelducks, ducks and teal, macaws, cockatoos, Amazon and Grey Parrots, Australian and other parrakeets are regularly breeding.

Also in the vicinity of Phoenix Mr. L. M. Ollson, a younger enthusiast, maintains one of the largest and finest collections of tropical and subtropical birds to be found in the western world and he is particularly successful with them. He has built numerous aviaries and enclosures, all of generous proportions and well planted. A number of them include ponds and he continues adding to them in a big way. They are strictly practical and no visitors are permitted to enter the grounds with the exception of other bird specialists.

All the genera of large ground birds are represented: Ostriches, grey and white Rheas, Emus and cassowaries. The Ostriches are a young pair, but all the others have been breeding in 1974. Mr. Ollson has been especially lucky with his Double-wattled Cassowaries *C. casuarius* for he has been able to keep three together, one male and two females, in a roomy pen about 100 ft. x 100 ft. and planted with trees and bushes—a most unusual occurrence, for all those who keep cassowaries have found out how difficult it is to associate even a male and a female together as a rule, the latter, the larger and fiercer of the pair, attacks the male and would quickly kill him without swift intervention and separation. That is the reason for the paucity of breeding records, but Mr. Ollson's birds, which were raised together, not only tolerate one another, but they have bred during 1974, the two females laying fertile eggs and one young one reared.

Sarus, Stanley, Demoiselle and Crowned Cranes breed each season, but the Wattled Cranes, like those at Clères, have so far laid infertile eggs only. The collection of waterfowl and game birds is very important, but wisely confined to tropical and subtropical species, most of them breeding regularly—such is the case with Cereopsis, Orinoco, shelducks and sheldgeese, Black, Black-necked and Coscoroba Swans and curiously enough a pair of Whistling Swans rear a brood each year. Argus, different peacock pheasants and others are doing very well, but Mr. Ollson's most interesting achievement is his outstanding success with curassows and other Cracidae. His collection of these Central and South American birds is no doubt the biggest in existence and he has reared more of them than anyone else. Crestless *Crax tomentosa*, Salvin's *C. salvini* and Black *C. alector* Curassows have bred in his aviaries for the first time in captivity during the past three years and many young have been reared; also Great *C. rubra*, Wattled *C. carunculata*, Bare-faced *C. fasciolata* and Blue-billed *C. alberti*. The Nocturnal Curassow *Nothocrax urumutum* has laid, but none have been reared. Guans and chachalacas of a number of species are kept and also breed, and I have noted some curious hybrids between a species of brown guan and a Piping Guan resembling more the former with numerous white lines, and streaks on the neck, head and mantle. Mr. Ollson's experiments with curassows and allied species have been of great value to Dr. D. Amadon and myself in our recently published monograph of these birds.

There are, moreover, many quail, parrots and parrakeets, doves and pigeons as well as passerine birds. The collections are constantly growing and at the present time of threatening extinction of many species of birds owing to over-shooting and to the destruction of their necessary habitats, the efforts of Mr. Ollson in propagating some of the fast disappearing forms is an example which should be followed by many others interested in preserving bird life for future generations.

BREEDING THE PURPLE COMBASSOU

Hypochera chalybeata ultramarina

By ROBIN L. RESTALL (Caracas, Venezuela)

The birds known variously as combassous, indigo birds or indigo finches are normally recognised as belonging to the genus *Hypochera*, but as long ago as 1880 it was suggested that *Hypochera* should be regarded as a synonym of *Vidua* (Forbes) and this view was latterly supported by Delacour (1934 and 1951). However, most authorities prefer to maintain the status of *Hypochera* (at least as a subgenus) as much for the convenience of separating the combassous from the other parasitic whydahs as anything. By the same token *Steganura* is considered a subgenus of *Vidua*. While discussions on what the genus might be may seem rather lofty and academic to the aviculturist, the question of what constitutes a species within the genus is more relevant. For example, depending on one's source of reference, there may be anything from two species *chalybeata* and *nigerrima* (Nicolai 1964) to ten.

When I wrote my rather generalised notes on the genus in CAGE & AVIARY BIRDS (Restall 1972) my motivation was to prompt the average bird keeper to take a more profound interest in his birds. Combassous generally are kept for decorative purposes in mixed collections of waxbills and allied finches. As far as I can make out no attempts are ever made to breed them, and should they ever be bred no doubt this would be by accident. I briefly related the host/parasite relationship of firefinches and combassous, and suggested that anyone with breeding firefinches might well consider including a pair of combassous in the enclosure with the thought of a parasite-breeding taking place.

All of this was brought home to me when, in the spring of 1974 I received a letter from Mr. D. Johns of Luton, Beds., who had followed my suggestion and successfully bred combassous as a result. I will (with his permission) summarise my correspondence with Mr. Johns, but first let me hark back to my opening notes on species identification. As far as he knew, Mr. Johns' birds were "Combassous". So I sent a drawing of an adult male bird with all the alternative diagnostics marked and, armed with the reply, I only then realised just how difficult it is to identify one race or species from another. Before anyone points out that a set of museum skins might have been useful I must say that the soft parts are just as important as plumage characteristics and since no two authorities in the world seem to be able to agree (Friedmann, 1960, summarises the confusion admirably) it really boils down to anyone's guess. However, I finally concluded that the "species" in the Luton collection was *ultramarina*, which may well

be a race of *H. chalybeata*.

Mr. Johns wrote as follows:

" . . . having bred East African Firefinches fairly regularly I introduced a pair of Combassous into my aviary that summer. Unfortunately the cock bird died that winter, but I was able to replace it fairly easily.

No apparent attempt at breeding was seen to be made until last year when my wife drew my attention to a young bird obviously just out of the nest, its appearance being that of a Firefinch hen. It was followed two days later by another youngster of similar appearance which I accepted as being another Firefinch. These two youngsters were seen being fed by a pair of adult Firefinches during which the Combassous appeared to take no interest whatsoever. Our suspicions were first aroused when the two youngsters started to outgrow their apparent parents. We then noticed certain plumage changes which included stripes across the head and sparrow-type markings on the wings, the chest feathers getting lighter in colour.

The size by this time was so marked plus the adult Combassous had taken up position each side of the youngsters whenever they were not being fed by the Firefinches, that I decided at this point to get a second opinion asking Mr Dennis Burgess of Luton who very kindly called and inspected the birds. He agreed with me that the appearance of these youngsters seemed to be that of young Combassous.

Following their weaning the two youngsters were closely watched and protected by the adult Combassous but unfortunately I lost one of the young, plus the cock bird. The remaining bird is now identical to the hen but slightly larger. It has uttered a call occasionally which sounds very like a cock bird's warning call. I am looking forward to next year to see if my opinion is proved correct."

Mr. Johns then supplied the following supplementary information:

"AVIARY

18 ft. long, 6 ft. wide, 6 ft. high. First 6 feet covered over top and sides; second 6 feet covered top and open side and the rest completely open to weather.

Back of aviary is made up of a wall of broken paving stones providing cavities for nesting sites. The floor is earth and some grass plus a large Fuchsia bush and a couple of small conifers, some Privet growing up the wall and there is a small pond. A small attached shelter (access by two holes) in which two tubes, thermostatically controlled, keep the temperature at 50 degrees all the time plus a small 15 watt lamp alight all the time.

FOOD PROVIDED

Mainly Panicum millet and millet sprays; some canary seed and plenty of grit and cuttlefish bone. Greenfood, mainly lettuce grown by ourselves.

I have found also that a pool of stagnant water helps to provide much needed live food. The firefinches take a great interest in the pool especially when it is washed out: they also spend much time on the floor, presumably catching live food.

Other birds in the aviary are one pair of Green Singing Finches, one pair Paradise Whydahs (only purchased in August 1973), four pairs Gold-breasted Waxbills, one pair Red-eared Waxbills, one pair Diamond Doves, one cock Weaver, a couple of Java Sparrows plus four pairs of African Firefinches as described in your articles printed in 'Cage Birds'.

DESCRIPTION OF YOUNG 'COMBASSOU'

Colour of eyes, dark; bill, pale pink (upper only); legs, pink although not so dark as in adult hen. Throat and lower bill, off white; upper chest light brown; lower chest, abdomen and rump, off white.

Two dark brown stripes one each side of head starting behind the eye to the rear each approximately $\frac{1}{4}$ inch long. Back of bird mainly different shades of brown (sparrow like in appearance). Some dark (near black) feathers in evidence: tail short, squared off.

General appearance of young bird is much bolder than adult hen which is by comparison slim. Head is broader and flatter than adult."

Regarding the identification of the firefinches I am afraid that I did

not make any further investigation but the one described in my article, and which Mr. Johns is certain corresponds to his birds is *Lagonosticta senegala* the Senegal Firefinch.

For members of the society who may be interested in the study of combassous I am summarising the known breeding records below. It would be superfluous to comment on these in detail, since this was done admirably by Holger Poulsen in 1956.

- ?1899. Russ (In Butler 1899). First known breeding. Combassous were reared by Senegal Firefinches. The combassous bred again, this time behaving like non-parasitic species.
1914. Mrs. Boyd reported in BIRD NOTES, and also by Hopkinson in 1926. First British breeding. Combassous were reared by Cordon Bleus *Uraeginthus bengalus*.
1937. C. C. Cosgrove (1947). The Black-winged Combassou *chalybeata* was raised by firefinches in an Australian aviary.
1951. A. R. Nielsen (A.M., 1951). First breeding in Denmark. Combassous *H. chalybeata* reared by Senegal Firefinches.
1955. K. Nielsen. Another Danish breeding, when the Combassous *H. chalybeata* built their own nest and reared their own young.
1956. K. Nielsen (A.M., vol. 62, pp. 11-13). A new Danish breeding result—breeding of the Combassou *Hypochera c. chalybeata*.
1958. H. Olsen. Yet another Danish breeding. One *chalybeata* was reared by firefinches; it was a female which paired back to its father and the original firefinches obligingly raised a further two combassous.

The two earlier records were assumed to be for the species *chalybeata* (and presumably the race *chalybeata*?).

Whether there are two (*amauropteryx* and *chalybeata*) or three species (*amauropteryx*, *chalybeata* and *funerea*) or even more, it seems abundantly clear that only the black-winged form known as *chalybeata* has been bred in captivity. In doing so it has raised all sorts of problems by its behaviour, for in the wild it apparently is a normal brood-parasitic *Vidua*, but in captivity there seems to be no doubt that it has reverted to a more primitive condition and behaved like a perfectly normal parental species, building its own nest and rearing its own brood. For those who like to think that aviculture can often help science with its problems I find it a perverse joke that in this case the aviculturist seems to have created more.

One clear lesson should be evident, however, and that is that we should never forget that few of our aviaries can duplicate natural conditions, and the corollary is that our birds should not be expected to behave naturally; the fact that many of them seem to do is a bonus. For this reason, if aviculture is to be much more than a toy soldiers kind of interest, as much data as possible should be recorded. In his

notes (1960) Herbert Friedmann was clearly restricted in the conclusions he was able to draw on the combassous simply because so little data had been recorded: in some cases even the species involved was in doubt.

For aviculturists who might care to attempt breeding the others I list below the scientific names, and this follows Delacour (1951).

SPECIES	RACE OR SUBSPECIES
<i>H. amauropteryx</i>	<i>amauropteryx</i>
	<i>nigeriae</i> = <i>camerunensis</i> , <i>ignestii</i> , <i>sharii</i>
	<i>chalybeata</i>
<i>H. chalybeata</i>	<i>codringtoni</i>
	<i>neumanni</i>
	<i>orientalis</i>
	<i>ultramarina</i>
<i>H. funerea</i>	<i>funerea</i>
	<i>nigerrima</i> = <i>purpurascens</i>
	<i>nilsoni</i>

It should be noted that Nicolai (1964) is quite certain in his belief that *amauropteryx* is a race of *chalybeata*.

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BREEDING THE RED-BACKED MOUSEBIRD AT
JERSEY ZOOLOGICAL PARK

By D. GRENVILLE ROLES (Deputy Curator of Birds)

The Red-backed Mousebird *Colius castanotus* was first bred here in 1967 when, unfortunately, the species was wrongly identified as *C. striatus*. The breeding was briefly described by Mr. J. Mallet in the 1967 ANNUAL REPORT of the Jersey Wildlife Preservation Trust.

This original breeding pair, which were acquired in August 1966, have attempted to breed with varying success every year since then, with eggs being laid in every month of the year except February.

C. castanotus is quite drably plumaged—principally earth-brown above with bright chestnut back and rump, light brown to buff underparts, earth-brown tail with cream outer vanes on the outer feathers. The face and forehead are black, speckled with grey and the crest is brown. Ear-coverts and neck are grey, eyes yellow, upper mandible black with a grey patch, lower mandible horn coloured and the legs are coral red.

As stated above the birds first bred in 1967. They were then kept in a small cage (in the Tropical Bird House) only 3 ft. 6 in. x 3 ft. x 4 ft.; this was shared by four Red-faced Mousebirds *C. indicus* which had to be removed due to the persistent aggression shown to them by the Red-backed. Their cage was furnished with a large wire cone filled with leaves, to which the pair were seen to add fresh green leaves from the twigs which they received daily. A clutch of four eggs was laid, two of which proved to be infertile, the remaining two hatching after 12–14 days' incubation.

The following information was gained from breeding activities of progeny of the above pair, housed in a large planted aviary 24 ft. x 12 ft. x 7 ft. which they shared with a pair of Brown Eared Pheasants.

On the occasion of the study the mousebirds built an entire nest for themselves, whereas previously pairs always used conical wire frames lined with hessian.

The large bulky nest was constructed principally of coarse straw, lined with fine grasses and feathers. The clutch of three uniformly off-white eggs averaged 22 x 17 mm.—this clutch was the only one measured. The nest was sited four and a half feet from the ground in the centre of a dense Hebe (*Scrophulariaceae*) shrub, at which they were constantly nibbling.

A precise period of incubation was not established for this clutch, but incubation probably commenced with the laying of the first egg, as the young hatched on consecutive days. On hatching the pink-fleshed nestling could be seen to be sparsely covered with greyish down. The lower mandible was dark, upper mandible yellow as was the entire top

of the head. The eyes were closed.

The adults seemed to brood constantly until the young fledged—and would set up a shrill clamour when the nest was inspected, remaining only a yard or so away and complaining loudly.

At two days old it could be seen that the first chick was developing very rapidly with the flight feathers showing dark under the skin. When four days old the chick had its eyes open and was still almost naked, although the sheathed wing and tail quills were now well developed. There was also a marked contrast between the yellowish-green upper mandible, yellowish crown and the pink flesh of the neck and body.

At six days, the inch-long tail feathers were starting to open as were the flights, coverts and body tracts. The crest was noticeable and the legs were seen to be darkening; it was also noted that down (from the pheasants) had been newly added to the nest.

At nine days the chick was alert and watchful, “wheezing” and squeaking when disturbed and moving around the nest perimeter quite rapidly. The colour contrast between the yellow upper and black lower mandibles was very marked. The plumage was developing rapidly and the tail was now $1\frac{1}{2}$ inches long.

When 11 days old the chick left the nest when it was inspected, although still unable to fly. It now resembled a miniature adult being cinnamon beneath, earth-brown above, with slightly darker upper back and head, and with chestnut feathers appearing through black down on the back and rump. The wing-coverts were lightly scalloped in pale brown. At 14 days the chick flew from the nest.

The mousebirds were given a diet of ripe fruits, hard-boiled egg and leaves (chiefly hawthorn). They occasionally ate mealworms.

Since 1967 we have reared 50 Red-backed Mousebirds, 40 of them from the wild-caught pair. Twenty-eight birds have been exported to five different collections in Europe and at present we are holding three separate colonies, of one breeding pair and current year's young in each.

The Striated Coly *Colius striatus* was first bred in this country by G. H. Gurney in 1914, but Jersey Zoological Park's breeding of *C. castanotus* from 1967 onwards appears to be the only recorded success with that species.

THE BAND-TAILED PIGEON

Columba fasciata

By CARL NAETHER (Encino, California, U.S.A.)

At the beginning of this essay, it is well to emphasise the fact that the Band-tailed Pigeon is California's only wood pigeon, the other one, the Passenger Pigeon *Columba (Ectopistes) migratoria*, well known to this day, having become extinct many years ago. Even today, "old timers" so-called, living in remote mountain regions and not being familiar with wild pigeons, their species and subspecies, will confuse Band-tailed Pigeons with Passenger Pigeons, with the result that we read reports in small-town newspapers from the far-back country of the occurrence of Passenger Pigeons. This confusion on the part of the "average observer" is quite understandable, since both wood pigeons were/are fairly large, active birds. Moreover, there is a similarity so far as distribution, flight demeanour, and feeding habits are concerned, both pigeons flying considerable distances in search of sustenance, frequently changing their local habitats as the need for food dictated. In search of their favourite food—acorns—Band-tailed Pigeons are known to travel often hundreds of miles.

The accompanying photographs will afford the reader a fairly good idea of the general appearance of this desirable game-bird; it is about the size of a common domestic pigeon such as the racing homer. Its head, neck and underparts are greyish-purple, fading into white below the tail; back, wings and tail are greyish-brown; in the middle of the tail appears a black band, hence the name of this lively bird. The back of the neck is conspicuously decorated with a white band, followed by a shimmering, golden green, sizeable patch. The eyes, bill, feet and legs are yellow and the beak is black-tipped. There is but little difference between the appearance of the male and the female, except that the latter is somewhat smaller in size and paler in colour. In young Band-tailed Pigeons, the white neck band and the metallic neck patch are lacking.

This attractive wood pigeon roams far and wide over western North America, from south-west British Columbia south to Cape San Lucas and Central America. In the United States it is found in the following states: Arizona, New Mexico, Colorado, West Texas, and especially in California. The availability of acorns will prompt it to change its current habitat from one region to another. Thus, quite some years ago, a most bountiful acorn crop in the forest valleys of the Santa Barbara Mountains attracted huge flocks of Band-tailed Pigeons. They came not only from Northern California, but from distant states, including Oregon, Washington, and British Columbia—masses of

pigeons, conservatively estimated at half a million, which thus were able to gorge themselves on their favourite acorns for a considerable period of time. This enormous concentration was featured in many local newspapers as a very unusual natural happening, and it brought literally hundreds of hunters from near and far to this beautiful Santa Barbara region, intent on bagging as many of these highly desirable and delectable game-birds as possible. Sad to report, a small group of hunters shot 1,560 Band-tailed Pigeons on a single day's outing! A butcher, in the employ of a San Francisco market, shot 280 in a single day under a single oak tree! This senseless killing of untold numbers of this pigeon so incensed bird- and nature-loving residents of this region as to call the attention of local and state authorities to this awful slaughter, who soon after issued legal ordinances stopping completely all shooting and catching of Band-tailed Pigeons for a period of five years so as to afford them a much needed opportunity to recoup their tremendous losses.

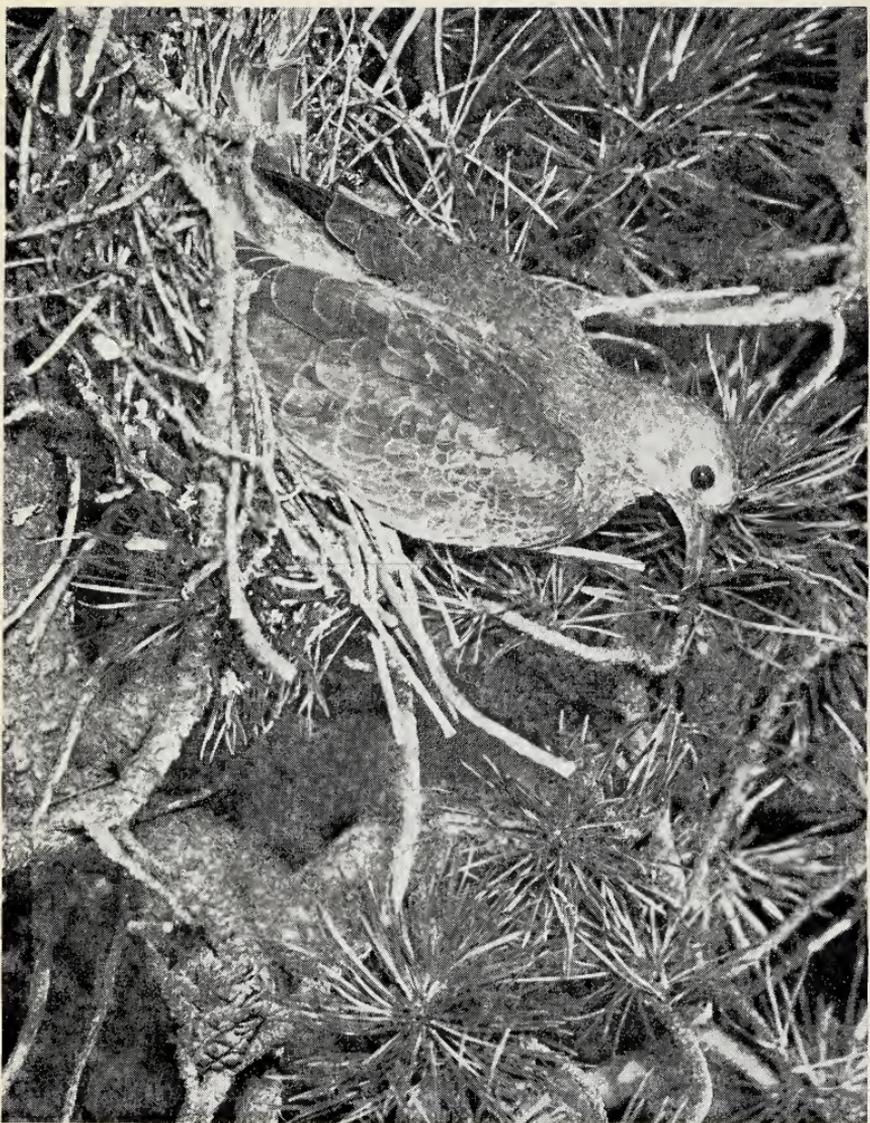
Usually the breeding season of the Band-tailed Pigeon runs from February till October, with the largest number of nestings being between the months of May to July. For California the earliest reported nesting date is 1st February and the latest 1st November. Some authorities report nests a considerable distance apart from one another; others report the opposite fact. Thus a member of the U.S. Forest Service in Tucson, Arizona, counted no fewer than 14 nests in one large Douglas Fir near a spring, and in the following year the very same tree accommodated 17 nests. In a study of nesting in Strawberry Canyon in the San Francisco Bay area, no evidence of communal nesting was discovered. In this region all conifer and oak groves were utilised for nesting, and heights of nests ranged from 7 ft. in an alder tree to 40 ft. in a pine tree. Always the nest tree stood above a small slope, affording the birds increased height and a broad view of the surrounding country when leaving their nests. Moreover, each nest tree was close to a clearing, which greatly facilitated access to the nest. The majority of the nests were set on horizontal limbs, about 2 to 5 ft. from the trunk. Usually the nesting platform is set in the dense foliage of oaks, pines, and other trees, not easily detectable by predators from above, as was the nest built in a sycamore tree on a residential street in the city of Pasadena, pointed out to this writer by a friend.

Various researchers in the field seem to aver that the male of this species selects the nesting place and that the female builds the nest, usually in from three to six days. As with most kinds of pigeon, it is a loosely constructed platform of dry sticks and small tree branches, laid criss-cross rather carelessly; moreover, it is so placed as to benefit from all-day shade. Like other wild wood pigeons, Bandtails use the same nesting site on the same tree branch again and again, provided, of course, that at this location they have not been interfered with by



Band-tailed Pigeon *Columba fasciata*

Photograph by courtesy of U.S. Fish and Wildlife Service.



Band-tailed Pigeon squab. Nest in a lodgepole pine
Photograph by courtesy of U.S. Fish and Wildlife Service.

predators from below or from above. The writer's foreign pigeons follow the same custom, using the identical nest site year in and year out.

Usually only one egg, white in colour, is laid, and brooded for from 18 to 21 days. A rare exception was a nest built of moss and green leaves, containing two eggs, and set on the forest floor between two large tree roots. Bandtails are very cautious and circumspect birds that sit tightly on their nests, which they leave very reluctantly at the last moment when danger threatens. Like all members of the pigeon family, male and female take turns at incubating the single egg, the male doing duty in the morning from about 10 o'clock until 4 or 5 o'clock in the afternoon and the female brooding the remainder of the time. Reports from the field would suggest that each pair maintains a fairly regular schedule. During the initial stage of incubation the egg is turned about three times, which number increases to eight or nine times with the approach of hatching. If enemies, as for instance squirrels, threaten the nest, the sitting pigeon will assume a typical pigeon-like defensive posture, striking with bristling wings at the intruder, at the same time grunting displeasure. If the bird is forced to leave the nest, it will usually drop to the forest floor, where it may feign wing injury; however, such behaviour is rather rare. When flying to their nests, Bandtails prefer not to approach them directly, but always half a dozen feet or more below the branch on which the nest rests. Often they will perch there for some little time, apparently making sure that no enemy has spotted them. Then they will climb to the nest limb by limb round the tree in a spiralling fashion. By means of this remarkable, instinctive behaviour, they endeavour to keep their nest location safe and secret.

Band-tailed squabs are fed, like all young pigeons, by regurgitation. When very young, they are fed more often than when they are older; in the latter case only once or twice a day. They may leave their nest at the age of from four to five weeks.

Even though acorns, picked off the ground and swallowed whole, appear to be the preferred food of Bandtails, berries of a wide variety as well as tree blossoms also are taken. In the Strawberry Canyon survey, alluded to above, the blossoms of the elderberry were at first the staple diet of these pigeons, to be later replaced by the green berries, and still later by the ripe ones. Their young were raised on this simple diet. Bandtails remain in a given territory as long as the supply of berries or other food lasts, instead of migrating to some other location yielding perhaps a variety of berries and blossoms. Almost parrot-like, Bandtails will crawl, frequently hanging upside down, amongst tree branches and bushes to pick the berries off and every berry is eagerly taken, many times unripe ones. While elderberries are the favourites of Bandtails, the fruit of *Cascara sagrada* and also that of the coffeeberry are not overlooked. Other kinds of berries include the following:

huckleberries, salal berries, salmon berries, and madrones. During any season of the year manzanita berries, whether ripe or unripe, are avidly taken. In case of necessity, Band-tailed Pigeons will feed also on the Christmas berry. In the springtime when but few berries are in season, these pigeons will pluck the tender leaves of oaks and manzanitas. In years past, there have been complaints voiced by farmers that Bandtails did much damage to freshly-sown oat fields. However, since the wood pigeons neither scratch nor dig, but simply pick up seed lying on top of the soil, such complaints are hardly justified.

The cooing of the Band-tailed Pigeon has been likened to the call of an owl, but careful observers maintain that its quality resembles that of the cooing of the Rock Pigeon and other common pigeons. "Singing" males commonly give voice to a series of from three to a dozen coos, rather weak and low, and not audible for any considerable distance. These calls "whoo-hoo-whoo-hoo" are not easy to describe. Some observers report much cooing going on in the early morning hours, while others found these pigeons to be vocalising mainly in the late afternoon hours. In their cooing, the birds seem to adhere to a regular time schedule, they stop cooing with the advent of incubation. Another type of vocalising of this pigeon is, for want of a more suitable descriptive term, called "chirping"—it is a sort of wheezing sound, or else somewhat like the chirping of a cricket. This pigeon is said to utter this sound with closed beak during display flights. Young Bandtails at the time of feeding are said to voice a peeping call, which may be likened to a similar begging call sounded by young domestic pigeons. Most cooing by males is closely related to courtship and mating—it is an excited calling to the female, and it establishes the sex of the bird.

Though attractive, lively and hardy in captivity, Band-tailed Pigeons are relatively rare in aviaries, in all probability because being game-birds, official permits are required for their keeping, exchanging, and selling. Most aviculturists do not wish to trouble themselves with so much "red tape". However, there are sincere lovers of wild pigeons who enjoy the presence of these lovely native birds in their aviaries. They are easily maintained in good health and breeding condition on a diet of mixed large grains, obtainable at any feedstore, and the usual pigeon grit. Band-tailed Pigeons have frequently been crossed with various breeds of domestic pigeons. Being good flyers, they should be accommodated in spacious aviaries, where if not disturbed, they are likely to nest successfully.

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A BREEDING ATTEMPT BY A PAIR OF SPARROW HAWKS

Accipiter nisus

By R. E. CORNHILL (Tiptree, Essex)

INTRODUCTION

The Sparrow Hawk which was formerly probably the most abundant raptor in the British Isles, declined rapidly in the early 1960's, leaving the present remnant population in eastern England and a much reduced density over the remainder of the country. Mid-Wales and Scotland now constitute the stronghold of the British population, particularly in reafforested areas. This dramatic population reduction is almost certainly attributable to toxic insecticides which resulted in raptor deaths, sterility, loss of faculties, thinning egg shells, etc.

The females of most species of birds of prey are larger than the males, but in Sparrow Hawks this characteristic is particularly pronounced, although size is subject to considerable individual variation. The female is 14 in.—16 in. long and weighs between 8 and 12 oz. whereas the male (sometimes called the "musket") is 11 in.—13 in. long and weighs between $4\frac{1}{2}$ and $7\frac{1}{2}$ oz. This considerable disparity in size, together with the species' highly strung temperament can provide problems during the introductory period, the smaller male being at risk.

If mature individuals are to be introduced, it is preferable to establish the male in the breeding accommodation for 2 or 3 months prior to the introduction of the female; by doing so, the male regards the flight as his territory and this improves his chances of survival when the female joins him. A better proposition is to rear a pair of young birds (eyasses) in the flight that they are to occupy as adults; this normally averts fighting providing food is supplied in abundance. It is also thought that this practice improves the chances of a breeding attempt being made when the birds reach maturity.

CAPTIVE BREEDING RECORDS

Sparrow Hawks were bred in the Plymouth aviary of Dr. L. H. Hurrell in 1971, a total of four being reared and in 1972 a single male was reared. Herr Herron has also successfully bred this species in his aviaries in Germany in 1969 and 1970. Accounts of these events and other (unsuccessful) attempts appear in "Captive Breeding of Diurnal Birds of Prey" Nos. 2 and 3, released jointly by the Hawk Trust and the British Falconers' Club.

DIET

In the wild Sparrow Hawks prey mainly on birds and due to their sexual dimorphism the sexes probably occupy different ecological niches. Food species range in size from Blue Tits to Wood Pigeons, although only the larger female would prey on the larger species. Thus, by the sexes largely preying upon different species of birds, it is

probable that a denser population can exist than would otherwise be possible.

I have found difficulty in simulating the diet of wild hawks, but have found day old chicks of domestic poultry to be completely satisfactory. Not only are my adult birds fed exclusively on chicks, but I have successfully reared young birds on this diet; no additives or supplements are employed.

Normally the pair of Sparrow Hawks under discussion consume six chicks per day, but this increased to seven for two weeks prior to laying and fell to five during incubation. I always feed more than is required and monitor what is actually eaten; this does of course necessitate removing uneaten food every two or three days. It can be deduced that if a chick weighs $1\frac{1}{2}$ –2 oz., the daily intake of 5–6 oz. for a bird weighing 11 oz. is fairly high; no doubt this can be accounted for by the considerable amount of nervous energy expended by these excitable birds.

AVIARY DESIGN

Due to the neurotic and erratic nature of Sparrow Hawks the design of their aviary accommodation warrants special consideration, the two major requirements being a layout to provide a sense of security and which can be serviced with a minimum of disturbance.

From the sketch it can be seen that half of the area is fully enclosed in the form of a purpose-built shed; in addition the back, end and half of the roof of the open flight are close boarded; these two areas are joined by a hatchway 30 in. wide x 18 in. high which can be closed at will. It has been found that the shed provides a retreat into which the birds can retire when approached by anything unfamiliar or disturbing, thus stress is greatly reduced and the birds are far less likely to fly madly onto the wire.

The flooring consists of a 6 in. layer of sharp sand and a 2 ft. diameter x 4 in. deep container provides bathing facilities. Natural branches, with the bark stripped are employed as perches and two stone perches are provided adjacent to the bath. Perches are positioned so as to encourage the maximum amount of exercise and to permit sun-bathing.

As can be seen in Fig. 1 a nest platform, consisting of a wire netting covered wooden frame, was erected in the most secluded corner of each section; both were 54 in. from the ground. Natural twigs approximately $\frac{1}{4}$ in. in diameter were woven into these platforms.

BREEDING BEHAVIOUR

From the beginning of May 1974, the male became aggressive and began to assume dominance for the first time in the two years that the pair had been together; also both birds uttered a new call when excitedly flying backwards and forwards. On 13th May the male was observed to carry a few sticks to nest site A and consequently between

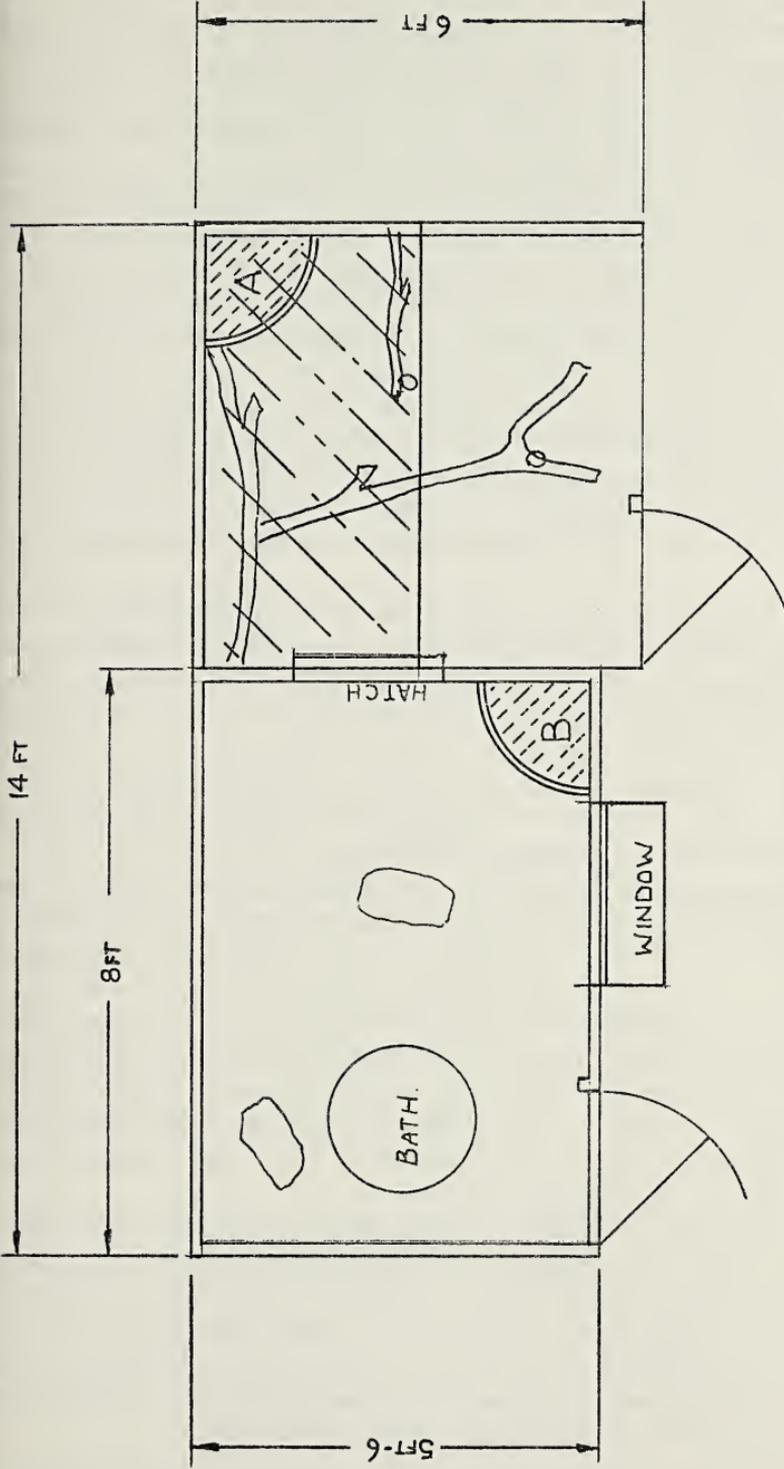


FIGURE 1

200 and 300 birch twigs $\frac{1}{8}$ in.— $\frac{1}{4}$ in. diameter x 6 in.—12 in. long were scattered on the outer aviary floor. Material was continuously added to nest site A by the male until 18th May, when he commenced carrying sticks to site B. The female was not seen to take any part in nest construction until 21st May, but from that date she probably accounted for 70% of the material added to site B.

Nest material was scattered on the floor of the flight daily, totalling 600–700 sticks in all, smaller twigs $\frac{1}{16}$ in.— $\frac{1}{8}$ in. diameter x 4 in.—8 in. long, some with leaves attached being provided during the last few days of the construction cycle. The nest was apparently complete on 25th May and the female roosted on the nest from then onwards. An inspection by torchlight during the night of 25th revealed that nest A was completely destroyed, but nest B consisted of a poorly constructed pyramid 2 ft. in diameter x 9 in.—10 in. high with a depression 1 in. deep in the top. In comparison to nests built in the wild, this nest was larger but far more roughly built, constituting little more than a pile of sticks, with softer material such as leaves and dry grass placed on the top.

On 1st June the first egg was observed, having presumably been laid during the evening or night of 31st May. By now the pair had become very aggressive and it was no longer possible to enter their aviary without being attacked; the male was even observed to fly at a passing cat.

With the exception of two 15–20 minute periods the female spent the ensuing days standing and lying on the nest until the 5th when it was assumed that incubation commenced.

When inspected on the night of 8th June, the nest contained two and possibly three eggs, the uncertainty arising from the female's unwillingness to more than slightly raise her body when approached to within 2 ft. by a torch. Incubation, as far as is known, was carried out solely by the female, who left the nest for a 3–5 minute spell every 3–4 hours during which time she fed, stretched, preened and occasionally bathed. Immediately the female vacated the nest the male assumed a guard posture on the nest rim and he may have brooded during these periods although this was never established; he always returned to the outside aviary on the female's return.

From 16th June the male was observed to pluck chicks and call to the female, after varying periods the female would appear and collect the chick from the male's feet; he was, however, never witnessed to perform the beak-to-beak food pass as is usual with raptors. By this date it was established that only two eggs had been laid and it was also observed that the female's moult was well advanced, with five pairs of primaries and the two central rectrices already cast.

The incubation period for Sparrow Hawks varies from 34 to 37 days with 36 days seeming to be the norm; therefore a discreet daily inspec-

tion was made from 6th July. However, by 14th July it was evident that the eggs were not going to hatch.

For fear of causing stress which might adversely affect future breeding attempts, it was decided to allow the female to continue to sit and not remove the eggs; however, one disappeared on 21st July and the remaining egg, which proved to be infertile, was removed on 23rd July. The female finally gave up sitting on 25th July.

After allowing the hawks a period to settle after their breeding attempt, the nest was dismantled on 10th August; this revealed fragments of egg shell embedded in the nest lining also a complete egg buried 2 in. below the surface and this also proved to be infertile.

OBSERVATIONS

The pair were never observed copulating, although this could have occurred in the house where they were not visible. The bouts of excited flying and unusual calling between 5th and 27th May could have been an accompaniment to mating; however, observations drawn from my other pairs of birds of prey suggest that captive raptors usually mate on the same perch and in the same position.

The pair will remain together and it is hoped that a more successful attempt will be made next year. I consider that this breeding attempt is significant in that it suggests that the successful breeding of highly strung hawks in a small garden should prove possible, given that an amount of common sense is employed. It would also seem that the considerable problems affecting captive breeding as put forward by some falconers are greatly exaggerated.

I should point out that Sparrow Hawks are protected in this country, appearing on the First Schedule which imposes the maximum penalty for disturbance of the nest site and for the trapping and killing of the birds at any time.

* * *

NESTING AND HAND-RAISING OF THE
HYACINTHINE MACAW*Anodorhynchus hyacinthinus*

By RALPH C. SMALL (Brookfield, Illinois, U.S.A.)

The female Hyacinthine Macaw was purchased by the Chicago Zoological Park on 30th June, 1949 as an immature bird; the other, also a female, died in 1966. These two did a lot of mutual preening, etc. It was not known until after the second one died, that it was a female and neither laid while they were together.

In January of 1967 the female Hyacinthine paired off with a Red and Yellow Macaw and on 30th April laid an egg, but it was broken, so we had no way of knowing if it was fertile.

In April the zoo purchased another Hyacinthine hoping that it would be a male: it had been imported 12th May, 1956, by Mesker Park, Evansville, Indiana and its age is unknown.

On 23rd April, 1968, the new bird was put in with the female; they got along well from the start and in June the two were put in an outside cage for the summer. If I paid any attention to the male, the female would pick a fight with him and I still have to be careful that I play with the female first or she bites him.

On 16th February, 1969, they wouldn't let me in the cage to clean. On the 25th, I saw the first copulation and this was repeated up until the time the first egg was laid. The second egg was laid about 20th March and both were clear. A second clutch was laid on 13th and 16th May and on 13th June the first baby hatched; the other egg was clear. On 16th June the baby was gone and I don't believe the female fed this one.

On 7th July, 1969, the first of the third clutch was laid. I don't know when the second was laid, but both of these eggs were clear. At this time I removed the barrel to give them a rest, but on 23rd and 27th August the female dropped eggs from her perch.

In January of 1970 I was transferred from the Parrot House: I heard that the macaws laid again but with no results.

On 4th October, 1970, I was lucky enough to purchase the pair. I fixed up a cage in the basement of my house 7 x 14 x 5 feet high with a 28 inch partition across the back. A 50 gal. steel drum laying on its side with the upper third of the top cut out serves as a nesting box. It is half filled with tan bark and about a gallon of water is added to give it the proper humidity. There is a door in the back of the cage and when this door is opened inward, it closes off the nest barrel partition from the main cage so you can work or check eggs. The feeding or cleaning door in the front is really two doors; the first has the food and water cups attached near the bottom and the second is

short so that the cups go under it. This way the birds only have a small area to get out. The room is thermostatically controlled and temperature runs about 74° F. to 80° F. the year round. There is a humidifier running in the winter and a dehumidifier in summer to control the humidity. There is a time clock to turn the lights on and off; they go on at 7 a.m. and off about 10.15 p.m. and then there is a 15 minute dim light. This operates the year round.

When the pair was introduced to this cage they acted as if they were coming back to an old remembered place. The male started to inspect and go into the barrel after a short time. It was the same barrel used at the zoo.

During October, November and December 1970, they did a lot of working in the barrel, courting, preening and copulating. On 5th January, 1971, the first egg was laid; the second was laid on 9th January, but when checked on 8th February, both were found to be infertile.

On 1st and 4th March, eggs were laid again. When these were checked on 15th March, one was found to be fertile; the other was clear and on 30th March the egg hatched. When found the baby was cold; it weighed 18.6 grams. The clear egg weighed 24.5 grams. The baby was taken upstairs to be hand-raised. This baby "Primo", took almost a full year before it could be said it was really on its own.

29th April, 1971, a very small unfertilized egg was laid and on 7th December, 1971, the first egg of a new clutch. The second egg was laid on 10th December. When checked on the 25th December again only one was found to be fertile. On 4th January, 1972, this egg hatched; the baby was found about 7 p.m. The parents seemed to be taking care of the baby so I decided to leave it with the mother. On 5th January at noon, when checked, the baby had a full crop of a yellow, soft milky substance: next day at noon the crop was again full of food and on 8th January saw the female feeding the baby; she held the whole head in the tip of the bill and gently moved her head up and down. I believe she pushes the food down into the bill of the baby with her tongue. Food comes out on both sides of the baby's head and makes a real mess in the nest and on the young one. At two weeks it weighed 156 grams. This baby cried very little and usually only when the female was there to feed or was feeding it. Weight at three weeks was 302.5 grams; four weeks 464 grams, 5 weeks 659 grams, 6 weeks 643 grams. I took the baby from the nest on 14th February at 41 days, for the mother had been plucking it; some of the small pin feathers were cut so short that they would bleed.

On 21st March, the first egg of a new clutch was laid; the second on 24th March and both were clear.

On 1st May, the first of the third clutch was laid and on 5th May the second. On 18th May I checked the eggs and found one fertile; on 29th May this egg hatched. At two weeks the baby weighed

189.5 grams, 3 weeks 347.5 grams, 4 weeks 533 grams, 5 weeks 668.5 grams. On 23rd July I took it and locked the parents out of the nesting area. The baby was again being plucked and was very dirty. The mother gets food all over the baby while feeding and her breast is always dirty with food; the inside of the barrel gets wet and dirty with regurgitated food. On 31st July this baby weighed 1,400 grams, a little over 3 pounds and it is the biggest of the three young ones.

On 10th July, 1972, I cleaned cage and again opened up nesting area. The first of the new clutch was laid on 8th August, second egg 12th August, 1972. 22nd August removed the barrel; both eggs were clear.

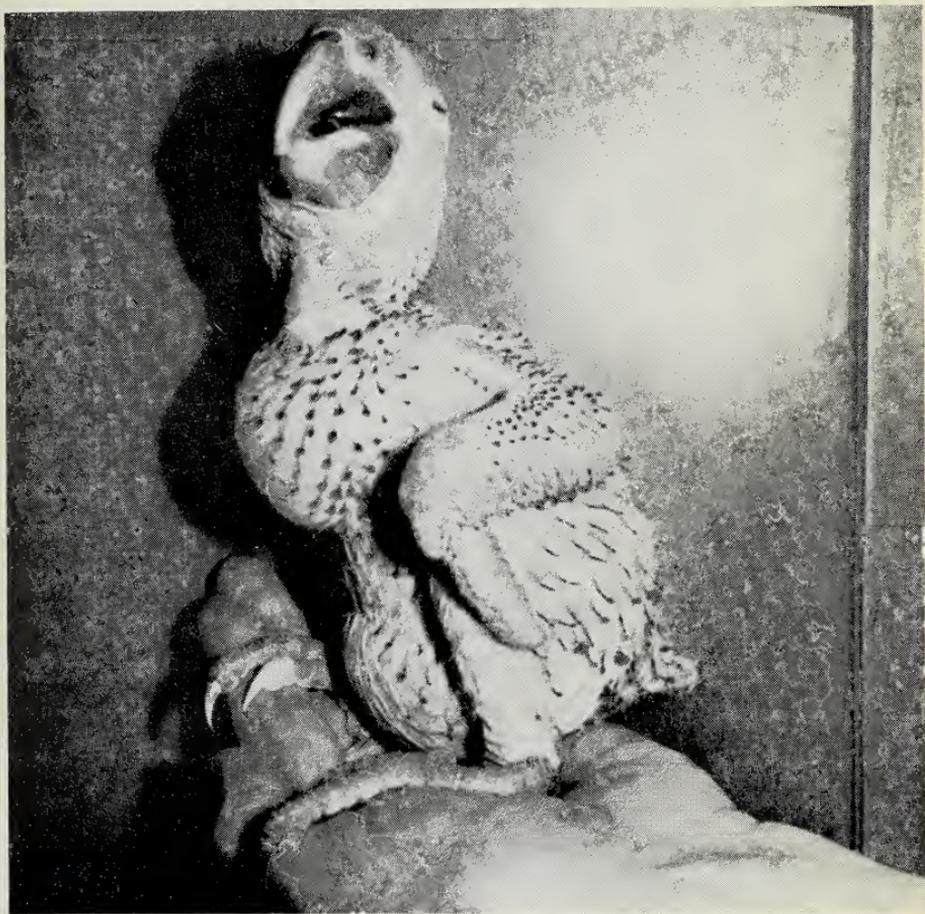
On 20th January, 1973, let pair back into nesting area. They had been moulting since they were locked out. 26th April, 1973, first of new clutch; second egg, 30th April. On 28th May one egg hatched; the other was clear. I took the baby at 34 days when it weighed 535 grams.

2nd August was the date of the first egg of second clutch; 5th August, second was laid, but both were clear.

3rd September, first egg of third clutch, second egg, 8th September, 1973. On 18th September, I found both fertile. This was the first time both have been fertile. 5th October, one chick hatched; the other was dead in shell. On 23rd October I took away the baby because workers were putting a new siding on the house. This young one weighed 243 grams. On 25th November, 1973, the first and only egg of fourth clutch and this hatched on 23rd December. The egg dried out after baby pipped and it was trapped so couldn't get out. We peeled the shell off and placed the baby back in the nest at 10 p.m.. At 4.30 on the 24th, they had not fed and the baby was cold so we took it to hand-raise. This one weighed 17.8 grams. We believe that because the baby stayed in the egg too long it could not raise its head up to be fed. It is at the time of writing 4 weeks old and doing fine. When we took this chick and locked the pair out of the nesting area and they proceeded to moult.

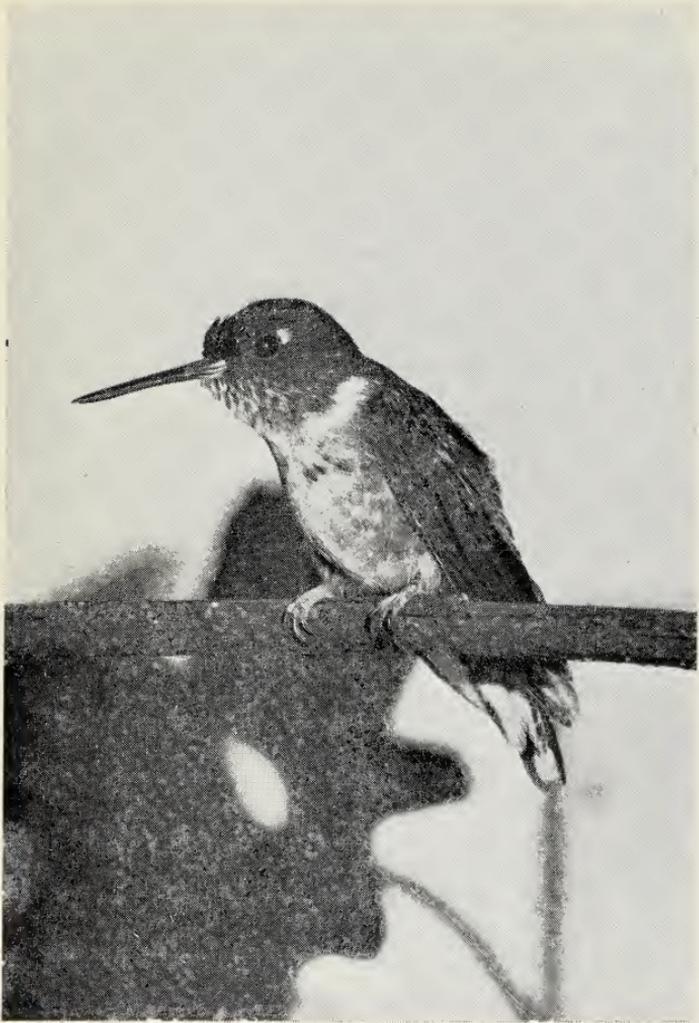
The food I am now giving this pair is 7 parts large, grey sunflower seed, 1 part pigeon feed, 1 part pigeon chow, $\frac{1}{2}$ part of a mixture of 50% canary seed and 50% large white millet. Daily they get a small handful of raw peanuts in the shell and 10 Purina 25% protein Monkey Chow pellets. Apple, carrots, orange and grapes are given. Escarole is given as green food. Liquid vitamin Vi Syneral at 06. cc, to two quarts of water with a little powdered calcium is given daily; also gravel is given daily.

I do not consider this a complete success because the parents will not take care of the baby totally. There is just too much going on around them that makes them nervous and I think this is what causes the plucking. I do have three beautiful hand-raised babies that know how to get into all kinds of trouble around the house to prove that,



Hyacinthine Macaw at 20 days.

Ralph C. Small



R. J. Elgar

Male Ecuadorian Piedtail Hummingbird

Phlogophilus hemileucurus

even under poor conditions and small cages, it can be done.

THE ECUADORIAN PIEDTAIL HUMMINGBIRD

Phlogophilus hemileucurus

By R. J. ELGAR (Manchester)

The distribution of the Ecuadorian Piedtail is given by de Schauensee (1970) as the tropical forest around the headwaters of the River Napo, eastern Ecuador.

This species is very rare in captivity and to my knowledge the two examples I have owned have been the only ones to reach England alive.

Here is a description of the bird: the crown is greenish-brown, rest of upperparts grass-green, throat and breast are white with green spots; a white band goes across the centre of the breast, abdomen is white. The two centre feathers of the tail are bronze-green; the rest have white bases and broad white tips with diagonal stripe of dark brown. All upper plumage including the two central tail feathers has a slight shining effect. The rest of the plumage is dull and non-metallic. The bill is black. A white post-ocular spot. Legs and feet are whitish with dark grey bands across the feet.

The first example I owned came to this country in a small shipment from Ecuador which Mr M. W. Clifford imported in early May 1972. I purchased this a few days later. It was very healthy and I experienced no difficulty in settling it in; it commenced its first moult in late September 1972 completing it some fourteen weeks later at the end of December. This was a full moult and in 1973 it did not have a complete moult, but in September and October of that year it did drop several feathers. On the 5th May 1974 I was fortunate enough to acquire another Piedtail from a dealer in Yorkshire.

From observing these birds for several weeks I came to the conclusion that the first one was a female and the second a male; unfortunately at the end of May 1974 I found the female dead in its cage.

On the 30th July 1974 I found several body feathers of the male Piedtail in its cage and at the time of writing, which is August 1974, this bird is in a full moult. From observing the female for two years and the male for three months I have found that these birds are extremely timid, especially the female, and they must be caged individually at all times. The cages I use for my small hummingbirds measure 42 inches long 16 inches high and 16 inches deep, with a natural perch at each end. In the centre of the cage floor an empty upturned one pound jam jar with a saucer placed on top filled with water for bathing. I have found that both male and female are very keen bathers, bathing two

or three times a day.

If the Piedtail is released into a mixed flight of hummingbirds it spends its time flying very low down or hiding in plants. After a very short time it gets distressed and if not returned to its cage I feel sure it would die. I have found Piedtails to be extremely insectivorous; they will spend long periods of the day hunting and catching fruit flies on which they are very dependent in their diet and when there is a shortage of flies there is a definite loss of condition and body weight. Here is a description of the method by which the male takes fruit flies :

1. Picking them from any surface, *i.e.* walls and floor of cage. When taking them from the floor he will catch the flies and land on the floor at the same time, using his tail for balance he will flick his bill in the air swallowing the fly. If there are more on the floor he will scurry after them, part running, part flying until he has caught them all. When taking flies from the wall of the cage, he will take the fly in the bill and in reverse flight, dropping slowly, will swallow it.

2. Hawking flies only on rare occasions, usually when there are none on the walls of the cage.

3. He will land on the fruit fly cultures which are housed in empty margarine tubs in his cage. He puts his bill into the dry bananas flicking them from side to side disturbing the flies. As newly hatched are unable to fly he will chase after them across the floor, as in the first method.

I cannot find any reference to the life of the Ecuadorian Piedtail in the wild : could it be that this bird takes insects on the ground chasing and scurrying through the vegetation after them? This bird also prefers to perch when taking nectar.

Flight Perching and Sleeping Postures

In hunting and hawking insects the flight is very similar to that of a butterfly with very jerky slow wing-beat, tail fanned, and continual bobbing of head.

In straight normal flight the wing-beat is quite rapid, flying for short periods then gliding for one or two yards then followed by another burst of wing-beats. The flight is very similar to that of the Speckled Hummingbird *Adelomyia melanogenys*.

When perched and active the bird will continually bob its head fanning its tail and moving its body from side to side. When sleeping I have found this species to use both feet on the perch; the only time I have witnessed it using one is when scratching and preening.

Call and Song

The call of both male and female is " Tic tic-tic tic " uttered through the day when active. The male song is " Chir chir-ziss ziss-chir chir-ziss-ziss. " At present I have only heard and not witnessed this song, so I don't know whether there is any display with the song, for the bird stops singing the moment I enter the bird room. Observing the female for two years, I have also witnessed from her a long drawn out

piping call and I think this is a warning or aggression call to the hummingbirds in the flight. She always perched as close to the wire front as she could, facing out with the bill wide open and the tail fanned out when making this call.

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BIRD NUTRITION: THE NEED FOR EXCHANGE OF INFORMATION

By BELA VARGHA (Budapest)

It is hardly necessary to stress that an essential factor in the successful keeping and breeding of birds is their proper nutrition. The standards of feeding farm animals are well designed and, no doubt, internationally known, but those of wild birds kept in captivity are not in general sufficiently researched and established. While many competent studies on various species have been published, some others are not sufficiently detailed, consisting of generalisations. Naturally every conscientious aviculturist tries to keep his birds in an efficient way so that they not only live long and thrive, but that they breed, not once or so, but generation after generation, for now that more and more countries enact strict protection laws, fewer of the formerly easily obtained birds are now offered by importers and it becomes increasingly necessary for aviary bred birds of the best quality to take the place of the imported ones. Therefore it is of the greatest importance that we share our experiences punctually and in detail with aviculturists all over the world so that all are able to provide their birds with the best available foodstuffs and general care. Naturally some of the foods described are not universally obtainable, but if information on their composition is given, those who cannot get the original can provide the best available substitutes. I appreciate, of course, that the precise analysis of proprietary foods may not always be known to the aviculturist and all too little is known about the wide variety of food items eaten by the birds in the wild state.

I give some examples from the periodicals to show the lack of detail too often given, though admittedly in instances where the birds did not touch the food, this would not matter so much. Goodwin 1963 wrote that Java Sparrows did not touch "soft-food" he refers to Radtke who reported that "these birds refuse to eat any kind of soft food". Naether 1951 gave "powerful soft food" besides other foodstuffs to his manakins, while Bahr 1965 had good results with his manakins by

giving them "Alexva I extra" and "Nectarmil". Blacktopp 1969 mentions "Farex baby food" and "Avivite"; Graves 1973 "Vionate" and "Pablum baby cereal"; Clear 1968 "Sluis" and "Stimulite" for soft-billed birds while Terhune 1973 writes "the standard soft-bill and nectarine diets" for Paradise Tanagers. An article in AVIDATA 1973 mentions "Vetanul", "Nutrigain" as foods. Vitamin and carotenoid additives such as Abidec or Carophyl are mentioned by name, but it is not always made clear that this is what they are. I found the best description of foods for soft-billed birds in Roots' (1970) but the author draws our attention to the fact that further investigation of percentages of ingredients is required. There are no doubt many other valuable contributions to knowledge of avian nutritional needs, Goodwin 1971 being one that gives sound practical advice, for it is one thing to offer birds what is good for them and very often another to get them to eat it.

Apart from the birds that have become domesticated, it is evident that others such as most waterfowl, pheasants and some parrakeets are dietetically adequately provided for in captivity, for they breed successfully from generation to generation, but the record in insectivorous species is in need of improvement.

The "softfood" on which I have kept and bred Java Sparrows and Gouldian Finches over a long period contains hard-boiled egg, grated raw carrot, two kinds of baby food, oat flakes, minerals and vitamins in the proportions shown in the tables. This food is given in addition to seeds and green food, of course, and the Java Sparrows eat mealworms, but the Gouldian Finches do not. The vitamin compound is mixed with the grated hard-boiled eggs, the minerals, Oriza, Maltiron and oat flakes are then added; the sequence of mixing is important, for in this way the Maltiron which has a high milk powder content will not make the mixture sticky, but will mix with and adhere to the egg. The grated carrot is the last to be added, having been squeezed out a little if need be. As can be seen from Table 4 the food contains nearly 30% carbohydrate, 10% protein and about 6% fat and the calorie content per 100 grammes is 223.

The proportions of carbohydrate and protein may seem small, but my experience shows that the mixture is adequate for the needs of Java Sparrows and Gouldian Finches, not only as a supplement to the adult diet, but also for the rearing of robust young. These two species cannot, of course, really be considered insectivorous, though they do in the wild state eat some insect life as well as both ripe and unripe seeds and, as is well known, many "seed-eaters" take quantities of insect life when rearing their young.

I should like to make some contribution to progress in knowledge of the dietetic requirements of birds, complex though they are in most instances, and will try to do so if sufficient detailed information becomes available.

TABLE 1. ANALYSIS OF THE PROPRIETARY PRODUCTS

	ORIZA	MALTIRON
*Ground rice	50%	12.5%
Maize starch	50%	12.5%
Milk powder mixture	—	40.0%
Decomposited starch	—	35.0%
per every 100 grms.		
Vitamin A	—	10.0 mgms.
Vitamin B ₁	5.0 mgms.	2.5 mgms.
Vitamin B ₂	5.0 mgms.	2.5 mgms.
Vitamin C	—	100.0 mgms.
Protein	4.5%	15.8%
Carbohydrate	89.5%	71.1%
Fat	0.3%	4.5%
Calories per 100 grms.	390	400

*The rice is first boiled, then dried and ground.

TABLE 2. ANALYSIS OF THE USED MINERALS AND VITAMIN PRODUCT

MINERAL PREMIX	in 1000,0 grms.	
Ca ₂ /HPO ₄ / ₂ (calcium phosphate)		648,070 grms.
Fodder salt		200,000 grms.
Mn (manganese)		4,700 grms.
Zn (zinc)		8,900 grms.
Cu (copper)		2,000 grms.
Co (cobalt)		0,020 grms.
I (iodine)		0,158 grms.
Branmeal	ad	1000,000 grms.
PHYLASOL-COMBI	in 1000,0 grms.	
Vitamin A		10,000,000 IE
Vitamin D ₃		2,000,000 IE
Vitamin E		20,000 IE
Vitamin B ₁		2,000 mgms.
Vitamin B ₂		5,000 mgms.
Vitamin B ₆		2,000 mgms.
Vitamin B ₁₂		12 mgms.
Vitamin K ₃		2,000 mgms.
Vitamin C		100,000 mgms.
Panhotenacid		15,000 mgms.
Nicotinacid		35,000 mgms.
Folacid		100 mgms.
Biotin		100 mgms.
Vehe.	ad	1,000 grms.

TABLE 3. THE ANALYSIS OF THE USED FOOD

100 grms.	CARBOHYDRATE grms.	PROTEIN grms.	FAT grms.	CALORIES
Eggs*	0.6	13.5	12.0	169
Carrots*	8.1	1.2	0.2	40
Oriza	89.5	4.5	0.3	390
Maltiron	71.1	15.8	4.5	400
Oatflakes*	65.3	14.4	6.8	390

*Tarján-Lindner (1968)

TABLE 4. COMPOSITION OF THE "SOFTFOOD"

	QUANTITY OF COMPONENTS		CARBOHYDRATE	PROTEIN	FAT	CALORIES
	grms.	%				
Boiled eggs	40.00	0.24	5.40	4.80	67.6	
Carrots	20.00	1.62	0.24	0.04	8.0	
Oriza	12.50	10.19	0.56	0.04	48.8	
Maltiron	12.50	8.89	1.98	0.56	50.00	
Oatflakes	12.50	8.16	1.80	0.85	48.8	
Phylasol-Combi	0.50					
Mineral Premix	1.00					
CaCO ₃ (calcium carbonate)	1.00					
Total	100.00	29.10	9.98	6.29	223.2	
	grms.	grms.	grms.	grms.		
	%	%	%	%		

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RARE TANAGERS IMPORTED INTO BELGIUM AND THE NETHERLANDS DURING 1974

By JOHAN INGELS (Destelbergen, Belgium)

Due to growing opposition among protectionists, it has become increasingly difficult to export live birds from South and Central American countries. This has resulted in a decrease in the numbers of tanagers reaching west European countries. Those which have come in have been mostly from Ecuador and Brazil, with small consignments from Colombia and Surinam also.

As well as the more common species, some very unusual tanagers arrived; rare not only in aviculture but also in their natural habitat, e.g. a Yellow-collared Chlorophonia *Chlorophonia flavirostris*, several Grey and Gold Tanagers *Tangara palmeri* and a Black-chested Mountain-tanager *Buthraupis eximia*.

The following list gives the rare and more interesting species which were included in these imports:

Mexico: *Euphonia musica*.*

Ecuador: *Chlorophonia flavirostris*,* *Euphonia minuta*, *Tangara palmeri*,* *Anisognathus notabilis*,* *Buthraupis montana*, *Buthraupis eximia*, *Chlorornis riefferii*.

Surinam: *Euphonia cayennensis*, *Euphonia finschi*.

Brazil: *Tangara cyanoventris*, *Tangara mexicana (brasiliensis)*, *Tangara preciosa*,* *Thraupis bonariensis (bonariensis)*,* *Piranga flava*,* *Tachyphonus coronatus*,* *Schistochlamys ruficapillus*.*

Argentina: *Thraupis bonariensis (schulzei)*.*

* Species kept and studied by the author.

The Yellow-collared or Green and Yellow Chlorophonia *Chlorophonia flavirostris* has always been a much discussed species. Only two tanager species have a salmon to red bill, legs and feet: the Grass-green Tanager *Chlorornis riefferii* (red to brownish red) and the Yellow-collared Chlorophonia (salmon to yellowish salmon); this chlorophonia is, by the way, very scarce in museum skin collections. Most information regarding this extraordinary tanager has been gained through observations made on aviary specimens (Conway 1962).

The Yellow-collared Chlorophonia which I purchased in March 1974 belongs to the Ecuadorian subspecies. Also belonging to the same subspecies are those owned by the New York Zoo (1962; 2 specimens), E. M. Boehm (1962; 1 male), Mrs. K. M. Scamell (1968; 1 male) (Scamell 1969, with colour plate) and some 15 or so specimens of both sexes imported during 1972 into Denmark, West Germany and England (Nørgaard-Olesen 1973 and 1975, with colour plate of a pair).

When purchased, the Yellow-collared Chlorophonia was immature; last September it moulted and attained male plumage. When juvenile, the bird resembled a female, being grass-green with the centre of lower breast, belly and under tail-coverts yellow; bill, legs and feet salmon. Adult males are grass-green with the upper back crossed by a broad yellow collar; the lower breast and belly yellow is separated from the green upper breast by a broken narrow band of chestnut, only two chestnut patches remaining at each side of the neck. The upper and under tail-coverts are also yellow, forming a ring around the base of the tail. The iris is white, and the bill, legs and feet are salmon. When comparing my bird with the males depicted in colour in the AVICULTURAL MAGAZINE (vol. 75, no. 1, 1969) and in TANAGERS (vol. II, plate 15), the chestnut patches on the sides of the breast are more extensive and the yellow band on the mantle is not as wide. In confinement the colour of the orbital ring, the bill and the feet tends to fade.

The male Blue-hooded Euphonia *Euphonia musica* which I purchased in May 1974, belongs to the Mexican subspecies *elegantissima*. It was amongst a consignment of Red-legged Honeycreepers *Cyanerpes cyaneus*. It differs from the Brazilian subspecies *aureata*, which I described last year (Ingels 1974) in that it has a dark chestnut forehead and brownish orange-red instead of orange-yellow underparts.

I have heard the song of this euphonia and can vouch that it is aptly named "euphonia musica" or musical euphonia. Shortly after purchase I placed the bird in a large cage in the garden, thus allowing me to take colour slides in full sunlight. While thus engaged, a young House Sparrow *Passer domesticus* in a nearby cherry tree started calling; the euphonia answered with a powerful melodious song. So excited did the bird become that it sang with bill opened wide, at the same time raising the feathers of the crown, throat and lower breast. I have observed a

male Golden-sided Euphonia *Euphonia cayennensis* using the same singing posture when placed near to a male Chestnut-bellied Euphonia *Euphonia pectoralis* which was uttering its rasping, insect-like calls.

True pairs of the White-vented Euphonia *Euphonia minuta* have been imported from Ecuador. Another small euphonia which is also very rare in aviculture, namely Finsch's Euphonia *Euphonia finschi* has been imported in small numbers from Surinam. This species is closely related to the Velvet-fronted Euphonia *Euphonia concinna*, having been classed as a subspecies at one time.

A few males of the Golden-sided Euphonia *Euphonia cayennensis* were imported from Surinam. This euphonia is also called the Black Euphonia, after the French "le tangara noir de Cayenne" and the old scientific name *Tanagra nigra*. The extraordinary all steel-blue colour pattern with orange-yellow patches on the sides of the breast, makes it a very attractive bird. This species, together with the Rufous-bellied and the Chestnut-bellied Euphonias, respectively *Euphonia rufiventris* and *pectoralis*, form a superspecies. The latter was imported in 1973 (Ingels 1974).

Although euphonias have always been imported in reasonable numbers, established pairs are rarely seen in confinement and in spite of the obvious sexual difference, breeding results have been somewhat rare (Ingels 1975).

The Blue-breasted Tanager *Tangara cyanoventris*, also called the Gilt-edged Tanager, has an extremely pleasing colour pattern. This Brazilian tanager with its very limited distribution range (from Bahia to Sao Paulo, Brazil) is closely related to the Brassy-breasted Tanager *Tangara desmaresti*, occurring also in south-eastern Brazil. In fact a wild-caught hybrid between both species has been described by Sclater as Gould's Tanager *Tangara gouldi* (Ingels 1971).

The distribution of the Brazilian subspecies of the Turquoise Tanager *Tangara mexicana brasiliensis* also called the Brazilian Blue Tanager after the French "le tangara bleu du Brésil", is restricted to the wooded coastal region above Rio de Janeiro. At one time it was considered a distinct species and given the name White-bellied Tanager *Tangara brasiliensis*. It differs mainly from the northern subspecies in being larger (15 instead of 13.5 cm), having no turquoise on wing-coverts and white instead of yellow underparts.

The Grey and Gold or Palmer's Tanager *Tangara palmeri* which is approximately 16 cm long, is one of the larger *Tangara* species. It was first described by Hellmayr in 1909, and because of this is sometimes referred to as Hellmayr's Silvery Tanager. Silvery is indeed the overall impression of this tanager's unusual colour pattern, and despite its somewhat sombre coloration, close examination reveals the species to be most attractive. Little is known regarding the species, and the 12 specimens imported last year may have been the first available to

aviculture.

A few pairs of Chestnut-backed Tanagers *Tangara preciosa*, the largest *Tangara* species (16.5 cm), have been imported recently. In 1973, only females were available. This species shows an obvious sexual difference. The Arnault's Tanager *Tangara arnaulti* described by Berlioz in 1927 is most probably a hybrid between this species and the southern form of the Burnished-buff Tanager *Tangara cayana chloroptera*.

The Black-chinned Mountain-tanager *Anisognathus notabilis* is closely related to the better known Blue-winged Mountain-tanager *Anisognathus flavinuchus*, but the former is more attractively coloured. Previously, both tanagers formed the genus *Compsocoma* and were only recently placed by de Schauensee (1964) in the genus *Anisognathus*, although both genera differ greatly in habits and general behaviour.

This year only one Hooded Mountain-tanager *Buthraupis montana*, which is protected, reached Europe, as did one specimen of the related but rare Black-chested Mountain-tanager *Buthraupis eximia*. It is obvious from their general behaviour that both of these sturdily built species (21.5 cm) belong to the same genus.

Nowadays mountain-tanagers including the above mentioned species, are badly threatened by environmental changes of their Andean subtropical and temperate life zones, especially in Colombia and Ecuador. Lately the forests of these higher altitudes have been cleared to make way for plantations and grazing lands. With the destruction of their habitat, these tanagers must move on to another forest zone where they may find it difficult adapting to their new habitat, thus resulting in decimation through predation and interruption of reproduction. There are a few tanager species which adapt successfully to the new environment of cultivated areas, such as *Tachyphonus* and *Ramphocelus* species (Buechner *et al.*, 1970; Páez, 1973).

Males and females of the two main subspecies *bonariensis* and *schulzei* of the Blue and Yellow Tanager *Thraupis bonariensis* were among consignments of Brazilian tanagers and Argentinian cardinaline finches respectively. Females of this *Thraupis* are rarely imported, and I have not seen them alive before. Immature birds are olive coloured with greyish-white underparts, and therefore cannot be confused with the greyish-brown adult females. Moreover, young males often show some bluish or orange feathers on the head and breast respectively.

The main differences between both subspecies mentioned are overall length and form of the bill. *Thraupis bonariensis schulzei* (15 cm) is distinctly smaller than *Thraupis bonariensis bonariensis* (17.5 cm). It is also said the former has a more orange abdomen, but the (age depending?) differences in colour deepness of this body part between individuals within a given subspecies are too important as to allow such

a conclusion. The differences in bill, especially in its height, are even more important; *schulzei* and *bonariensis*: exposed culmen: 12 and 12.5 mm (from base: 15 and 15.5 mm), height: 6.75 and 9 mm, respectively. The former's bill is more slender, the latter's thicker, blunter and broader at the base (see Fig. 1). *Schulzei* and *bonariensis* have a blackish upper mandible; however, the former's lower mandible is horn colour, whereas the latter's is whitish.

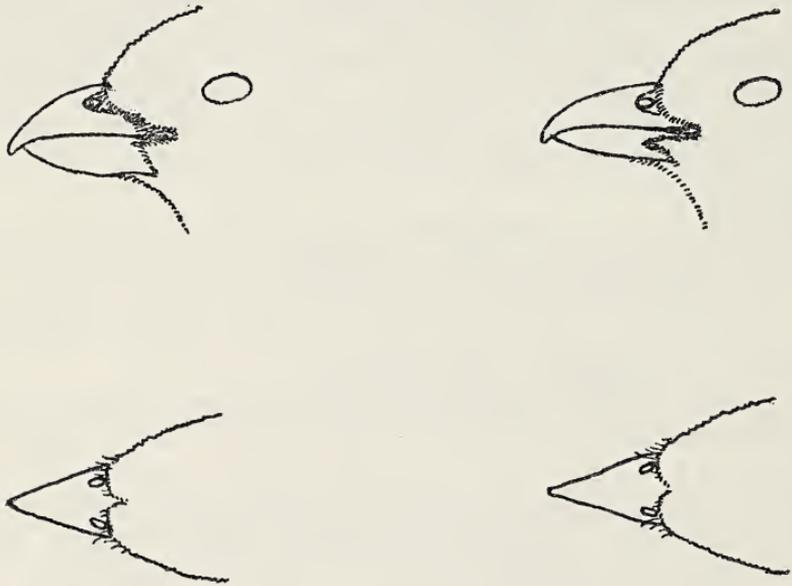


FIG. 1

Difference in form of the bill between the subspecies *bonariensis* (left) and *schulzei* (right) of the Blue and Yellow Tanager *Thraupis bonariensis*.

The nominate subspecies has been bred in the aviaries of the late E. M. Boehm (U.S.A.).

Pairs of the Crimson-backed Tanager *Ramphocelus dimidiatus* were imported from Colombia. This species is closely related to the Silver-beaked *Ramphocelus carbo* and Black-bellied Tanagers *Ramphocelus melanogaster*, and these three are thought to form a superspecies with the Brazilian Scarlet Tanager *Ramphocelus bresilius*. However, the lighter coloured rump and underparts, in marked contrast with the darker coloured head and mantle, are typical of *dimidiatus* only. The Crimson-backed Tanager was bred in 1967 by H. Murray (England).

Two pairs of Hepatic Tanagers *Piranga flava* were found in Brazilian imports. The dark coloured bill and cheeks and greater length (17.5

cm) distinguish the male from the Summer Tanager *Piranga rubra*; (16 cm). The female Hepatic can be separated from the female Summer Tanager by its dark coloured bill and cheek patches and also by the more greenish-yellow appearance which is tinged with orange on the underparts.

Hepatic Tanagers migrate from the northern parts of their distribution range (U.S.A., Mexico); the subspecies of subtropical and tropical parts are resident. Therefore it seems to be an intermediate form between the migrating North American *Piranga* species and the more sedentary species of that genus in the tropics.

The mainly south Brazilian Ruby-crowned, or Red-crowned Tanager *Tachyphonus coronatus* is very closely related to the slightly larger White-lined or Black Tanager *Tachyphonus rufus*. Confusion between both species is possible, as the red crown patch is clearly visible only when a male is held in the hand. Occasionally one may obtain a glimpse of the red when a specimen becomes excited and erects its crown feathers.

A very unusual and rarely imported tanager is the Grass-green Tanager *Chlorornis riefferii*. Other than the already mentioned Green and Yellow Chlorophonia, this species is the only tanager with a striking red bill, legs and feet. The Grass-green Tanager has yet to be studied and little is known regarding its habits other than the information supplied by Dunning in his Portraits of Tropical Birds (1970). After a moult in confinement, the brilliant grass-green colour becomes a beautiful blue (Scamell 1966).

The Cinnamon Tanager *Schistochlamys ruficapillus* is only found in Brazil, unlike the other species of that genus, the Black-faced Tanager *Schistochlamys melanopsis* which is distributed throughout the whole eastern South America and which was imported last year (Ingels 1974).

These tanager species are closely related to the saltators, cardinals and certain grosbeaks. Their general appearance, especially the bullfinch-like bill, and the colour pattern resembles that of certain grosbeaks (e.g. *Caryothraustes* species), and it is said their song resembles that of a saltator rather than a tanager (Mitchell 1957).

NOTE

In my article "Rare tanagers imported into Belgium and the Netherlands during 1973" (AVIC. MAG., 80(1), 20, 1974), the scientific names for the Summer and Hepatic Tanagers (*Piranga rubra* and *flava* respectively) were inadvertently transposed.

ACKNOWLEDGEMENTS

I wish to thank J. Maroy (Belgium) and S. van 't Hart (Holland) for their help in acquiring some of the rare tanagers described, and E. Nørgaard-Olesen for his comments and suggestions on the manu-

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NOTES ON SOME NECTAR-FEEDING BIRDS

By DIETER POLEY (Director, Zoological Gardens, Heidelberg)

While the convergent adaptations of flowers and the many species of tropical and sub-tropical birds that take nectar and pollen from them are quite well known, there is a lack of detailed information on the insect part of the diet of almost all the nectar-feeding birds. Those who keep such birds in captivity are faced with the problem of how to provide animal protein in a suitable form and, of course, it is mostly done by additives to the liquid food, for such as hummingbirds and sunbirds refuse to take solid foods from dishes. Even the proven method of teaching difficult species of insectivorous birds such as the Goldcrest to eat artificial foods by sticking ant pupae and morsels of soft food on to twigs and leaves by means of fat or water will fail in the case of hummingbirds, sunbirds and others who are only attracted to live insects, particularly those that are moving. Such birds kept indoors can, of course, be given such easily bred insects as fruit flies (*Drosophila*), wax moths, houseflies, etc., but to supply a sufficiency in quantity and variety might be difficult. On the principle that necessity is the mother of invention, many aviculturists, myself among them, have tried giving these birds meat extract, ground up *Daphnia*, bone, meat and fish meals, horse liver, beef fat, dried cod-liver oil, algal meal and much else besides. Many animals are successfully kept on substitute

foods, so why not nectar-feeding birds? There have been notable successes with some of them, but for the most part such successes have been with hardy and adaptable species and they are the more astonishing in view of the very specialised alimentary tract of nectar-eating birds. Nectar and insects are first mixed with saliva in the crop and probably predigested while the nectar, which in natural form consists of simple sugars, can be quickly absorbed by the gut, passing rapidly to the intestines while the insects are first digested in the stomach. As with many birds, indigestible chitinous parts of insects are regurgitated in the form of pellets. Of the digestive secretions and processes in the crop, stomach and intestines of nectar-eating birds little is known beyond what is general knowledge of the digestive systems of other vertebrates.

Carbohydrates, proteins, fats, vitamins and all such ingredients of the artificial nectar, because of the structure of the alimentary tract, pass straight to the intestines so that the protein in the mixture is not acted on first by pepsin, but immediately by trypsin and therefore it is not known whether this protein is properly digested and utilised, but there is doubt on this point.

The great difficulty of keeping montane hummingbirds and sunbirds which, in nature, feed more on insects than on nectar and pollen is further evidence of this doubt, for all the successfully kept species have been lower altitude forms that in the wild state take a greater proportion of nectar. The best method of keeping these birds is to ensure that they have ample supplies and a variety of live food, and since the breeding of large quantities of fruit flies, etc., is a lot of work, we have our nectar-feeding birds in an aviary that combines an inner shelter with an outdoor flight. The birds can get from the planted and heated shelter measuring $14 \times 4 \times 3.5$ m. via an open window to the planted outdoor flight which measures $22 \times 2.5 \times 3$ m. where many insects are attracted to the food vessels, while in other parts of the aviary we put receptacles of decaying fish, meat and fruit to attract more insects. In the evening the artificial lighting of the shelter attracts still more insects and the birds are thereby encouraged to come for the night into the warmed shelter. During the day almost all the aviary inmates spend their time in the outside flight. Now, after $1\frac{1}{2}$ years we can see the advantages of such accommodation over the more usual type of indoor aviary and the importance of such natural factors as sun, fresh air, temperature variations and rain. The following instances support this claim: Bronzy Sunbirds *Nectarinia kilimensis* of which we had kept indoors two males and a female for almost a year began to sing within a month of being put into the aviary, whereas previously we had heard nothing from them but an occasional call note. Newly imported Tacazze *N. tacazze* and Malachite Sunbirds *N. famosa* were put into the aviary immediately on arrival and were acclimatised without loss

and the males were singing after only a matter of days. We had similar results with two pairs of Splendid Sunbirds *Cinnyris coccinigaster*, a pair of Hunter's Sunbirds *Chalcomitra hunteri* and a Blue-headed Cyanomitra *alinae*. Of a large number of Scarlet-backed Flowerpeckers *Dicaeum cruentatum* half were put into the aviary on arrival and were acclimatised without loss whereas the remainder, put into our indoor quarantine cages, suffered some losses. Hummingbirds of various species, Masked Flower-piercers *Diglossa cyanea*, Blue Honeycreepers *Cyanerpes cyanea*, the Blue Dacnis *Dacnis cayana* and Bananaquits *Coereba flaveola* are also thriving in this aviary. The Bananaquits have built two large globular nests and a female Splendid Sunbird built a half-metre long hanging nest of cobwebs, plant fibres and wool and laid one egg which, after an incubation of 14 days, hatched, but the chick did not live.

Signs that the birds are getting a sufficiency of insect life in the aviary include the fact that at the midday siesta period they are more interested in resting than in catching insects, whereas those kept indoors are at all times eager for the live food. I have observed that the animal protein seemingly preferred by the birds in their artificial nectar is raw egg and mealworms suitably minced and thoroughly mixed with the other ingredients, of course, and this seems to suit them better than other protein preparations.

There are, of course, many recipes for the liquid nectar food, but our method of supplying insect life appears not only better, but certainly far cheaper than the cultures would be; also the birds are given exercise in pursuit of the flying insects attracted to the aviary. We are, of course, fortunate to enjoy a mild climate—Heidelberg is, not without reason, called the "most northerly town of Italy"—and to be situated in an area of many orchards and a countryside favourable to a wide variety of insect life.

* * *

SPANISH NOTES — 4

By ROBIN L. RESTALL (Caracas, Venezuela)

THE AZURE-WINGED MAGPIE

Cyanopica cyanus

Some years ago, when John Yealland was curator of birds at the London Zoo, he and I were discussing various species in the collection as we strolled along the aviaries. All of a sudden my eye was taken by a beautiful bird that I had not seen before, and he was able to tell me much about it. It was a fine example of an eastern race of the Azure-winged Magpie *Cyanopica cyanus*. As this beautiful bird presented itself to us, the story of its extraordinary distribution unrolled and the species acquired a special appeal for me that it has never since lost. A few years later I accepted a transfer to my company's Madrid office and suddenly the dream of studying the species in the field became a real possibility, for *Cyanopica cyanus* occurs in the Iberian peninsula (and the most easterly parts of Asia—and nowhere in between).

In the almost five years that I spent in Spain I had many opportunities to watch the bird in the field and was able to keep specimens in my bird room on several occasions. The bulk of the following notes are taken more or less literally from my bird diary for 1972, but before referring to these I would like to suggest that any member sufficiently interested in the species may find my notes (Restall 1972) and those by Derek Goodwin (1971) of interest. These notes contain various data on feeding, breeding and natural behaviour in the wild. Even so, that is not very helpful if one does not have the books to hand, so I will briefly summarise the feeding and breeding behaviour.

Azure-winged Magpies are obviously omnivorous, but have strong insectivorous tendencies. Those that I have managed to watch undisturbed have appeared to be taking beetles, grasshoppers and other small items that might have been seeds. They apparently take fruit in season (Coverly 1933) and seeds including acorns (Goodwin 1971). Sydney Porter collected some of the Chinese birds before the war and brought them back to England where he successfully bred from several pairs. He found that in addition to the usual diet given to birds of this kind, they took mice (Porter 1941).

Philip Wayre, who has regularly bred the species since acquiring six in 1966, normally feeds his birds on a mixture of pheasant starter crumbs and insectile food, with a liberal supply of mealworms and maggots. When rearing young they appeared to feed them exclusively on mealworms which were sprinkled daily with Glaxo's Casilan to supply additional protein.

While in Spain the species appears to be persecuted by the man with the gun (which means about half the male population at the

weekend), in Portugal it is persecuted by farmers for its believed eating habits. It is destroyed "because of the damage it does to potato crops". Yet when 60 specimens were shot for crop analysis they were found to have been feeding exclusively on the Colorado Beetle (Santos 1965). Also in Portugal the eggs and young are often destroyed whenever they are found because they are said to do such great damage to fruit trees (Coverly 1933). I have clear evidence from observations in garden areas along the southern side of the Gredos mountains that they take a lot of fruit in season, in this case figs and cherries.

On one memorable occasion my wife and I watched about a dozen of these birds cleaning up the remains of a Spanish roadside picnic. A pile of apple peel, cores and orange bits had been dumped on the verge, and the magpies were tucking in like a gang of House Sparrows. Large morsels would be carried to a tree, held with a foot and dealt with. They would gulp down lumps of apple the size of grapes, but totally ignored the orange. The flock scattered at the approach of every car, but our car—quietly sitting still—was ignored. We were almost too close for binoculars and my camera was at home! On two occasions we have seen identical behaviour in the car park of the mountain cathedral at the Valle de los Caidos.

The nest is a reasonably well-constructed cup of bents and twigs, lined with grass and soft hair, etc. It is frequently found in almond trees, olives, or evergreen oaks, fairly close to the trunk as a rule and from 10 to 20 feet from the ground—according to the literature. All the nests that I have found have been between 20 and 30 feet up, and nesting normally occurs in May and June. They are occasionally double-brooded, I believe, but I think that this is either a response to unsuccessful first rounds (personal observations) or an early start under particularly favourable conditions having ideal breeding conditions still prevailing (aviculture).

Two of Porter's pairs built a double nest, one joined to and below the other. As the young reached fledging time four of them (there were eight) transferred to the lower nest. The clutch, incidentally, may be anything from four to nine (I have only found five or six).

My office diary for 1972 was made redundant by the gift of one of those status-symbol ones from a prestigious British journal. It immediately became a kind of bird diary, and the following notes are, literally, what I wrote at the time.

"6th February, 1972. The third bad weekend on the trot, pouring with rain. The Rastro (Sunday morning market) is dead and while there is the normal brisk trade in canaries - I've never seen so many people walking off with breeding cages - there is nothing to even look at, except a few Goldfinches. This morning I finished an article for John Gooders on the Azure-winged Magpie, including a story on how I had been quoted a price in a pet shop of £48 each for the species. I decided to inflict the family with a wait in the car while I stopped off at the market for some bird seed on our way to Church. To my shock and surprise I saw a trapper with five tatty and sorrowful Azure-winged

Magpies. I was tremendously interested (and excited) but tried not to show it. 'Naturally, they're very expensive', said the dealer. I didn't ask the price, but he gave me a long hard sell on how four of them were young, vigorously healthy, and had been in his possession for a long time (a lie, since he certainly didn't have them last week). The fifth bird was sick, and had spasmodic convulsions. This, it was claimed, was recently caught and had not yet responded to his care. So I asked the price and was quoted 1,500 pesetas for the four good ones (£9). Not certain whether this figure was for one or all I feigned disappointment and did my Japanese 'Saaa!' impression, meant to convey gravity, concern, unhappiness - and folly imputed to the other party. The Japanese are very clever. I was then clearly offered all five for this price, and trying not to shake or stutter with excitement I agreed and arranged for them to be delivered to my house after lunch.

Before going out that morning I had tucked an old (and empty) pepper pot half-filled with mealworms into my pocket. Just before leaving the dealer I gave these to the birds, attempting to give most of them to the sick bird. 'That's not necessary', said the man's wife, 'they're used to eating bread.' Sure enough the sick one did peck at some bread - but in despair I thought - and it quickly seized the mealworms.

When the birds arrived that afternoon I had already prepared two roomy cages for them plus water dosed with aureomycin, a dozen or so mealworms for each bird, and a bowl of soft food sprinkled with chopped-up mealworms. Food formula:

- Large cup of Sluis universal
- Lump of corned beef
- Hard-boiled egg
- Teaspoon of peanut butter
- Dessert spoon of runny honey
- Lump of cheese

The solids were grated fairly finely on a Mouli-grater.
The Robin was given some of this food and loved it.

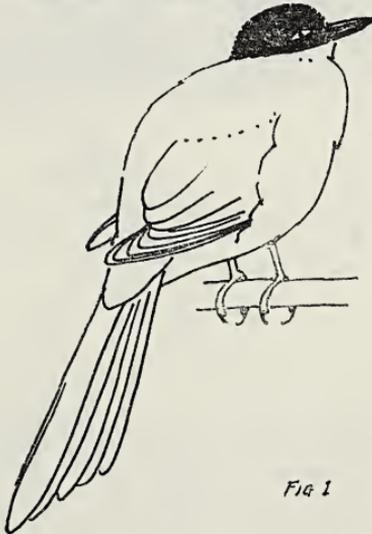


Fig 1

That evening the light was kept on until 9.00 p.m. One of the birds called a great deal and I attempted to listen carefully. The call is rather similar to that of the Spree Starling, but when repeated very rapidly, *ooreagh, ooreagh*, it sounds like a double note.

All five are remarkably tame and steady - rather the way that half-starved birds often are. Those in the 3 cage are slim, upright and active. In 2 cage the sickly bird (Fig. 1) is puffed up, but ate a lot of mealworms. Its companion was sufficiently relaxed to enable me to make a lot of sketches while all it did was watch me. Those in 3 keep shaking themselves as if attempting to bathe,

so I think that I may wash them soon (they are filthy). One has a badly broken tail, and will henceforth be called Shorty. It is fascinating to watch the change of personality that occurs when the thin sleek head is fluffed out to become a guardsman's busby. This is done when the bird is excited in some way. The black head, bill and eye, are indistinguishable and it is not easy to see where one begins and the next ends, for the irides are very dark in colour.

7 February. This morning filled both food bowls with repeat of mixture, being short of mealworms only gave 12 to the 3 cage but 20 in the 2 cage. This evening both food bowls *completely* cleaned out. Sickly looks better but is still much more fluffed up than its companion. It roosts well fluffed out and with both feet gripping the perch. Tried them with an orange this evening. Cut into small bits but kept within the skin. 3 cage sampled it but didn't exactly gobble it up. No response from 2 cage. Mixed fresh batch of food but replaced corned beef with raw minced beef.

26 March. There are at least three different voice groupings apart from the social contact yodel mentioned earlier. A loud clear screech, sheer and often long and sustained; this is given by a bird alone but not under any apparent stress or pressure (other than of being isolated). Then there is a soft, very low intensity screech made by the pursued bird when being chased or bullied by the dominant member of the group. Next, a soft, short, clicking note made by a bird busy searching for food. I have a distinct feeling that this is a mate-contact call rather than flock-contact.

My wife heard the pursued-squeak several times and was convinced that, by the increased intensity of bumps and sometimes climaxing in a crash and squawk that some kind of a fight was occurring regularly. As I never found a single feather, nor a damaged bird, I concluded that it was not too serious. All four of the birds are now in a new cage measuring seven feet by four by four. It has three perches and gives the birds some freedom of movement. I have

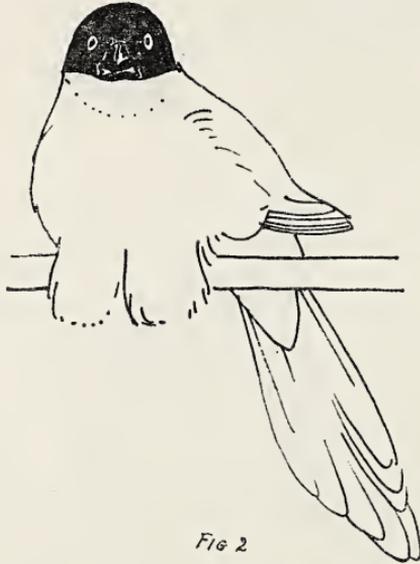


Fig 2

noticed that when the birds are nicely at rest (Fig. 2) at mid-day for example, or when roosting for the night they are always grouped one-two-one, which leads me to the tempting conclusion that there is one bonded pair at least while the other two might be anything.

28th March. This morning at dawn I heard the pursued squeak and raced upstairs to peek around the corner. On two occasions I managed to hear and see the chase and positively identified the aggressor as pendulum-tail. This bird was chasing in a determined sort of way (but not so determined as to be really vicious). As the flier fled it squeaked the 'help!' note continuously."

Obviously one cannot keep such large and active birds in cages for long. The sickly bird had deteriorated rapidly and had a nasty head-twisting convulsion: it soon died. I had isolated it and given a lot of mealworms, well dosed with medicine, but to no avail. I was unwilling to release the four healthy adults since I hoped to be able to study them in aviary conditions in due course. Eventually I managed to get them back to England where they were split into two pairs and left in the care of friends. I hope that their notes on the breeding behaviour of the birds, plus feeding, etc., will follow these notes.

Later the same year I happened to be in the market on a Sunday morning. The following entry is headed, Immature bought 20.8.72:

"A man that I have never seen before on any of my visits to the market was standing in mid-stream, the dense crowd surging by and around him. A cry of 'Oh! Rabilargo!' caught my attention and within seconds I was by his side. He was holding a small and battered canary cage, within which was dull and shabby Azure-winged Magpie. 'How much?' I asked. 'Two hundred, with cage', was the reply. Without further ado I thrust a couple of notes into his hand and dashed off home gleefully. It wasn't until I opened the boot of the car when I arrived home that I realised that the dullness was from immaturity and not dirt. The bird greeted me with some high-intensity begging. I put it in a large (but not large enough) all-wire double-breeder where I could keep a constant watch on it. The cage could be kept on a tree by the front door, and in the living area of the house.

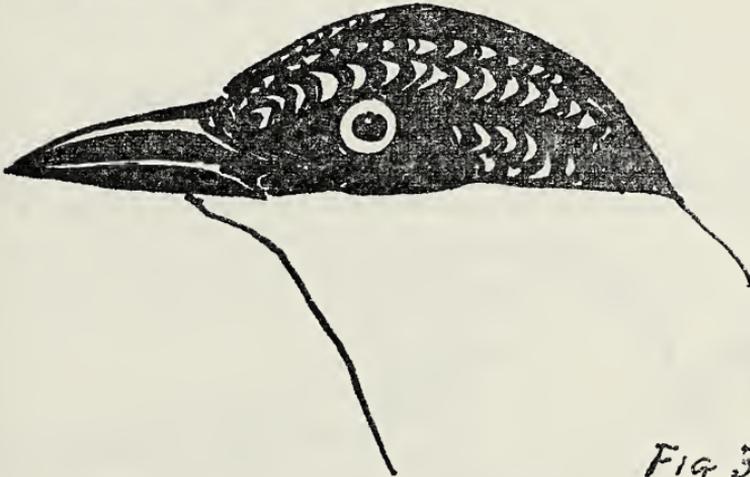


Fig 3a

Plumage: Black head flecked with broad arrowheads (Fig. 3a) of light brown. These edges look as though they will wear off, leaving the head blacker, before being replaced by a moult. These pale marks form a distinct superciliary line and are scattered all over the crown and ear coverts. Otherwise plumage is as per adult bird, but noticeably duller. Mantle and scapulars are greyer than on an adult but do have a brown wash.

It seems as though the canary cage had been the house of the bird for it seemed to be well 'fitted in', and its tail was frayed and worn by constant rubbing against the wires. However, I decided that it had been given a lot of freedom also for it was very keen to explore and see all the corners of its new world.

Voice: Rasping 'open mouthed' noise, which sounds like displeasure (being anthropomorphic) is almost identical to adult. Two similar contact cries are unmistakably Azure-winged Magpie in origin, but are not the familiar adult

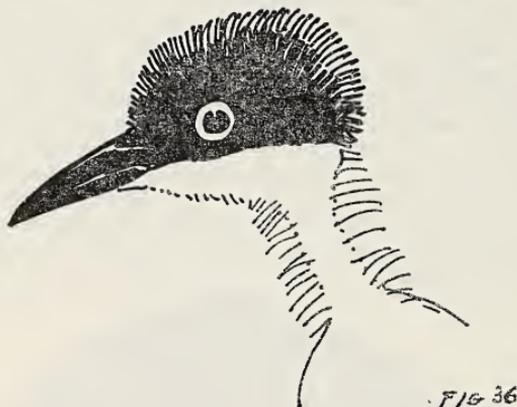
contact calls. Possibly the exact/accurate notes are learned, the calls of this bird being 'inherited memory'.

Begging: Solicits food exactly like any other baby crow, raised beak open, depressed body, fluttery wings, baby squeaking/pleading. Intensity of solicitation is a response to feeding stimuli (in this case my fingers with food) and not hunger. When genuinely hungry will beg high intensity just at the very sight of me. Will spend ages hiding morsels, retrieving them, hiding them again, etc., a real game of hide-and-seek. Often it will beg a morsel from me only to go off and hide it. Young Magpies and Carrion Crows have done exactly the same.

Food: After an hour of food hide and seek I gave some soft sweet apple. This was all devoured with obvious enjoyment - then back to food hide-and-seek.

Diet has been a mixture of scraps of raw chicken neck, chopped chicken crop, hard-boiled egg, raisins, apple, grated cheese, all tossed in Sluis universal. On occasion ripe tomatoes and sweet grapes have been devoured ravenously.

Behaviour. In general an absolutely enchanting pet, full of the antics that



one might expect from a magpie or crow. When a finger is pointed at it it immediately stands stiff (Fig. 3b) and stretches its neck with every feather erect. This is a super-high-intensity allo-preening invitation response. The head



is not tilted. Pupils are dilated. When the bird is released in the house it proves to be totally tame. Its favourite resting spot is on somebody's head. When perched on wrist or finger it almost invariably responds to *any* attention by its stretched-out peering act (Fig. 4). This can be triggered off by close talking, hand moving near by, nearness of a child's head. When alone it calls frequently, a drawn-out rasping *wha-a-a-a-a*, but shuts up at once and behaves very contentedly and happily whenever it has human company. Body postures go from one extreme of being tightly sleeked and alert to roundedly fluffed-up and relaxed. Its most incredible ability is knowing when anyone is intent on giving it a titbit; It begins begging at once, with increasingly high intensity as the treat draws near."

I took this bird over to England on a subsequent business trip, and left it in the care of my friend Colin Harrison. Early reports on its progress confirmed that it was totally human-imprinted, was miserable in the aviary with the other Azure-winged Magpies and was only happy when perching on its keeper's head. Whether Colin has been able to do any comparative studies on this bird and the wild-caught adults I do not know. An interesting remark of his that is worth repeating here is that birds of this kind are much more likely to be totally imprinted when reared in isolation as individuals, but the damage is significantly reduced when two or more are reared together.

However, I learned from Miss Laura Fisher, who was a student of Dr. Castroviejo (of the Consejo Superior de Investigaciones Científicas), that with him she had helped to hand-rear various birds and mammals. On one occasion they hand-reared a brood of four Azure-winged Magpies. One died, one was given away, but the other two were thought to be fairly thoroughly imprinted onto humans. On two separate occasions broods of two Carrion Crows were hand-reared and both times both birds were undoubtedly imprinted. Unfortunately no tests in aviary or at liberty were conducted to see whether these birds would breed.

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* * *

NEWS AND VIEWS

The first breeding in this country of the Purple Grenadier Waxbill *Granatina ianthinogaster* took place in 1958 at the Keston Foreign Bird Farm (A.M. vol. 64, pp. 164-166) and what is probably the second success was achieved by Mr. and Mrs. N. R. Flint at their home in Oxfordshire. The birds were kept for the winter in a cage 6 ft. x 15 in. x 15 in. in a birdroom heated to 60° F. and in May they were put into a greenhouse together with a pair of Heck's Grassfinches and a pair of Green Avadavats. In June a nest composed of grass and dead bamboo leaves was constructed: it was built in a bush and was domed with a side entrance. The incubation was shared by the pair, each sitting for about six hours at a time during the hours of daylight. At hatching time the male drove the other birds away from the area of the nest and in July two young birds of a soft brown colour came out.

The birds were given panicum millet, soaked and germinated spray millet, seeding grasses, an insectile mixture, mealworms, fruit flies and, as soon as nesting started, freshly collected ant cocoons and grasshoppers. A vitamin and mineral supplement was also given and when the eggs hatched both green and black aphids were added to the diet. The young continued to be fed by the father for some six weeks after leaving the nest and meanwhile the mother had laid two more eggs in the same nest, the resulting two young being also reared. The winter is a particularly difficult time in the keeping of this species and Mr. and Mrs. Flint believe that a dry atmosphere during this time of the year is necessary for the health of this waxbill.

* * *

Mr. J. Forshaw has nearly succeeded in breeding the Red-browed Fig Parrot *Opopsitta diophthalma macleayana*. The parents stopped feeding the chicks after ten days for some reason unknown.

* * *

Writing from his home at Chembur, Bombay, Mr. S. R. Sane says that one of the breeding successes in his aviaries is that of Meyer's Parrot *Poicephalus meyeri*. His large collection includes the yellow Blossom or Plum-headed Parrakeet, the Long-tailed Parrakeet and dilute, pied, blue and yellow Ring-necked Parrakeets.

* * *

Dr. Janet Kear sends news of the breeding, in Rhodesia, of *Nettapus auritus* the African Pygmy Goose. The breeding took place in the collection of Mr. R. Harland and the parents are hand-reared birds, the male three years of age and the female only one. It is, of course, the first captive breeding of this species.

* * *

The English translation of volume 2 of TANAGERS by E. Nørgaard-Olesen has now been published. Volume 1 was reviewed in the Magazine (vol. 80, no. 1, p. 38).

M.H.H.

CORRESPONDENCE

BIRDS INTRODUCED INTO EAST AFRICA

The letter from J. C. Barlass about some of the birds seen during a visit to East Africa was most interesting, particularly the comments about the lovebirds on the Kenya coast at Nyalı Beach, Mombasa.

Fischer's Lovebird *Agapornis fischeri* has never been recorded in the wild in Kenya, and the Masked or Yellow-collared *A. personata* only once as a straggler many years ago. As the heading to the letter suggests, these species have been introduced and this has happened fairly recently, not only at the coast but elsewhere in Kenya. On one occasion, a few years ago, I saw some lovebirds fly over Lake Naivasha, but was unable to identify them.

In a letter to the EAST AFRICA NATURAL HISTORY SOCIETY BULLETIN, August 1972, A. D. Forbes-Watson wrote that both were common in Nairobi and around Lake Naivasha, adding that they hybridize freely and that most are intermediates at one stage or another. He noted that they only appear to be successful in their new localities when associated with man.

Following the letter two observers wrote saying that Forbes-Watson had omitted any mention of these birds on the Kenya coast, at the same time stating that there did not appear to be any published accounts of *Agapornis* for this locality. They then list their own records for 1972; the biggest party they encountered numbered only around 20 Masked Lovebirds—nothing to compare with the "literally hundreds of Fischer's Lovebirds" that Mr. Barlass saw.

They noted a bird that looked basically like *personata*, but with the lower throat to chest yellowish-orange. This was thought at first to be a hybrid, but later found to fit the description of a known variation in which orange may be present on the upper breast and even on the yellow back of the neck.

Fischer's and the Masked Lovebird both occur naturally in Tanzania, which is immediately to the south of Kenya. Although there appear to be no major physical barriers to prevent them spreading north, almost certainly they are all released cage birds or escapes. Lots of these lovebirds are exported from Tanzania, some by air from Nairobi and others doubtless by sea on vessels that call at Mombasa, so these localities would be likely places where mass escapes could occur.

A third species, the Red-headed Lovebird *A. pullaria* extends naturally eastwards from Uganda into extreme western Kenya where it is said to be scarce and restricted.

The Madagascar Lovebird *A. cana* was once introduced onto the East African islands of Zanzibar and Mafia from the Comoros (where it still occurs as a naturalised species) but failed to establish itself permanently.

A letter in the November 1971 issue of the E.A.N.H.S. BULLETIN records the sighting of four Ring-necked Parrakeets *Psittacula krameri* in Nairobi National Park earlier that year. The authors state that "In features the birds appeared identical to the Indian Ring-necked Parrakeet *P.k. borealis* which is so popular as a cage and aviary bird".

They point out that van Someren first drew attention to the presence of this species in the National Park in 1969. In this instance, I think, van Someren saw a pair at a nest. He concluded they were "most likely to be escapes, or the progeny of escapes, of imported birds" rather than an African race.

The African Ring-necked Parrakeet occurs naturally in Uganda, but not Kenya or Tanzania. An Asiatic race has been introduced onto Zanzibar where it is said to be rare.

In the two fairly recent field guides to the birds of East Africa (Collins), John G. Williams does not mention the introduction of any of these parrots, but does record that of the Indian House Crow *Corvus splendens*, stating it is now abundant on Zanzibar and common at Mombasa and Port Sudan.

MALCOLM ELLIS

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London, N.7.

AVICULTURE'S IMPACT ON SOME RARE AUSTRALIAN PARROTS

Members of the Society may be surprised and pained to know what a bad name British and European aviculture "enjoys" among Australian ornithologists. It is a sad and unfortunate fact that aviculture has been responsible for severely depleting the numbers of two of Australia's most beautiful parrots, the Hooded and Golden-shouldered Parrakeets. The word has got around that in Britain and Europe aviculturists are prepared to pay very high prices for these birds. The supposed prices may well be exaggerated, but the effect on the two species is catastrophic.

They are totally protected and have no natural enemies except man, but they are conspicuous birds and nest in termite mounds. Once the nesting hole has been established it is a simple matter to plug the hole at night and to dig out the birds. How many caught in this way survive the shock of being handled by aviculturally unskilled station hands and boundary riders is hard to say—probably not very many. Those exported are smuggled out in the most brutal manner. A recent case where two smugglers were caught trying to take out Golden-shouldered and Brown's Parrakeets is recounted in the following newspaper account of 25th January, 1975:—

"Two Swiss nationals were fined \$500 each yesterday for trying to illegally export 14 rare Australian parrots.

"The Special Federal Court in Sydney was told four of the birds, golden-shouldered parrots from Cape York, would sell for more than \$6,000 a pair overseas.

"A customs officer said, outside the court, they were in danger of extinction.

"He said eight of the birds were northern rosellas and would fetch about \$4,000 a pair.

"Delano Antonius Reuss, 28, an engineer, and Friederich Frei, 23, a bricklayer, both pleaded guilty to trying to smuggle the birds.

"Mr. P. Ryan, for the Crown, told Mr. G. Smyth, S.M., the defendants were arrested at Sydney Airport on Thursday night by the Fauna Squad as they were boarding a Singapore Airlines flight.

"Mr. Ryan said 12 birds were found in Frei's possession—eight in a specially-constructed tape recorder and four in specially-constructed bags hanging below his knees, under his trousers.

"Six birds in the tape recorder and one of the golden-shouldered parrots in the bags were dead.

"He said two blue bonnet parrots were found in a cage in Reuss's suitcase in the aircraft's hold.

"Reuss told Mr. Smyth through an interpreter that heat had killed the birds.

"He was a bird lover and if he had been aware of the heat danger he would have packed them differently.

"Mr. Smyth said Reuss had not given much thought to the birds—'only to the profit that was coming his way.'

"Mr. Ryan said the defendants told Customs officers all the arrangements had been made overseas by another person who was known to the Fauna Squad. He said inquiries were being made about this person.

"Reuss said his reward was to be the two blue bonnet parrots.

"Frei said he was not quite aware of the seriousness of the offence."

I realise that not many members of the Society own illegally obtained Australian parrots and the number who own Hooded or Golden-shouldered Parrakeets must be minute. Nevertheless members should be aware of the harm that is done

by deliberately or tacitly encouraging the illegal export of protected birds from Australia or anywhere else and of the unnecessary disrepute into which it brings the practice of aviculture.

ALASTAIR MORRISON

26 Canning Street,
Ainslie, Canberra, A.C.T.,
Australia.

SUBSPECIES AND THEIR RELEVANCE TO AVICULTURE

I have followed with interest the views expressed by Dr. Colin Harrison (A.M. 76, 1970, pp. 191-194) and David Holyoak (A.M. 81, 1975, p. 59) regarding the desirability and practicability of aviculturists concerning themselves with the subspecific division of species. I wonder if I might be permitted to put forward my own views on this somewhat complex subject? I should point out that my views are not backed by the erudition possessed by the two authors mentioned above, but are those of a "dilettante" employing what I hope to be simple logic. I realise that some of my reasoning may be scientifically unsound, in which case no doubt some of our members will correct my erroneous thinking.

To perhaps over simplify my contention; it is my view that if a local population of a species merits being awarded subspecific status then this division is relevant to aviculture. If however, the subspecific status is aviculturally irrelevant, then that status is unwarranted anyway. Perhaps I can now expand these points.

I am obviously at variance with accepted systematics, but I can see no purpose in awarding subspecific status to a population of a species if it is impossible or nearly impossible to visually identify examples correctly. I would have thought that for subspecific division to be of any value, examples of that subspecies should possess consistent and definable characteristics that set them apart from the nominate and any other forms. I can see no benefit in gratuitously bestowing subspecific status on a regional population of a species merely because their range has crossed a geographical border, which on many occasions is political anyway and has nothing to do with zoogeography.

If part of the population of a species becomes geographically isolated and so evolves independently, then it is probable that after a period of time this isolated group will assume characteristics that make it visually identifiable. Also, of course, if two populations of a species are widely separated such as in the case of the Azure-winged Magpie *Cyanopica cyanus*, then it is feasible that examples from the two groups will develop distinct characteristics which would make subspecific division a viable decision. However, many species with extensive ranges are divided into numerous subspecies all occupying contiguous areas. Surely in such an instance, although specimens from opposite ends of the range might be significantly different, a spectrum of variation will exist, making subspecific division impracticable—and unworkable?

I have a particular interest in two families; the Strigidae and the Psittacidae and both abound in examples of species capriciously divided into myriads of allopatric subspecies which to my view are unjustified and impracticable. For example, in the standard work on North American birds (Bent), nine subspecies of Great Horned Owl *Bubo virginianus* are described, all with contiguous ranges. How is it possible to define at what point a population ceases to belong to one subspecies, but should be classed as another? In fact, this problem is complicated still further when one realises that even local populations of *Bubo virginianus* can vary quite significantly and, in addition, depending upon weather and the availability of food, considerable seasonal movements of population can take place, which would result in populations becoming intermingled. Therefore, with the intergrading and sporadic movements of population that take place, I find it difficult to accept that such munificent division is either desirable or warranted. When one further considers that Bent and his workers largely confined their interests to the avifauna of the U.S.A. and that *Bubo virginianus* is indigenous to almost the entire continents of North and South

America, it makes one wonder how many subspecies would have resulted if the species as a whole had been investigated!

If I had to select a similar example of what I consider to be excessive division from the Psittacidae, I think that I would find it difficult to suggest a more obvious case than the Rainbow Lorikeet *Trichoglossus haematod* (of Peters) which has been discussed in some detail by Rosemary Low (A.M. 80, 1974, pp. 203-204) and David Holyoak.

In common with some species of owl, many species of lorikeet seem to exhibit almost infinite variation, in fact so much so, that if a shipment of a few dozen birds is examined, it is not unusual to find that there are hardly two birds of identical size, coloration and markings and this is particularly true of *Trichoglossus haematod*. Confronted with such a variable species it would seem imprudent to accept slight differences as evidence of subspecific deviation and yet this is exactly what has occurred. I, like Dr. Harrison and Mr. Holyoak, have examined museum skins and even after a detailed comparison of the skins of some subspecies, I have been unable to find any discernible difference. Presumably identification was made possible only because the origin was known—surely this is absurd?

I think that it is now generally accepted that the present nomenclature applied to the Rainbow Lorikeets is totally unworkable, but it is equally true that any alternative is far from perfect. Having spent some time studying this enigmatic species both as living aviary birds and as museum skins, may I suggest a revised system that I consider more appropriate and workable? It is my opinion that this species can be split into three groups which would be better considered as distinct species and that many of the subspecies should be amalgamated. The groups are as follows:—

English name	Scientific name	Subspecies that appear distinct	Subspecies of doubtful validity
Rainbow Lorikeet	<i>T. moluccanus</i>	<i>capistratus</i> <i>rubritorquis weberi</i>	<i>septentrionalis</i> <i>fortis flavotectus</i>
Coconut Lorikeet	<i>T. haematodus</i>	<i>rosenbergii</i>	<i>berauensis caeruleiceps micropteryx intermedius flavicans nesophilus massena deplanchii nigrogularis</i>
Forsten's Lorikeet	<i>T. forsteni</i>		<i>djampeanus mitchellii stresemanni</i>

To conclude, it is my belief, that if a population of a species merits subspecific status then it must be significantly and consistently distinct and if this is the case, then it is incumbent upon aviculturists to retain the subspecies in their pure form.

BREEDING TERMS

I wish to relate the following which took place during 1974 between two breeders of parrakeets: I find it hard to believe, but nevertheless it is apparently true. One of the persons concerned had a clutch of eggs laid by a Yellow-bellied Parrakeet *Platycercus flaviventris* and unfortunately the female refused to incubate them. His supposed friend had a pair of Pennant's Parrakeets *P. splendens* with a clutch of eggs and incubation just commenced, so it was agreed that two of the aforementioned eggs should be put with the clutch of Pennant's. The two eggs hatched and the youngsters were reared along with the six Pennant's that hatched and when the young were independent, the owner of the Yellow-bellied was so delighted that in appreciation he offered his "friend" a young hen Pennant's that he had himself bred. This generous gesture was turned down as the rearer of the birds did not think it sufficient reward and demanded that he either had one of the young Yellow-bellied or the full value which he claimed to be £500!

It is generally acknowledged amongst amateur breeders that if a bird is loaned on breeding terms the first chick goes to the owner of the aviary in which it was reared, the next to the owner of the loaned bird: if three are reared the first mentioned has two of them and so on. I do not know what happens in the case of eggs, but it is my firm belief that the resulting young are the sole property of the owner of the aviary from which they came. I should very much like other amateur bird breeders in the Avicultural Society to state their views on the subject through the good offices of the Magazine. Being a breeder of parrots, etc., for many years I have never before heard of such an outrageous demand—Shylock demands his pound of flesh!

J. C. BARLASS

Applegarth,
Singleton,
Lancashire.

BLACK APHIDES AS FOOD FOR BIRDS

In two recently published books the black or bean aphid has been recommended as a food for zosterops. The green aphid has, of course, long been known as a food for small insectivorous birds and is probably eaten by a number of native species—the House Sparrow can sometimes be seen eating it, but I have never seen any wild bird taking the black aphid and what also suggests that it is unpalatable is that it is quite conspicuous.

Birds that have never met with this aphid might eat it—once if no more—and it would be interesting to know of instances of zosterops or others eating it regularly.

J. J. YEALLAND

Binstead,
Isle of Wight.

* * *

AVICULTURAL MAGAZINE BINDING

I apologise to members for the long delays experienced in getting their Magazines bound. This has been due partly to labour disputes at the firm we have hitherto been using and also to the difficulty of finding another willing to meet our comparatively modest demand.

However, I am pleased to report that both Mr. A. J. Swain, 45 New Road, Bromham, Bedford and Messrs. P. G. Chapman & Co. Ltd., Kent House Lane, Beckenham, Kent BR3 1LD have agreed to undertake our binding from henceforth and members should send their orders, accompanied by payment, direct to either of them. Orders should state whether the covers and advertisements are to be bound with the volumes.

The price for binding one year's AVICULTURAL MAGAZINE in art cloth with gold block on the side, inclusive of the cost of return postage and packing, may be obtained on application to Mr. Swain or to Messrs. Chapman. Members should ensure that their volumes are complete before sending them for binding. Missing back numbers, if still available, may be obtained from the Society.

H. J. HORSWELL,
Hon. Secretary & Treasurer.

THE AVICULTURAL MAGAZINE

The Magazine is published quarterly, and sent free to all members of the Avicultural Society. Members joining at any time during the year are entitled to the back numbers for the current year on the payment of subscription.

ADDRESS OF EDITOR

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The AVICULTURAL MAGAZINE is distributed by the Avicultural Society and members should address all orders for extra copies and back numbers to the Hon. Secretary and Treasurer, 20 Bourdon Street, London W1X 9HX.

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NEW MEMBERS

The 28 candidates for membership in the January/March 1975 number of the AVICULTURAL MAGAZINE were duly elected members of the Society.

CANDIDATES FOR MEMBERSHIP

MISS G. ADDIE, 3 Partridge Avenue, Bagley Hall, Wythenshawe, Manchester 23 8DS.

MISS E. M. ALLEN, c/o Bamboo Pet Shop and Aviary, 125 West Jefferson St., Joliet, Illinois 60431, U.S.A.

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MR. J. GEMMILL, to Maxfield Nursery, Galston Road, Hurlford, Kilmarnock KA1 5JB.
MR. H. GRUNENBERG, to P.O. Box 523, Taree 2430, N.S.W., Australia.
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The Society entirely depends on Members' subscriptions and donations to maintain standards, and so donations, of whatever amount, are always especially welcome.

Will members please donate their surplus books on birds to the Society?

Member's Advertisements

Offers requested for true pair Funereal Cockatoos, fully acclimatised southern Europe for many years. Francisco Jose Simoes, Quinta das Terras, Pinheiro de Loures, Portugal.

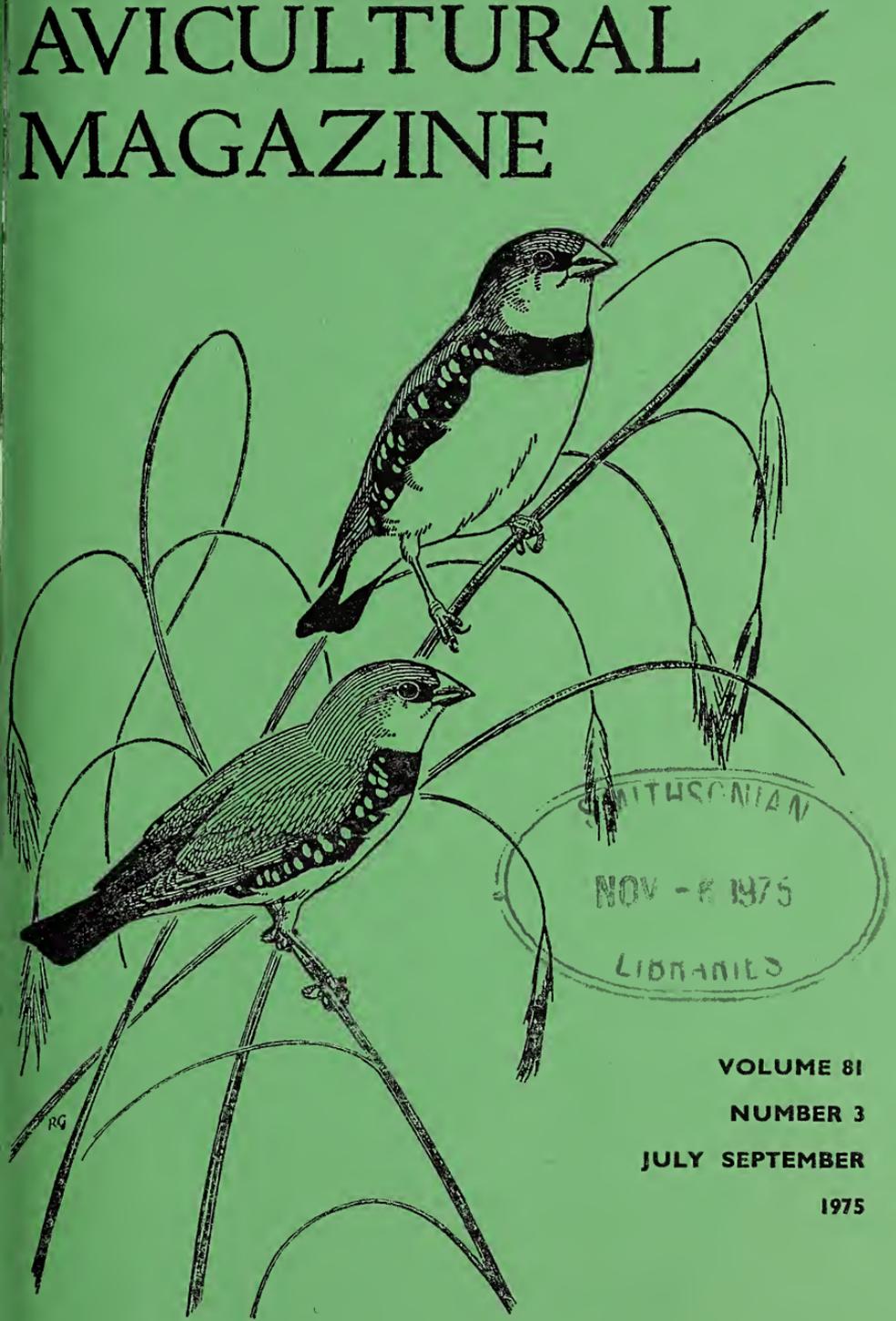
Vol. 84 No. 4 July/August 1974 is now out of print and the Hon. Secretary would be most grateful if any members who no longer require their copies of this issue, would return their copies to him so that new members may have the opportunity of reading it.

The charge for Members' advertisements is 3p per word. Payment must accompany the advertisement, which should be sent to the Hon. Secretary, H. J. Horswell, 20 Bourden Street, London, W1X 9HX. All members of the Society are entitled to use this column, but the Council reserves the right to refuse any advertisement they consider unsuitable.

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AVICULTURAL MAGAZINE



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1975

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BREEDING THE RED-HEADED BARBET

Eubucco bourcieri

By M. D. ENGLAND (Neatishead, Norfolk)

Barbets are to be found in the tropical parts of the New World, in Africa, in Asia and eastwards through Indonesia to the Philippines. In this widespread and mainly attractively-plumaged family, the Red-headed from Central and South America surely deserves a place among the most beautiful, although its colour—especially that of the male—varies considerably over its geographical range. For example, in males from Ecuador *E.b. aequatorialis*, the red is limited to the head, whereas in those from Colombia *E.b. bourcieri* it extends from the head down through the breast to where it shades into orange on the belly (see below).

Unlike many barbets which are very difficult indeed to sex from their plumage, the sexes in this case are markedly dissimilar, the male at first glance appearing a predominantly red bird while the female looks overall green; early workers may indeed be forgiven if they classified them as different species. There is then never any doubt as to a bird's sex, and this is so immediately a nestling begins to grow feathers on its face.

Although males—especially those from the northern parts of the range of the species—are almost startlingly lovely, the females have a quiet beauty and might easily be mistaken by the uninitiated for one of the smaller species of the Asiatic genus *Megalaima*.

The upperparts of the male, including the tail, are dark green; the whole head is scarlet, the extent of which, as has been mentioned, is very variable in a number of fairly distinct races, and ranges from a red head quickly blending into a yellow throat and breast to a large area of red from head through the throat and breast shading down into orange then yellow and finally to a dappled greenish-white. It has

Red-headed Barbet

Male on left, female on right.

Plate donated by Palaquin Fine Arts
London.

a narrow pale blue half-collar round the back of the neck; the legs are dark grey and the bill very light yellow-horn, looking almost white in some lights.

The upperparts of the female are similar to those of the male, but there the similarity ends: she has a black face extending in a thin line behind the eye, light blue cheeks and superciliary stripe, golden crown extending as an incomplete collar, and a pale green throat. Her breast is yellow and the belly and underparts a washy dappled green.

They are not usually noisy birds, the male having a call like a very rapid, quiet version of a Hoopoe's *Upupa epops* "poo-poo-poo", so rapid in fact as to be roughly reproduceable by saying "brroooo . . ." with slightly open lips and vibrating tongue. (It is interesting that a slower version—with distinct "poos"—is used by the Red-fronted Barbet *Tricholaema diadematum* and one slower still by the Pied Barbet *Lybius leucomelas*.)

Both sexes have conversational notes consisting of a soft "cluck-cluck", a seductive variant of which is used when offering food to a youngster and persuading it to feed. The young in the nest keep up, for quite long periods, what can only be described as a rapidly repeated ticking, which ceases when they climb up to the entrance hole. When the young are out of the nest the parents use a harsh "nark, nark" as a warning or scolding note.

As a family, barbets have in captivity a reputation for being very destructive to the woodwork of aviaries, to such an extent that they have never been very popular and my friends' warnings, when I said that I was hoping to study the family, led to my housing my first two species in steel-framed aviaries. However, these forebodings proved unjustified and in my opinion the bad reputation is quite undeserved. I admit that, although amusing, it must have been annoying when a barbet at the London Zoo, having bored into a log, bored right through it and then through a very solid door behind the log into a room beyond (Olney, 1972). However, the only sign of destruction I have experienced—and I have ten different species of barbet at the moment—was when a Gaudy Barbet *Megalaima mystacophanes* started pecking at a part of the aviary framework which proved to be infested with "woodworm". Aviary damage can nearly always be avoided by providing plenty of rotting logs to which the birds can devote their almost inexhaustible boring propensity. It may not be inappropriate here to mention that one should not allow oneself to be over-optimistic when birds appear to be boring a nest hole. Holes are bored for roosting, to find food and, apparently, just for something to do, while some species bore, in the autumn, a hole which will be used for nesting the following summer.

Admittedly barbets have other faults from an avicultural point of view: they are messy, they need expensive food and are very wasteful

in their feeding habits. Many a sultana or apparently choice titbit is picked up only to be discarded—a favourite and unpleasant habit is to drop it in the water dish. Being frugivorous, they foul their perches very quickly by wiping their sticky bills on them and their droppings are copious; some species have voices which are either intolerably loud or exasperatingly repetitive and monotonous.

However the assets of many members of the family more than balance this rather formidable list of disadvantages. Most are attractively plumaged, they are active and inquisitive and have most interesting breeding habits; many readily become fearless of those who look after them; all have an anatomical characteristic which is most interesting but imperfectly understood, the juvenile “heel pads” (Gyldenstolpe 1917 *et al.*). In short, few families of birds are aviculturally more rewarding, and not the least of the points in their favour is the fact that there is still a lot to learn about them. An overriding advantage is that, at a time when the need to conserve rather than deplete natural resources should have priority, there are many species of barbet which are still sufficiently numerous in the wild for it to be permissible for limited numbers to be taken for aviculture and, even more to the point, a number of species breed sufficiently readily in captivity for a stock to be maintained without any importations at all.

Red-headed Barbets are among those with most merits and fewest vices. They are small (about the size of a Lesser Spotted Woodpecker), inoffensive, quiet, beautiful, easy to feed and less messy than many of their relatives. If my own experience is any criterion they are ready breeders since each of the only two pairs which I have possessed produced young within a few months of their arrival.

For most of the year Red-headed Barbets are mainly frugivorous, preferring sultanas soaked and cut into halves but taking apple, pear, melon, orange and occasionally a little banana. Although I am sure that many aviculturists manage to “meat them off” on to soft food, I have never done this because I find that on the whole barbets do not take readily to it and I prefer to give them food which they appear to enjoy, although I admit my inability to give them plenty of figs, the staple food of many species in the wild. However, one pair of Red and Yellow Barbets which I have seem to relish ordinary dry “out of the packet” commercial soft food, and this provided me with an opportunity to get them to take fruit—which they had hitherto refused—by mixing small pieces of apple and sultana in with it, indeed a reversal of the usual process.

As breeding time approaches, the diet of Red-headed Barbets makes a radical change: fruit is almost ignored and living food is sought. What little courtship there is consists of the male offering mealworms to his mate, and even maggots, which they normally do not like and tend to bring up undigested, are eaten in limited quantities. Locusts

are ignored except for feeding young (see later).

They are among the comparatively few species—apart from parrots and birds of prey—which hold food in a foot while feeding. Locusts and other creatures with legs or wings to be torn off are held on to a perch by one foot (sometimes both) and very occasionally a foot is raised to the beak, usually to remove and clasp food which requires more tearing up before swallowing. Thus in three adjacent aviaries I have three species with three different methods of preparing locusts for food: the Red-headed, using the feet; the Red and Yellow *Trachyphonus erythrocephalus*, holding the insect by a leg or wing and shaking it until the body flies off the grasped member (England 1973); and the Golden-whiskered *Megalaima chrysopogon*, which seizes and mandibulates the locust in its massive bill, occasionally throwing it up to catch it another way round, and finally swallowing the lot.

The commencement of serious breeding activity may be expected when both birds take turns at boring the same hole and when they spend considerable periods within it. In particular the female, although she is not actually nesting, may disappear for an hour or more. It is also very noticeable that the birds surprisingly become much tamer when breeding; one female which has young as I write will snatch a locust from my fingers to take to her chicks. Unlike other barbets, they do not usually flee from their nest on the approach of man, but content themselves with poking their head out to see what is happening. In parenthesis, although they normally perch across a branch or cling upright to a vertical surface like a woodpecker when searching for food they can cling upside down on a fragile branch like a tit (*Parus* sp.) or a redpoll (*Acanthis* sp.) while they often adopt a Nuthatch-like position when leaving the nest hole, clinging head downwards for a few moments just beneath the hole before flying off. Sometimes a bird will adopt this unusual position when boring into wood, and not infrequently a fledgling is fed from above, the parent hanging head down. Until I saw this, I had been greatly puzzled as to the method of feeding large youngsters in the very cramped confines of the nest cavity.

In the last two years a pair of each of the races mentioned above have bred in my aviaries. Pair A (*E.b. aequatorialis*) are in a densely planted aviary 24 x 4 x 8 feet with shelter $4\frac{1}{2}$ x $2\frac{1}{2}$ x 8 feet high. In winter it is thermostatically controlled at a minimum temperature of 50°F. (although one or two of last winter's "Norfolk nights" beat the heating and brought it down to little more than 40°F.).

They are more particular in their feeding than the other pair, limiting themselves to chopped sultanas, nibbles from a half-apple and mealworms. Maggots are taken very sparingly and then only when the birds are deprived of their favourite foods. Unlike other barbets, most of which are avid cuttlefish "bone" eaters, they appear never to

touch it. The only courtship seen was frequent feeding of the female by the male on mealworms.

Their first youngster was hatched in the lowest of four holes which they bored in a rotten tree-trunk, about seven inches in diameter, in their aviary shelter. It appeared to have been a solitary effort, as had happened with a pair of Red-fronted Barbets two years previously (England 1973), there being no sign of eggs or chicks thrown out of the nest. Incubation and fledgling periods were impossible to assess accurately, although there is no doubt that the latter is long—probably at least a month—as has been confirmed by pair B.

While the nest contains young a good deal of hammering is heard from within. When the young are small this can only be by a parent; indeed it then only occurs when one of the adults is in the hole. Later, however, I suspected that the growing chicks did it as well and I thought that—as in some other species—“sawdust” was being made to absorb the faeces (which were never seen to be carried away by the parents). This was probably so, but subsequent experience has shown that the nest cavity is almost certainly enlarged by the adults as the young grow, especially if there are several of them and they are a very tight fit, although even at its largest it is remarkably small for what it has to contain and the youngsters are very cramped (England, in press). The entrance hole is a very “tight fit”, being usually only a little over 3 cm. in diameter (average of eight holes, 31 mm.).

Male and female take roughly equal turns at boring the hole, incubation and feeding the young, which is done with food carried in the bill. Pair A would only take mealworms to the nest, a very unbalanced diet which I did my best to improve by rolling the mealworms in Vionate. Fruit they ate themselves but locusts were ignored. They caused a great deal of worry, once the egg had hatched, by spending much of their time searching—and sometimes trying to get out of—the aviary for some food which we could not provide. However, the titbits of small insects obtained by the time-honoured method of striking with a stick a leafy branch over an inverted umbrella were not touched (except later by pair B, which took two green grasshoppers to the nest).

They eventually disgraced themselves by not only killing their solitary youngster but eating its brain. One day to my horror I came upon the male holding the inert body of his offspring under his foot on a perch, pecking a hole in its head. The female parent was little less guilty since, standing beside her mate, she reached across him occasionally to share the feast.

This pair subsequently had three “false pregnancies”: three times they went through all the preliminaries:—cock feeding hen, both boring hole, alternate periods of incubation, then nothing except eggshells on the flight floor. As I write they have bored another hole

and spend a lot of time in it.

Meanwhile pair B (probably *E.b. bourcierii*) taught me—the hard way—my sternest avicultural lesson. Ignoring logs in the shelter (where I prefer them to nest because fledglings are easier to control) in late June 1974 they bored in a log about 10 inches in diameter in their flight in a position difficult to watch from outside. Incubation was as usual by turns but the first sign of hatching was the distressing unsatisfied search for something not included in the diet which I was supplying. This pair seemed unwilling even to take mealworms to the nest and obviously thought nothing of the assortment of crawling things which I laboriously found in the garden. However, I did see them take two small green grasshoppers to the nest so, in desperation, I gave them some very small locusts, which they had steadfastly refused to touch before. Immediately both parents became very excited and flew down to the food dish before I had even closed the door. Three locusts had their legs hastily removed and were rushed to the nest: the answer had been found. For the next fortnight *only* small locusts, so far as I could see, were taken to whatever was in the nest (we guessed there must be three chicks, because it was always *three* locusts; if any more than this were given at one feed the surplus were eaten by the parents). So keen were they that, from being wary if not timid, they would land on the food pot as it was being put in and the female took locusts from my fingers.

Since our supply of $\frac{3}{4}$ inch-long locusts was not inexhaustible—on the contrary—we dared not waste them on the parents and so they had to be given three at a time, a wearying and time consuming process which very few wives would have undertaken in their husband's absence, as mine did (quite apart from a nerve-racking period after fledging).

The young must have been nearly three weeks old when the locust diet—which appeared at least to be keeping them alive—was supplemented by mealworm pupae and later by white mealworms (*i.e.* those which had just shed their skin). Later still chopped sultanas and small pieces of apple rolled in Gevral were taken to the nest. At least a month went by before the young in the nest could even be heard from outside and it was still some time before a face appeared at the hole. The first out was a male; I did not see him leave and the first I knew was a miserable, neglected-looking little bundle (which by the way, soon recovered under warmth and became bright and perky) on the concrete floor of the aviary.

Had I been asked to guess the colour of fledgling Red-headed Barbets I should have said that I expected them to be dull editions of the female. I should have been wrong: this youngster was an undoubted male, complete with red head. So we were soon able to see, from the faces at the hole, that a male and a female remained in the nest. The



Red-headed Barbet fledgling

M. D. England



first out seemed so forlorn and the weather so unpromising that I took him inside the shelter where the parents apparently ignored him; they were fully engaged in trying to entice the other two to leave the nest. By nightfall they still seemed not to be aware of him in the shelter so I took him indoors to hand-rear him. Seldom have I made a bigger mistake: being wise after events is all too easy and I now suspect that his miserable death two days later, of a liver disorder, was at least partly my fault.

He would not gape, so had to be force-fed, a process which he vigorously resisted. Locusts and mealworms he ejected, pieces of sultana he swallowed, though apparently with increasing difficulty because he appeared either to have difficulty in swallowing or chronic anti-peristalsis. By the second day all solid matter was coming back so, in order that he should have some nourishment, he was given a high-protein nectar, but to no avail.

On the day after this first ill-fated youngster left the nest the parents tried very hard to make the other two follow suit by holding food just out of reach, even allowing them to nibble at it but never to grasp it. Instead of coming out they retired to the nest cavity and stopped appearing at the hole, giving me grave fears that they would starve.

During the afternoon the male entered the box and loud hammering was heard; I hoped that he was not murdering his offspring. After a time he appeared with a beakful of wood chippings which he scattered outside and returned within to repeat the process. The hen meanwhile started to hammer on the outside of the log, at about the point where I imagined the nest cavity to be.

After several hours during which I saw no food at all taken to the nest I felt that I simply had to enter the flight to see what was going on. I was even determined if necessary to get at the young somehow to see whether they were still alive, but this was a situation in which matters would have been simpler in a nest box than in a deep hole in a large log.

I need not have worried: failing to entice them out, the male from within and the female from without had worked desperately to cut a hole at nest level, and when I arrived I could see the two nestlings through a hole which was already nearly large enough for them to emerge through. (It incidentally gave me an unexpected and much desired view of the position which the young perforce adopt in a very restricted space.) The boring into the nest cavity from the side of the log is worthy of comment in the light of my previous experience with Red-fronted Barbets which did something similar, although in that case the single youngster finally emerged through the original nest hole and not through the new hole in the side of the log (England 1973). This further instance makes it less unreasonable to conclude that, instead of it being the work of a predator, a boring into a barbets'

nest may be a part of normal—if not constant—behaviour on the part of parents whose young appear to be reluctant to emerge from the nest.

When darkness began to fall, instead of leaving the fledglings to the dangers of a wet and windy night in the flight I shut them and their parents in the shelter. I erected "ladders" from the floor in all directions to perches above because at first the young could not fly, although they continually and over-optimistically launched themselves into space, to crash to the floor (and once into the water pot, which I had to remove). Like the young of other barbets which I have bred, they did not gape but appeared—until they had been out of the nest for about a fortnight—totally disinterested in food, and accepted it with reluctance after one of their tireless parents had prodded all round their face with encouraging "clucks", more often than not refusing it altogether. However, they flourished—for two or three days. Then the little male began to "go off", looking seedier hour by hour until I knew that night was going to be his last: two out of three, both the males.

Sure enough, next morning he was not on a perch and I found his body on the floor in a cranny. I took him to the refrigerator to preserve the body for a *post mortem* examination but, just as I was putting it into a plastic bag, I thought I felt a very slight movement. He was as near dead as could be and was certainly unconscious, but I had not the heart to put him in the refrigerator, nor could I summon the courage to put him out of his misery; but what to do with him? I could think of nothing better than to lay him in a cardboard box in the shelter until he really was dead. Meanwhile, to crown all, the young female now had drooping wings and would not accept food at all. Had they *all* got their brother's liver disease?

I felt that drugs were useless and heat had not saved the life of the first one; apparently one could do nothing but stand by and watch a promising family perish. They had thrived in the nest so what had changed? The only change that I could think of was from a diet of 100% live food to one in which the parents chose to give an increasing number of sultanas rolled in a protein concentrate. Even if it were too late to do any good, at least it could do no harm to withdraw the fruit and revert to 100% locusts. This strained our resources to the utmost, since the Red and Yellow Barbets in the next aviary were rearing a brood on them at the same time.

Several hours later I went to recover the body of the young male, to find to my astonishment that he was perched on the edge of the cardboard box, admittedly with eyes closed, but looking sufficiently like a young bird for his father to be trying, quite ineffectually, to get him to take a locust. So far as I saw, neither youngster took any food at all that day and I expected a pretty heart-rending sight next morning. On the contrary, the young female was accepting a locust as I entered the

shelter and her "moribund" brother was on a perch at least a foot off the ground. A fortnight later both fledglings could fly the whole length of the flight and were picking up food for themselves, although still carefully tended by a most wonderful pair of parents.

Without doubt this was the most remarkable experience in a lifetime of aviculture and I still do not quite know what lessons to learn from it. The old saying "A sick bird is a dead bird", although over-pessimistic, has all too much truth in it, but the mind boggles at the complete recovery from apparent death, with no treatment at all save starvation, of a young bird rather smaller than a sparrow. There can be little question that the diet was at fault and it seems probable that on this occasion an excess of something rather than the more usual deficiency was responsible, since all was well once their systems had cleared themselves of sultanas and the high protein food. The Vionate powder could not have been to blame since this was continued on the live food, and too little apple had been taken for it to have had an adverse effect. It is difficult to refrain from wondering whether all three, instead of two, might still be alive if the first to die had been allowed a day's starvation and then fed for a while on tiny locusts only.

The first brood were removed as soon as it was certain that they were feeding themselves because another nest hole was meanwhile being bored by their parents, chiefly by the male. Regular incubation of the second clutch was apparently not started until 4th October—five weeks after the first brood left the nest—but it must have been proceeding covertly for some time because the second brood, a male and a female, left the nest on the 9th November. The precocious young male of the first brood was at about that time not only singing the full adult song but was trying to feed his sister.

SUMMARY

The Red-headed Barbet, its distribution in the wild and its habits in captivity are briefly described. Details of the breeding in aviaries in Norfolk of two pairs of different races and the successful rearing of young are given, and there is an account of the remarkable recovery and eventual rearing of an apparently dead young bird. Feeding methods and boring by the parents into the side of the nest cavity are described; also the raising of a second brood shortly after the first had left the nest.

ACKNOWLEDGEMENTS

I am grateful to Dr. David Snow for permission to examine the skins of various races of *Eubucco bourcierii* in the British Museum (Natural History) at Tring, and to Derek Goodwin for helping me with this. Dr. Ian Keymer not only made an examination of the young bird which died but was most helpful in discussion of the possible causes of the diseased liver.

My very real thanks are due to A. T. Thompson and P. J. Curry who very kindly reinforced my rapidly dwindling stock of small locusts at a critical period; and most of all to my wife, without whose help in my absence aviculture would not be possible at all and the young barbets would certainly not have been reared.

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As described, *Eubucco bourcierii*, the Red-headed or Bourcier's Barbet has been bred by Mr. M. D. England and this is believed to be a first success. Any member or reader knowing of a previous breeding of this species in Great Britain or N. Ireland is asked to inform the Secretary or Editor.

* * *

PEKIN ROBIN X BLUE-WINGED SIVA HYBRIDS

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

An event that has recently caused a stir in avicultural circles in South Africa, the breeding of three magnificent hybrids between a Pekin Robin and a Blue-winged Siva by Mr. Ron Cleaver, Chairman of the Rand Avicultural Society, will doubtless be of general interest and worthy of record in the pages of the AVICULTURAL MAGAZINE.

The breeding took place in a large "garden" type aviary, 45 ft. x 24 ft. and averaging 7 ft. in height, entirely lawn and well planted with a wide variety of trees, shrubs, creepers and vines. Mr. Cleaver had owned a fine pair of Blue-winged Sivas for six years and at one stage they caused excitement when they built a nest and eggs were laid. Regrettably nothing came of this attempt and all hope abruptly ended with the death of the cock, as soft-billed birds are seldom imported into South Africa and there was small prospect of securing a replacement. A pair of the much commoner Pekin Robin was added to the collection some two years ago and as the hen did not live long, the scene was all unwittingly set for a most surprising and interesting breeding.

The first intimation of the event was when the Blue-winged Siva and the Pekin Robin showed interest in an open shallow wire basket secured in an avocado pear tree; other birds had already built a fairly bulky grass nest in the basket and the pair more or less flattened out the abandoned nest and constructed on top of it a neat cup-shaped nest, using horsehair for the most part. Three eggs were laid in November 1974 and are described as being blue with brown spots. Within

14 days two chicks hatched and both left the nest 14 days later before being fully feathered or able to fly and both were hustled away into the densest creeper by the parents whenever anyone approached. They were mouse grey in colour with very short tails usually held erect and they were very difficult to see in the large aviary. Providing food that the parents would accept to feed the young proved a major task. The usual seeds were always available plus the extremely simple softbill mixture that Mr. Cleaver provides fresh every day and that consists of three cupfuls of Pro Nutra added to four hard-boiled eggs finely mashed without any further additive. Not surprisingly, however, the parents were only interested in live insects for rearing their young. Mr. Cleaver had in the past had little success when using mealworms as the only rearing food for young insectivorous birds, so he put his faith in maggots procured by hanging up a wire container of liver and heart, catching the maggots as they fell into a tray below and leaving them to clean in sand for 12 hours or so. Approximately 75 maggots were given morning and evening daily, but the parents showed greater enthusiasm for other sorts of insect and may not have reared the brood without them. Mr. Cleaver has a swimming pool in his garden and a number of brown beetles, no doubt attracted by the light in the pool at night, get drowned in it. These beetles were scooped off the water with a net every morning and were eagerly taken by the birds. To avoid the possibility of poisoning the young hybrids no further chlorine or pool acid was added to the water of the swimming pool, which very soon went a bright green with the algae, became more attractive to insect-life in general and helped to solve the problem of providing live food for the young softbills. Cutworms were also regarded by the birds as a delicacy and Mr. Cleaver was slipping home from work to dig for cutworms in the garden to keep the brood going, and wet sacks were put down in various places to attract crickets overnight. News of the event spread and soon neighbours, friends and relations, not to mention all employees in Ron's business, were bringing contributions! The birds particularly liked small grasshoppers (up to 2 in. in length) and the praying mantis. Small wonder that the story had a happy ending.

Almost before the babies were independent the parents had started on their second round. This time they built their nest from scratch in the fork of a peach tree and everything went as previously even to there being two babies again. However, exceptionally heavy and continuous rain set in and finding the insects proved very difficult. It is thought that lack of sufficient insects was responsible for the loss of the smaller of the young just after they left the nest in January 1975.

I saw the babies before they had coloured up and again in May 1975 when Ron took me into the aviary and brought all five birds to the now bare branches of the peach tree by merely holding out his hand.

All are extremely tame and showed themselves beautifully as they hopped about in the branches within two or three feet of me in anticipation of some live food, although only a few mealworms were forthcoming in the end. All these hybrids were in top condition and had the lovely sleek appearance so characteristic of both parent species when well kept.

And now to the difficult task of describing their plumage. They show characteristics of both parents and it would be true to say that they come roughly half way between the Pekin Robin and the Siva. The first impression gained at a quick glance is of a very light Pekin Robin with a lemon rather than dark orange chest and with a tail nearly double the normal length. The long tail comes, of course, from the Siva, but it is very noticeably forked at the end like a Pekin Robin's and not rounded like a Siva's. The most striking feature inherited from the Siva are the long eyebrow stripes that run right across the head and peter out virtually on the nape, which are quite as broad as in the Siva but have come out black without any trace of cobalt. These black stripes on the heads of the hybrids probably enable them to be easily sexed as they are broader and darker on the two more highly coloured birds, so presumably the bird with the thinner, lighter head stripes is a hen. It is these stripes, too, coupled with their possessing the general shape and demeanour of the Blue-winged Siva that gives these birds an appearance so strikingly different from either parent. They also show very clearly the streaking on the head that characterises the Siva, prominently on the forehead but fading away rapidly on the crown. The wings of the hybrids definitely favour the Pekin Robin, though they are lighter grey and the orange bars on the wing of the Pekin Robin are much reduced in width and are light yellow and white rather than orange. The outer edges of the wings are black or dark grey, but the line is very narrow and there is no trace of blue. The lemon colour on the chests of the hybrids fades rapidly into very light grey and almost to white on the belly, in which feature they again favour the Siva. The dark band at the end of the Pekin Robin's tail, taking up approximately the last inch has also been inherited and this dark tip shows up well on the longer tail.

More than enough has been said to show that the hybrids have inherited features from both parent species. One last word may help a reader to gain the correct impression of these hybrids: they tend to favour their father in coloration, but their mother in shape.

Whether one approves of hybrid breeding or not, it is undeniable that three highly attractive birds with all the tameness and character found so often in softbilled birds have been produced. They are probably unique, certainly very interesting and they seem to prove a close affinity between *Leiothrix lutea* and *Siva cyanouroptera* that was perhaps not fully realised before.

BREEDING AND BEHAVIOUR OF CAPTIVE YELLOW RAILS

Coturnicops noveboracensis

By P. SCOTT STALHEIM (Mankato, Minn. U.S.A.)

The Yellow Rail is a small, brown crane, resembling a miniature Corn Crane *Crex crex* and, like many species of the Rallidae, very little is known about its behaviour and breeding biology. It has a wide breeding distribution in the northern United States and southern Canada, and winters along the Gulf Coast. In addition to the nominate race, there is a non-migratory race (*goldmani*) known from several Mexican specimens (*e.g.* Dickerman, 1971). During three summers (1971–1973) I made observations on both captive and wild birds in Minnesota (Stalheim, 1974), and as far as I know this was the first time the species has bred in captivity. The following notes detail the care of the captives and their basic breeding biology. A brief summary of my major findings on breeding behaviour is included, but these will be reported in greater detail elsewhere.

The adult Yellow Rail is about 12 cm. (5 in.) long. Upperparts behind the head are alternately striped with dark brown and narrower fawn stripes; the dark brown stripes have conspicuous transverse white bars. The crown and ocular stripes are dark brown, the rest of the face fawn; chin pale fawn to white; throat, breast and belly fawn, except for indefinite dark brown bars at the sides of the belly. The white secondaries form a distinctive patch, conspicuous in flight. The legs and feet are charcoal grey, irides brown, the bill dark olive-green to black. During the breeding season, however, my adult males were distinguishable by a pale yellow to orange bill. I sexed my birds by post-mortem examination or by position during copulation. Measurements of spring and summer adults are : wing chord 80–93 mm. (20); exposed culmen 12.5–16 mm. (19); weight 42.1–65.4 gms. (13), with males tending to be a little larger than females (Walkinshaw, 1939).

Juveniles differ from adults by being darker above, with white bars and spots on the head and neck. This agrees with statements by Roberts (1932 :ii, 550) on the nominate race and Dickerman (1971) on the southern race (*goldmani*), but some authors (Bent, 1926 : 320; Ridgway and Friedmann, 1941 : 174) have incorrectly identified the spotted form as the adult.

The rails I observed were obtained from a marsh about two miles south-west of Waubun, Minnesota (47° 12' N. 96° 00' W.). The marsh water is about 35 cm. deep in the spring, but the level drops considerably during the summer (to about 10 cm. in 1972). The main vegetation was sedge (*Carex*), cattail (*Typha*) and bulrush (*Scripus*). Sora *Porzana carolina* and Virginia Rails *Rallus limicola* also nested in the marsh. The vegetation seemed very thick, even for rail habitat, and

judging by the location of calling and flushing birds, the Yellow Rails lived in the densest areas (mostly sedge) while Sora and Virginia Rails were usually found in areas with more cattail and bulrush.

CARE OF CAPTIVES

The best technique for capturing Yellow Rails proved to be hunting them at night with a pointing dog, bright lights (to make the birds "freeze") and hand nets. My first season was a disaster and all twenty rails captured had died before the end of the year. In 1972 the diet was improved and rats were controlled with poison, reducing rail mortality to 30%.

Both seeds and invertebrates have been found in wild Yellow Rail stomachs (*e.g.* Walkinshaw, 1939; Stalheim, 1974). My observations of these birds suggest that they prefer a primarily carnivorous diet, but take seeds regularly. By trial and error I arrived at a recipe for a prepared food which included: 8 oz. of Vet's canned dog food, 1 cup Giezler's "Mynah Bird Meal", $\frac{1}{4}$ cup commercial "chick starter", a whole boiled egg (including shell), $\frac{1}{4}$ cup wild bird seed, about 50 mealworms, and 1 tablespoon gelatin powder. The food was mixed with enough water to make it crumbly. Occasionally aquatic invertebrates and grasshoppers were added to the pens, and earthworms and dead flies were added to the food.

A major problem in caring for captive Yellow Rails was inducing them to take the prepared food and this had to be done gradually. I kept newly caught birds in a small holding cage no more than 1.7 m.² for at least ten days. During this time plentiful live food was supplied (*e.g.* mealworms, earthworms, crippled flies, snails), some of it mixed with prepared food. Next the rails were released into their main pen (about 90 m.² in 1971 and 1973; 40 m.² in 1972). There they had feeding bowls similar to the ones they had been using (about one bowl per 10 m.²). I tried to keep some live food in these bowls continuously for about a week, by which time the rails had usually become adjusted to the pen and the prepared food. Feeding stations were then reduced to about one per 20 m.², and the rails were fed on alternate days.

The aviaries were designed so that the rails would be easy to observe. During the 1971 breeding season a rectangular pen 17.4 m. long x 5.2 m. wide x 3.0 m. high was planted with rows of vegetation radiating from a central blind, and flooded with several centimetres of water between the rows. Two corners of the pen had completely dry areas, each about 2.5 m. x 3.0 m. This pen was designed by Gerald Kaufmann (1971) for his intensive study of the Sora and Virginia Rails. Unfortunately Yellow Rails were more secretive than Sora or Virginia Rails and they spent most of their time within (rather than between) the rows of vegetation, making observation difficult. One pair formed, but no eggs were laid in 1971.

In 1972 I built a new pen in the edge of the marsh at Waubun. This

octagonal pen had radiating tunnels of vegetation which allowed me to watch the rails even when they were hiding under the tunnels (Fig. 1). In the observation hide there was a sunken metal tank to sit in, surrounded by observation windows about 30 cm. above the water level (which fluctuated with that of the marsh). Enough straw and

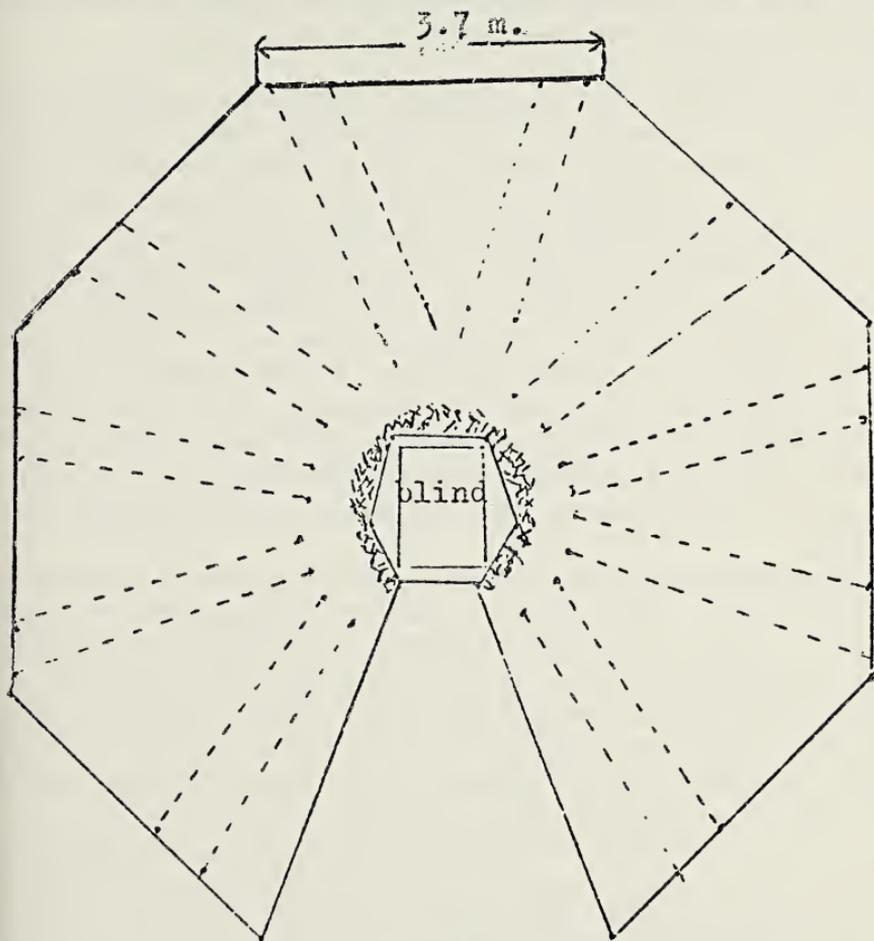


Fig. 1

The aviary used in 1972. Dashed lines show the tunnels.

dead marsh grass was scattered so the rails could walk on top of the water, but the only completely dry area was the nesting cover which was placed in a border about .7 m. wide around the blind. The greatest advantages of the new pen were that natural live food was easy to obtain in the adjacent marsh and it thrived in the pen; captives may have been stimulated by wild Yellow Rails calling nearby, and the birds were easier to see in the new pen. Three males and two females were introduced to the pen in 1972. One pair formed and they built a nest and laid eggs about 25 cm. from my observation window,

yet I didn't discover the nest until the female began incubating!

In 1973 I kept four males and two females in the pen built by Kaufmann. One male paired with both of the females consecutively and each female raised a brood.

BREEDING BEHAVIOUR

The following conclusions are based on observations totalling 250 hours in 1971, 350 hours in 1972 and 15 hours in 1973.

Hostile behaviour

Hostile interactions were uncommon during winter while the birds were held in an indoor pen, but occasionally hostile displays and chases were observed. In spring, however, hostile interactions were frequent between males as soon as the birds were introduced to the breeding pens (late May). As the breeding seasons progressed, the territories of subordinate males were reduced until the dominant male established the entire pen for his territory. Males patrolling their territory walked through it, stopping frequently to give clicking calls (a five-note series of metallic notes with the characteristic rhythm: "tic-tic, tic-tic-tic", not unlike the tapping of two stones). Upon encountering an opponent in his territory, the male usually stopped to give the Clicking call and then chased the opponent, who usually retreated and gave a Squeak call. The chaser often Clicked again after the chase.

Most chases involved males, but sometimes when a male encountered a strange female in his territory, he Clicked and approached her performing the Wing-spread display (both wings fanned out behind and head stretched toward her). She usually walked away even if he did not chase her. In these situations, the male seemed to have conflicting sexual and aggressive tendencies. Once a male encountered a sleeping female (not his mate) and apparently succeeding in raping her. She gave Squeak calls until he dismounted and then she retreated.

In 1972 the number of chases decreased when I removed the subordinate males (almost constant chasing was threatening the lives of all the males). The remaining male (who was paired to one of the two females in the pen) continued Clicking and patrolling, and sometimes chased the unpaired female. About four weeks after the removal of the subordinate males, incubation began and chasing almost stopped completely. During incubation the male continued patrolling his territory and Clicking, but he did no chasing. The incubating female avoided her mate entirely and the male was attempting to pair with the other female.

Pairing and sexual behaviour

Pairing and sexual behaviour was similar in 1971, 1972 and 1973, but my observations of these activities were much more intense in 1972, and all the counts of behaviour patterns are from 1972 observations.

The two males which successfully defended territories in the breeding pens also formed lasting pair bonds, while three other males formed temporary pair bonds which broke when their territories were overrun by a dominant male. In 1972, the pair that eventually bred performed the entire repertoire of pairing and sexual behaviour, including one copulation, during the first week. During the first few days, standing together was the primary pairing activity, but gradually the birds began performing other activities such as feeding, preening, and sleeping while near each other. Preening the mate and copulations were not seen until five days after the rails were put in the pen. Except for a few instances lasting a few seconds, the female did not preen the male, but I observed him preening her on 50 occasions.

Although a female seldom approached her mate, a male would approach his female many times by walking toward her or chasing her, but she usually avoided him. On 87 occasions in 1972 the male was seen chasing his mate with the apparent intent of copulating; only six of those attempts resulted in apparently successful copulations. The female prevented the male from copulating not only by retreating, but also by hiding under dense vegetation, standing erect, or avoiding a posterior orientation toward the male. On a few occasions her attempts to avoid this orientation resulted in a circular precopulatory chase, the female retreating from the male in a circular path two or three feet in diameter. As the breeding cycle progressed, the male was less aggressive toward his mate and she was more often receptive to his copulatory advances, sometimes not avoiding him at all.

Pairing and sexual behaviour peaked around egg-laying time in 1972, and the last apparently successful copulation (of 23) was seen two days before incubation began. All pairing and sexual behaviour between the mates stopped when incubation began in both 1972 and 1973, but the male tried to re-pair with a new female in both years, and he succeeded in fathering a second brood in 1973.

Nesting and incubation

My captive Yellow Rails laid one clutch in 1972 and three clutches in 1973 (one nest deserted, the other two hatched by different females), but most of my observations were of the 1972 nest which was less than 25 cm. from the blind window. Nest-building was first seen 28 days before incubation. Both sexes participated in the early stages, when crude "scrapes" were hollowed out in the vegetation. Three such potential nest sites were constructed in 1971; in 1972 six were constructed of which one was used as an egg nest and another was used later as a brood nest. While sitting at these potential nest sites, the male often gave Clunking calls (sounding like a distant knocking on a door), Croaking calls (sounding like the croak of a Leopard Frog *Rana pipiens*), and a call combining both sounds in alternation, the Clunks-and-Croaks call. On a few occasions the female approached

her mate while he called at these sites. Neither sex was ever seen carrying nest material. (The nests could have been constructed without carrying material, by simply hollowing out and moulding vegetation around the nest).

The female (at least in 1972) completed the finer details of nest-building during egg-laying and this activity continued during incubation. She pulled nest material in, and poked at it, turned in the nest, and sometimes kicked backwards with her feet. When I pulled away the vegetation around the nest for a better view, she pulled a canopy back over the nest as soon as she returned. After the eggs hatched, the female finished construction of a separate brooding nest.

The egg-laying sequence was not observed, but Peabody (1922 : 42) suggests that an egg each day is the normal rate in wild Yellow Rails, and he gives evidence of one egg being laid at night. Of the four clutches laid by my rails there were two with five eggs (all eggs hatched), one with four eggs (deserted), and one with an unknown number of eggs (at least four hatched). Incubation begins about the time the last egg is laid, resulting in nearly synchronous hatching, as Terrill (1943) also observed in a nest of wild birds. The period from the hatching of the first egg to that of the last was about 24 hours in the two five-egg clutches I watched.

The incubation period could be determined only for the 1972 nest (17 days). In all three nests I observed, only the female incubated. During the fifth day of incubation in 1972 I recorded the nest attendance for a 24 hour period. 85% of daylight hours were spent on the nest, with each bout of incubation averaging 37 minutes (S.D.=6), and with periods of inattendance averaging 6.3 minutes (S.D.=2.5). At night, the female remained on the nest constantly. Feeding during incubation must be a critical problem since rails do not have crops for food storage, and (judging from my captives) the male Yellow Rail does not relieve or feed his mate. Thus, while off the nest the female fed intensively, even performing comfort movements (such as shaking, scratching, and sunning the wings after bathing) while she ate.

Care and development of the young

During hatching, the females were very protective of their nests. Once when I checked a nest during hatching the female bit my finger. The newly hatched chicks are wet and at first lie in the nest, lifting only their heads and giving peeps. After a few hours the chicks sat up, supporting themselves on their tarsi. Sanitation at the egg nest was not a serious problem, partly because the brood moved to another nest two days after hatching. Chicks went to the edge of the nest to defecate after they were a day old. I did not see the mother remove egg shells from the nest, but she did crush some shells with her bill and then pecked them into the bottom of the nest, and she may have eaten some.

The downy young have been described from museum skins (Ridge-

way and Friedmann, 1941), and chicks a few days old were described (with photo) by Terrill (1943). The newly hatched chicks are completely black, except for a bright pink bill and charcoal grey legs and feet. Fig. 2 depicts stages of development of the young. As the birds mature, the bill gradually becomes paler, being a dull white by the 16th day and turning grey-black by the 24th day. Chicks begin losing their downy appearance by the 12th day, when they first begin to show fawn coloured patches of the juvenal plumage beneath the down of the sides and auricular area. By the 18th day, feathers predominate over the down, although the remiges and rectrices do not finish growing

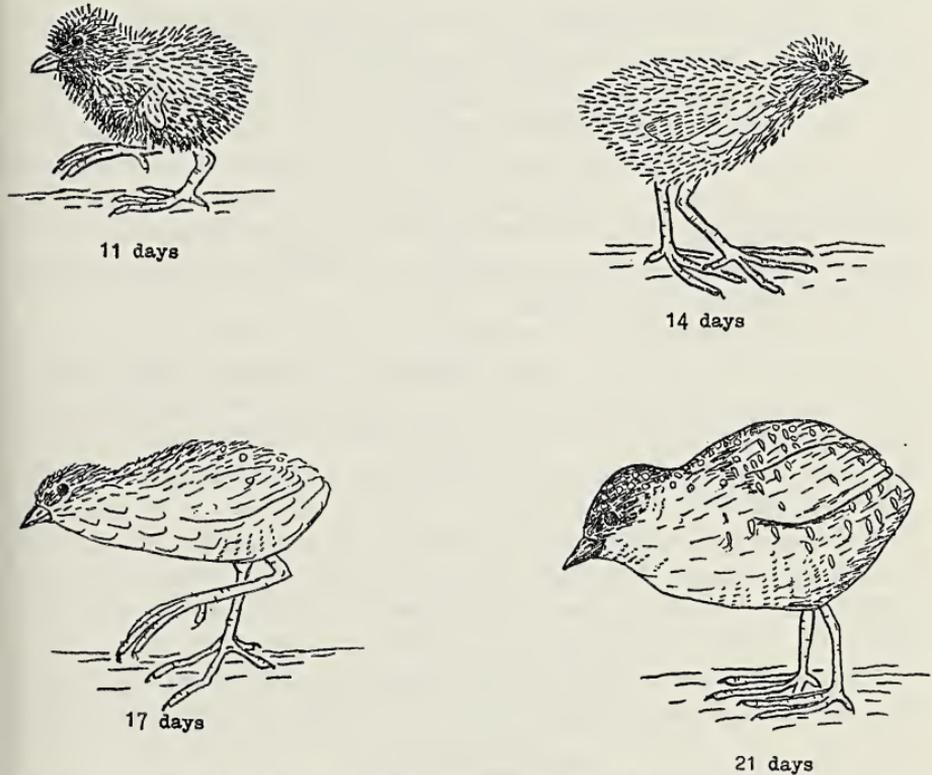


Fig. 2 Stages of development of young Yellow Rails drawn in proportion from photographs

until about the 35th day, at which time the young are capable of flight. On the 24th day measurements of three chicks were: wing chord 44,46,46; exposed culmen 11,11,11; middle toe without claw 27,29,29 mm.; and weight 39,39,46 gms.

The mother first brought food to the nest, including large mealworms, about 15 hours after the first egg hatched. Before presenting them to the young, she softened the mealworms by dunking them several times and mandibulating them. Food was offered to the chicks' bills, but the chicks never used special begging postures. During the

first day after hatching some of the young ventured a metre or so from the nest for a few minutes at a time. Two days after hatching, the entire brood followed the mother away from the nest, and for the next two days the chicks moved together as a group, almost always touching one another.

When they first stood on their toes, at almost two days of age, the chicks had difficulty in balancing and for about the first five days the wings were held out, apparently for balance, when feeding or running. The well developed wing-claw, commonly found in rail chicks, helped the young to scramble through the vegetation and climb in and out of the nest.

When the mother Whined (a call much like a dog's whining) and walked back and forth, the chicks would follow her. She also gave a Low Moan, a quiet cooing that seemed to calm the chicks, especially when she brooded them. Chicks gave an assortment of intergrading peeps and cheeps. The loud and sharp peeps seemed to indicate cold or hunger because the mother responded by brooding or feeding the young. The chicks also gave very quiet "wees", which started and ended more gradually than the peeps, and which were usually given while they were being brooded.

The mother brooded the young and fed them both in and out of the nest for about 17 days, after which they were no longer brooded during the day. The chicks began feeding on their own five days after hatching and they were last seen being fed on the 21st day. When two weeks old the chicks were pecking at food on their own more often than from the mother's bill.

As the young became less dependent on their mother for food, warmth and shelter, they spent less time near her. Three weeks after hatching the juveniles were independent of their mother, although they could not fly until about the 35th day.

The same male was father to all three broods I observed (there were three different mothers), and he ignored the eggs as well as the young.

ACKNOWLEDGEMENTS

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BREEDING THE VERNAL HANGING PARROT

Loriculus vernalis

By G. D. GRADWELL (North Shields, Tyne and Wear)

In an aviary measuring 21 x 7 x 6½ feet I kept, during 1974, a pair of Vernal Hanging Parrots together with two hen Blue-crowned Hanging Parrots, sunbirds, sugarbirds, tanagers, zosterops, yuhinas and some others. This outside aviary connects with a flight inside a birdroom which is heated to 50° F. and the birds agreed well together, the only sign of aggression coming from one of the Blue-crowned. The milk-based food provided is composed of 4 dessertspoons Ostermilk, 6 sugar, 1 Nestle's milk and 4 glucose to one quart of water. Vitamin compound drops were added to this and sponge cake was soaked in it. Fruit such as apple, banana, pear and grapes together with tomato, cheese, maggots (bred from meat, not fish), millets and sunflower seeds were also provided. In the outside flight there is running water and I noticed that the male Vernal, after eating sunflower or other seeds, would drink water before going on to the nectar dish. Also in the outside flight there are two logs of silver birch *Betula alba* about two feet high and 15 inches in diameter and the parent hanging parrots ate the inner bark (the cambium layer), sometimes quite a lot of it, after eating other foods and before going to feed the young. The maggots were also eaten by them and later by the young birds.

The nest was in a wooden box about 4½ inches interior diameter and some 3-4 feet long—it was actually what conveyor belting was wrapped around for delivery to quarries. The box stood on the ground leaning against the aviary side at an angle of about 45° and there was no peat, decayed wood or sawdust inside, but only leaves of Cotoneaster, a layer about 1½ inches deep. The mother collected these leaves from bushes growing in the flight and carried them to the nest, sometimes tucked into the rump feathers, but more often into the breast feathers. The mother is a bird that I bought in 1965

and was exhibited by me. She, her mate and the young were shown at the 1974 National Exhibition in the breeders' class for parrots.

In the spring of 1974 she laid and incubated three infertile eggs, later laying another clutch of three and hatching three chicks which lived for eleven days. On July 3rd, 4th and 5th or 6th three more eggs were laid and when I looked into the box on July 27th I saw three chicks. I was able to observe in some detail the events from then on, for I was convalescing from an illness and spent a lot of time watching the birds in the aviary and I kept daily records.

The father took no part in the incubation and was not allowed by the mother to enter the nest. He always perched on the rim of the entrance and fed her from there, while at night he roosted in the inside flight. On July 29th when I inspected the nest with the aid of a torch, I noticed that the young ones were of a dark reddish colour as if the skin was inflamed, but I believe this is natural, for the chicks that died were quite pallid by comparison. One of the hen Blue-crowned was constantly trying to get into the nest which was successfully defended by the Vernal.

On August 1st the father was allowed for the first time to enter the nest and feed the young, perhaps even brooding them while the mother was feeding, bathing and preening. The young were getting grey down by the 4th August and this appeared darker on the 5th, while the eyes of the chicks were beginning to open. On the 6th I could hear the young birds calling from a distance of 9 feet and they were no longer being continuously brooded during the day. By the 8th the eyes were fully open and the calling louder, but on the 10th the weather became cold and wet and for some reason the father stopped feeding the young, but the mother continued to do it. On the 11th he resumed feeding the mother, but not the young. As the nest was then very wet I put sawdust in, but this had the effect of frightening the mother who kept looking into the nest but would not enter, so as last when she was at the entrance looking in I made a loud noise which alarmed her so much that she dived in. By the 12th the young were well covered with down and I could see them by the light of the torch moving about. The father at this stage was trying to entice the mother to the nest, but she only stayed long enough to feed the chicks and she did not brood them. By this time the wing quills could be seen and three days later some green was showing on the wing feathers with body feather sheaths visible on the 17th. At about this time the nest had again become very wet and on the 15th the mother carried in more leaves.

The male was by now anxious to get his mate to nest again, but she attacked him whenever he attempted to mate. The cold weather continued throughout August and although the nest was very wet I did not put any more sawdust into it. The young continued to

develop fast and by the 26th they appeared almost ready to leave the nest; the mother fed them at the entrance and they appeared there a good deal, though they hastily went back inside on seeing anyone approach. On the 30th they left the nest, but I put them back because of cold fog and rain. Next day they came out again so I put them into a shelter with the parents and that night one of the young was roosting in the characteristic hanging position. By the 3rd September all had found their way into the outside flight and they have been in the aviary ever since. The young were very much like the parents in general plumage, but they had not the sheen of the adult birds. The mother has more blue on the throat than the father but I find the easiest way to tell them apart is by the iris colour which is white in the male.

The young were quite independent at three weeks after leaving the nest, eating all the foods and always roosting in the shelter. Now (May, 1975) I have a Philippine Hanging Parrot incubating three eggs in a parrakeet nesting box which has nine inches depth of peat moss in it, but I have not found mates for the two Blue-crowned which laid eggs in 1973 and 1974—five eggs in each nest in their case.

I am very grateful to Mr. and Mrs. Grantham for all their advice and help during the time that these hanging parrots were breeding; also to my wife and children who, of course, cared for the birds during my illness. My daughter taught the male Vernal to eat the maggots and I believe that this additional food may have helped the chicks through the early days of their lives.

As described, the Vernal Hanging Parrot *Loriculus vernalis* has been bred by Mr. G. D. Gradwell and this is believed to be the first success. Anyone knowing of a previous breeding of this species in Great Britain or Northern Ireland is asked to inform the Secretary or Editor.

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BREEDING OF RED-BREASTED NUTHATCHES IN CAPTIVITY

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The study of birds in nature can be benefited by studying hand raised individuals in an aviary. This, at least, has been my experience with Red-breasted Nuthatches *Sitta canadensis*. Whereas a previous communication (Kilham, 1973) gives description of their courtship studied under these conditions, as well as of the aviary in which they were kept, the present one deals with actual nesting and successful fledging of young. There appears to be little in the literature on captive nuthatches. The only references known to me are those of Löhrl (1961) who kept individuals of *S. canadensis* and of the related Corsican Nuthatch *S. whiteheadi*, although without breeding them, and of Meaden (1970) who observed the successful nesting of the European Nuthatch *S. europaea*. I have studied the White-breasted Nuthatch *S. carolinensis* (Kilham, 1972a) in the same manner as *S. canadensis* as regards courtship, but the birds, although they laid and incubated eggs, failed to raise young. The present report is, I believe, the first one of the breeding of *S. canadensis* in captivity.

My wife and I hand-raised five Red-breasted Nuthatches, all taken from one nest when in the pin-feather stage in June and I had four of them, two pairs, in the aviary the following April. By this time, as a result of conflicts between the males, one pair had become dominant and was the only one to show signs of breeding. I set up a nest box on 15th April. The breeding pair took an immediate interest and the female, hitherto subordinate to her mate, asserted dominance by pecking at the male when he came close to the entrance. At times, however, the two entered the box together in great amity, expressing themselves with soft, low notes. Both worked to "excavate" although there was little excavating to do. Red-breasted Nuthatches in nature excavate cavities in semi-rotten stumps, making entrances that just fit their body size. My nest box was a regular bird box, made to simulate in size, depth and diameter of entrance a natural nest cavity and they accepted it readily.

The gamut of courtship activities, detailed elsewhere (Kilham, 1973), included courtship feeding, wing shivering, aerial pursuits, courtship flights to and from the nest box, and singing by the male. By 6th May the female was busy bringing in nest material, mostly fine grass and the male, oddly enough, taking much of it out. This latter is a phenomenon that I have also noted for *S. carolinensis*. At the approach of egg-laying and copulations the female appeared plump, calm and leisurely. Her mate on the other hand appeared restless, and at times aggressive, as he poked and prodded her into the air for fast pursuit flights.

The female continued to carry in nest material that now included bits of bark as well as fur from a Woodchuck *Marmota monax* that I had found dead on the highway. There were eight eggs in the nest on 28th May. The female did all of the incubating and brooding and the male continued to feed her, although she often came out to feed herself. It was at this time that the male began to plaster the nest entrance and its vicinity with bits taken from half-oranges. As the bits dried, they made a sticky, sugary mass. I was continually reminded of the houses made of candy one reads about in German fairy tales. Red-breasted Nuthatches have a regular habit of daubing pitch (resin) from various conifers around their nest entrance in the wild (Kilham, 1972b) and my nuthatches had seemed to find a reasonable substitute in the oranges. When I began bringing in freshly cut boughs and logs of balsam firs *Abies balsamea* later on, the nuthatches started using the pitch immediately. The male, however, still used the oranges and the result was a bizarre mixture.

The eggs hatched on 9th June. The aviary had screening over the windows of a size large enough to admit insects. The male, in consequence, was able to catch small midges and flies to feed both his mate and the young. On some occasions both male and female would enter the nest together. Food brought to the young also included mealworms (Tenebrionidae), bits of raw meat, and insects, including small moths that I caught in a light trap at night. Both parents were carrying out faecal sacs by the end of a week.

When the young were 11 days of age I noted a difference in the way the male and female took mealworms. Thus while he took four and fed them to the young immediately, she ate one, fed one to the nestlings, then stored four more about the nest box. The male was the partner taking the greatest interest in the young. He often sang low musical songs as he flew back and forth from the nest box. He appeared to take great joy in all his parental duties. The female, on the other hand, was obviously becoming interested in other things. When the young were 14 days old she began to follow the male, her wings shivering, as if again soliciting either courtship feeding or coition. Her mate, however, appeared too busy to take much interest.

By the time the young were 16 days old they were so skilful at hiding in the mass of nest material that I was unable to see just how many there were. There may have been only two, for this was the number that fledged three days later. It is possible that, with no real need for the female in a brood so small, she had, in her leisure, become ready to breed again. Possibly this was why she continued to bring in nest material. The nestlings now put their heads out of the nest entrance at feeding times, making rasping, harsh "grr" notes. In asking why the begging of young should be so unpleasant I wondered whether the harshness was not a spur to the parents, feeding being

one way of putting an end to the noise, at least temporarily.

On the day before nest-leaving the male appeared to be a bundle of activity in comparison with his mate. When I turned on the aviary lights at dawn, he burst into a full return of courtship, making rapid "hn, hn" vocalisations as he poked and prodded his mate to take wing, then pursued her in flight. He also tried to feed her in courtship feeding. She wavered her wings but did not accept food. He meanwhile showed no loss of interest in the young. When I gave him a mealworm, he arranged it to point straight forward in his bill, flew to the side of the nest, then clung for a moment to sing his bubbling song. He then fed the young. This seeming joy in life that I have also noted with pairs of Red-breasted Nuthatches in the wild makes them a most attractive bird to study.

I noted a phenomenon on the day of nest-leaving that I had also noted in the wild. The nest entrance had become so sticky by this time that the parents had to cling to it in just the right way. What would happen when the inexperienced young ones started to come out? On the day of nest-leaving the parents stuck small clumps of fur around the inner nest rim to prevent, I presumed, the young from becoming stuck. I once found (Kilham, 1972b) a female nuthatch that had become stuck to the pitch at the entrance to her own nest. There is no doubt, therefore, that the pitch, which is as sticky as bird lime, can be a real hazard.

The young, after fledging, clung closely together at the top of a pole where the male fed them for several days. His mate, meanwhile, re-entered the nest and by the next day had laid the first egg in a second clutch of five. The male fed her as well as the two juveniles. The young did well until 6th June when they started to fly. It was then that the catastrophe happened. I had a glass door into the aviary which the parents had learned to avoid so that I had forgotten that it was a hazard. The young, however, struck it in their first flights and both died. The second clutch of eggs hatched, but the parents were not successful in raising their second brood.

In retrospect I think that a limiting factor in getting these Red-breasted Nuthatches to breed in captivity was lack of plentiful supply of live insects of just the right kind. On the positive side I think that having two pairs in the aviary at the start was probably helpful. Conflicts with a rival may be helpful in raising birds to the pitch of emotion needed for successful breeding. There may be many additional factors that I did not appreciate. It is the search for such factors; the effort to provide birds with all they need in the way of habitat, artificial as it may be, that makes the raising of birds such a challenge. This is particularly so if one is studying them in nature as well as in captivity.

In regard to the pitch around the nest entrance, it should be noted that nuthatches of various species, European and American, have

special ways of protecting their nests, as I have summarised elsewhere (Kilham, 1968).

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NOTES ON THE RED-CAPPED PARROT

Pionopsitta pileata

By PAOLA BERTAGNOLIO (Torrimpietra, Rome)

In 1974 a pair of Red-capped Parrots in my possession produced two chicks, a male and a female. The former (who incidentally is strongly spotted yellow on wing-coverts, mantle, rump and tail) differed from his three brothers hatched in 1973 in that he had only a small amount of dirty orange-yellow in the middle of his forehead instead of a precise thin red frontal band. We know also that a number of imported subjects that, on reaching Europe, showed a completely green head, later developed the red cap. This confirms that juvenile dress is in this species rather variable, an uncommon occurrence in neotropical parrots, except with certainty only a few species of *Amazona* and perhaps a single *Forpus* (*F. cyanopygius*).

The two females I bred, one in 1973 and the other in 1974, were, on leaving the nest, a little more bluish on the breast, like the adult female, while the blue on the forehead was almost non-existent (1973) or completely absent (1974). The very first traces of red colour (males) and blue (females) began to appear on the forehead on 18-20 October, both in 1973 and 1974, though in the former season the chicks hatched on 3rd July and in the latter on 3rd August.

The amount of blue on the forehead of the female after the first moult seems also a variable character. My old imported female shows only a vague greenish-blue wash, the female of 1973 two or three bluish feathers and that of 1974 a well defined blue band.

The connections between *Pionopsitta* and the other neotropical parrots are uncertain. Only the poorly known *Hapalopsittaca* and *Gypopsitta* genera seem closely related, while possible affinities with *Touit*, *Forpus* and *Bolborhynchus* are less obvious.

Over a number of years I have had the opportunity to breed extensively both *F.x.xanthopterygius* and *F.x.spengeli* and I can point out a few more or less relevant similarities and divergences between them and *P. pileata*.

P. pileata scratches over the wing, like *Forpus* and unlike the majority of neotropical parrots, while *P. pileata* holds food in the foot and pairs a foot on the perch and the other on the back of his mate, like the majority of neotropical parrots and unlike *Forpus*.

Forpus eggs are very rounded while the eggs of *P. pileata* are unusually elongated and very little or not pyriform*. Less relevant, due also to the different body size, is the incubation period (19–20 days in *F. xanthopterygius* (and one or two days longer or shorter in other species of *Forpus*) and 25–26 days in *P. pileata*) and stay in the nest of the young (32–36 days in *F. xanthopterygius* and 48 (in 1973)–59 (in 1974) in *P. pileata*. The delay in the last season could be attributed to the later breeding and consequently shorter daylight in the rearing period.

Another point that would need confirmation concerns sexual maturity. *Forpus* are able to breed even when six months old, while the behaviour of the female *P. pileata* bred in 1973 (who is paired to an imported male in my possession since 1969) gives me the impression that sexual maturity is not attained during the breeding season subsequent to that of birth.

P. pileata chicks hatch with a rather abundant white down, while *Forpus* are at birth practically naked.

Young *Forpus* after leaving the nest continue to return to it at night for one or two weeks, while in *P. pileata* the box is definitely ignored by both adults and young after fledging. Furthermore male *P. pileata* seem never to enter the nest during the breeding operations (with only one doubtful exception in my experience), while male *Forpus* usually sleeps inside with the rest of the family.

Forpus are very spiteful and (especially males) often attack and kill young of their own sex the moment they leave the nest or a few days later. The Red-capped Parrot is in my experience much more tolerant and I have always left the young with their parents the whole autumn and winter, though if one of them was taken away even for a short period of one or two days it could not be put back again as the female attacked it.

Very similar is the behaviour of the incubating females of the two species when disturbed. They puff their plumage, crouching and slightly rolling with semi-opened beak turned up in a defence-aggression attitude also reminiscent of *Amazona*, though the latter also

* Two infertile eggs of 1974 have been taken to Tring Museum by Mr. L. J. Hedegus, of London, who paid me a visit last summer.

growl, while both the *F. xanthopterygius* and *P. pileata* keep silent.

Forpus in the wild and in captivity lay two or three consecutive clutches every year (with the possible exception of *F. cyanopygius* that could be single brooded), while *P. pileata* is in my experiences decidedly single brooded.

Another point worth mentioning concerns accumulations of faeces in the nest. The faeces of *Forpus* and especially those of *P. pileata* dry up on the bottom of the box, retaining their ring or spiral shape, while in other South American parrots (e.g. Patagonian Conures or caiques) the excreta of the young completely disintegrate and in part are carried or scraped out by the parents, which give to the litter a quite different aspect. It is probable that more hygienic conditions are typical of those species who use the log as dormitory all the year round and that no sanitary measures are taken by those species who enter a cavity for breeding purposes only, at least in South America.

Finally the warbling song of *P. pileata* is reminiscent of *Forpus* but much more of *Triclaria* (of which I have a pair). Furthermore both *P. pileata* and *T. malachitacea*, when very frightened or excited, utter a very similar rasping-mewing sound. The likeness between these two species (in spite of a rather different beak) is in my opinion not casual and if one has the opportunity to keep them under observation for a length of time genuine affinities in general outline (and more in particular in the shape of the head), flight, behaviour, etc., can be easily detected. Both are forest birds and in fact they have an almost identical distribution area.

A single male *P. pileata*, housed in a flight contiguous to that of my Purple-bellied Parrots, often tried to court through the wire the female of the other species when her husband was in the shelter, and Rosemary Low told me that her male *T. malachitacea* promptly reacted to the introduction of a female *P. pileata*, courting her.

Apart from neotropical parrots I have always had a curious impression of strong likeness between *Pionopsitta* and *Oropsitta*, though I admit that I have never seen a living specimen of the latter; museum skins, photographs and colour plates only. If I compare my birds with the colour plate of *Oropsitta* in Forshaw's AUSTRALIAN PARROTS, the one in the AVICULTURAL MAGAZINE (no. 5, 1967) or the photographs in Robinson's AUSTRALIAN PARROTS IN COLOUR, I cannot fail to notice a singular parallelism in general shape and attitude and in particular in the flat snaky head. It can be added that sexual dimorphism is in some way similar. In *O. diophthalma marshalli* or *O. diophthalma virago* for example there is a tendency for a replacement of the red colour on the forehead of the males by blue in the females. Furthermore the bulbous lower mandible seems an adaptation of those parrots whose diet is largely based on berries and the way *P. pileata* eats the small fruits of *Crataegus*, *Cotoneaster* or *Ligustrum*, holding them in the

lower mandible, is a little different from that of the other parrots in my collection. Perhaps this way of feeding saves the juice of some types of berries.

All that has obviously not the pretence to represent valid proofs; only a personal impression that the few collected notes on captive behaviour of *Oropsitta* seem, however, not to support. These parrots behave rather like lorikeets or caiques progressing along a perch in a series of hurried jumps, turning in mid-air, so that at one moment they have their back to you and the next are facing you.

Another hypothetical link between South American and Australian parrots has been pointed out by a few authors and involves *T. malachitacea* on one hand and *A. erythropterus* on the other. I completely agree in that the two species under certain visual angles are surprisingly similar. To take an example, the black and white photograph of young *Aprosmictus* on page 46 of Groen's AUSTRALIAN PARRAKEETS could well be passed off for *Triclaria*, but for a little smaller beak and slimmer body.

This theoretical bridge between Australia and south-eastern South America could have, in my opinion, a valid middle pier in Madagascar and neighbouring islands where *Coracopsis* parrots live, a genus not closely related to Ethiopian fauna. The Naples Zoo has four Great Vasa Parrots *C. vasa* and the immediate impression I had when for the first time I saw them was that they truly were an archaic type of *Alisterus*.

Perhaps an analysis of erythrocytary antigens and the electrophoretic patterns of egg-white proteins (less easy due to the difficulty in getting the eggs of certain species) carried out on *Triclaria*, *Pionopsitta*, *Coracopsis*, *Alisterus* and *Aprosmictus* could help to clarify whether these more or less evident similarities have a more profound significance or not.

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BREEDING THE BLACK-HEADED CANARY

Serinus a. alario

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

The cardueline finches are a large group and widely spread, occurring in both Old and New Worlds. They are ideally suitable as aviary birds, for they are easily fed on a seed mixture and green food and are not generally speaking aggressive, so mix well with other species. One of the fairly typical genera is *Serinus* represented in Europe by the Citril Finch and the Serin and by many more species in Africa, about a dozen occurring in South Africa where they are variously known as serins, canaries or seedeaters, and they form an important sub-section in our bird shows. The Black-headed Canary is now placed in *Serinus* where it undoubtedly belongs, even though it seems rather the odd one out as regards colour, for most serins have some yellow in the plumage. The Black-head, as it is locally known, has a black head and upper chest, russet brown back and white underparts. On the grounds of its strikingly different colour pattern and its marked sexual dimorphism (the hen is a contrast to her mate, having a duller brown back and grey over the rest of her body) the Black-head was placed in a genus of its own—*Alario*. It is very much a southern and western species, being practically confined to Cape Province. There are two subspecies, the other, *Serinus alario leucolaema* being found in more northerly areas, mainly in South West Africa. It is known as the Damara or King Black-head and differs in having attractive white stripes on its black head, while the female is generally paler, especially about the throat. This is an important bird in South African aviculture and is greatly sought after for showing and for the breeding of "mules". I was given a pair of Black-heads early in 1973 by a fellow fancier whose line is domesticated Canaries, also *Serinus*, of course. He had returned from the Cape with more than he needed for the breeding of mules and at first I was not particularly enthusiastic about my acquisition, but the cock soon proved such an excellent and indefatigable songster that I would not have parted with them for anything.

I tried them in several of my aviaries, but they always refused to sleep in the shelter and roosted out in all weathers; however they proved extremely hardy and were none the worse for their rather Spartan way of life. Seed and water with an occasional spinach leaf was their simple fare.

In September 1974 I was able to give them an aviary that I felt would be suitable for breeding. It measured 6 ft. x 6 ft. and was divided roughly into half shelter and half flight. Though two sides of the aviary and half the shelter roof were of solid material, most of the shelter part was of transparent fibre glass so there was enough light for

the growing of small cypress trees to provide nesting sites. In this shelter the Black-heads soon set about building in the fork of a cypress about a metre from the ground. The nest was of the typical cup shape and was beautifully constructed of strands of grass, unravelled string and cotton wool. It was so neat as to be a delight to see, but it did give the impression of being very small for the size of the hen and when she sat in it she provided a spectacle that appeared rather top heavy. The nest was in an open position, but this did not matter since the birds had the aviary to themselves and the nest was well sheltered from the weather. Perhaps herein lies the reason why more carduelines are not successfully raised in our aviaries; however under these conditions everything went well. I measured one of the clutch of three eggs and found it to be 18 x 13 mm. which is rather larger than the average given by Skead 1960 (16.7 x 12.5 mm.) though well within the range of sizes given for the Black-head in his excellent work. The eggs were of a light turquoise in colour, speckled mainly at the obtuse end with spots or streaks of a shiny chocolate brown and a few blotches of a duller lighter brown. Once the hen was sitting I provided soaked and germinating seed and about two teaspoons of egg food every morning. The parents were quite used to this by the time the chicks hatched and no further supplementary foods were given at any stage, nor were the quantities or frequency increased. I estimated the incubation period to be 13 days and when I first saw the babies they were pinkish in colour with prominent patches of fluff on their heads and backs. As they grew the skin of their heads, backs and wings rapidly darkened and at seven days they were beginning to feather and they developed into three very attractive nestlings of a pretty cinnamon brown streaked with darker brown on the back and grey, streaked darker, on the front. They left the nest on the 15th day and all three proved to be hens. They did not assume the adult plumage and lose the streaky plumage of the juvenile until they were four months old. The parents subsequently built and laid twice; on both occasions the clutch was of three eggs, but the nests were not built securely enough. The first broke at the side and tilted to such an extent that the eggs fell to the ground; the second was not adequately lined and the eggs fell one by one through the bottom. I was misled into blaming the cock until I saw what was happening, by which time it was too late to take any action.

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WHITE-WINGED WOOD DUCKS AT SLIMBRIDGE

By M. R. LUBBOCK (Curator)

One of the rarest ducks in the world, living in areas of deep, shady forest where streams and marshes are abundant, is the White-winged Wood Duck *Cairina scutulata* of South-east Asia. Its habitat is rapidly disappearing with Man's agricultural progress, since vast tracts of rain forest are being cut down to make way for crops on the fertile soils.

The Wood Duck is rather similar to its relative, the wild Muscovy Duck *Cairina moschata*, except in the comparative sizes of the males and females: there is a very small difference in the Wood Duck, while in the Muscovy the two sexes differ considerably.

Only a few live specimens were brought out of Asia during the last fifty years and it is only in the last ten years that any great effort has been made to ensure a future for the species by captive breeding. In 1969 five males and one female arrived at the Wildfowl Trust, Slimbridge, from Assam, and these were followed in 1970 by two males and four females. They had been hand-reared from wild eggs by Mr. Sam MacKenzie and formed the nucleus of a breeding stock. Losses occurred during the first two years while the birds were acclimatising, so only three breeding pairs were finally made out of the original ten ducks.

One pair was left free-winged and given a separate aviary with plenty of swimming water, a surrounding of thick foliage and large nesting boxes. These nesting boxes measured 2 ft. in length, 1 ft. wide and 1 ft. high and were placed 2-3 feet from the ground. Entrance holes of 6 in. diameter led into the boxes, which had 2 in. of earth followed by 2 in. of peat with a sprinkling of dried grass, at the bottom for the birds to nest on. A second and third pair were pinioned and given a larger pen. These pairs were provided with ramps up to the nesting box entrance holes in order to make access easier.

All pairs were kept on a high protein diet of dog biscuit meal, dried shrimp, chopped fish, wheat, brown bread and 22% turkey starter crumbs. Water was added and the mixture placed in an open food bowl. The ducks thrived.

The full-winged female that had arrived in 1969, was the first bird to lay in 1971. White-winged Wood Ducks produce an average of 12 eggs in one clutch, taking 33 days to incubate them without any help from the male.

The eggs were left with the female, but just after they hatched the drake was removed to another aviary as he became rather aggressive towards the young.

The female hatched ten chicks and successfully reared eight of them.

The young had access to the same food mixture as the parents, plus some dry starter crumbs and plenty of duckweed. Brown bread was also thrown onto the water as the young tended to eat only whilst they were swimming. They were very slow-growing in comparison with most other waterfowl.

Breeding again occurred in 1972, with fairly good success, and one of the pinioned pairs also laid; but in 1973, because of incubator failures, only three ducklings were reared. These three had been neglected by the female and needed to be rescued from their aviary after flooding in extremely bad weather. The ducklings were taken off the rather complicated diet which they had been receiving and were given the same treatment as other hand-reared waterfowl in the collection. Their new diet consisted of chick starter crumbs, then grower's pellets, followed by wheat. This proved to be as good as their previous diet.

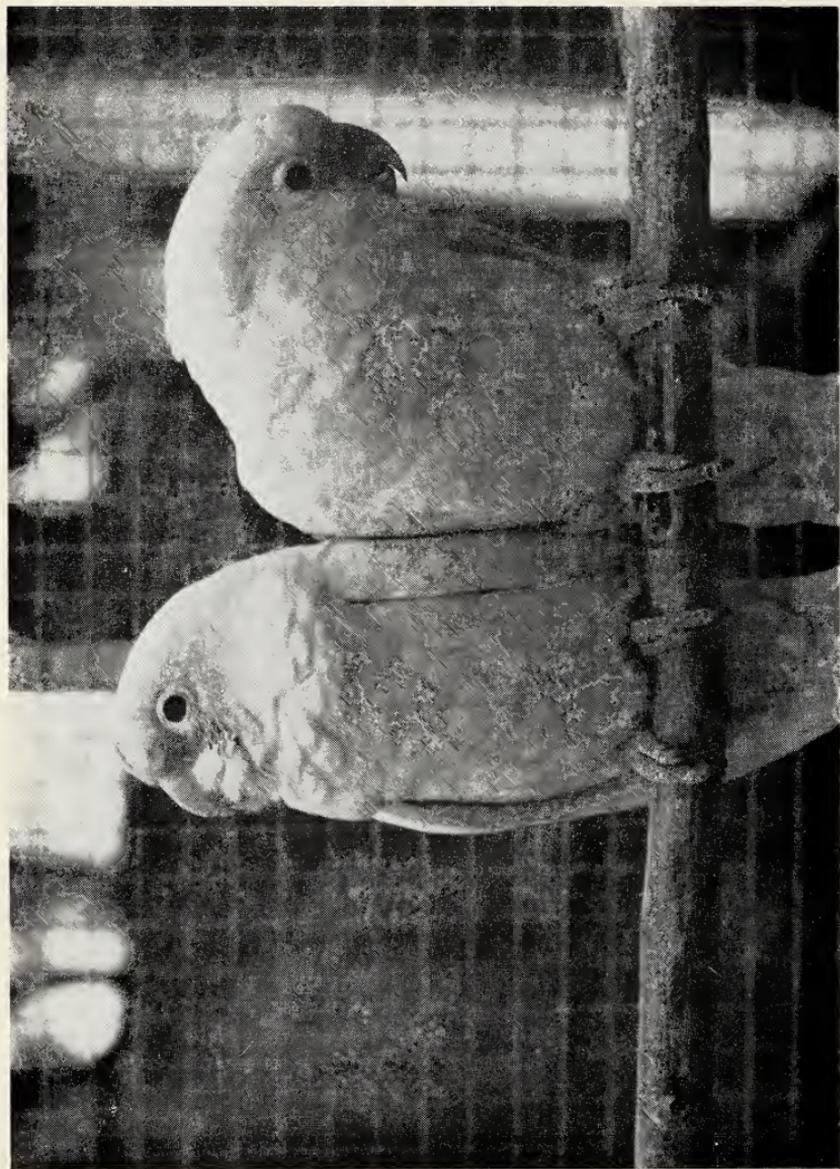
The most successful year of all for the White-winged Wood Ducks was 1974: thirty young were hand-reared to maturity. One of the original pairs laid two clutches, which was the first time that a repeat clutch had been laid in captivity. One pair, that had originally been raised by the parent in 1971 and had shown a bit of white coloration in the region of the head, bred for the first time. Five of their eggs hatched, the young were reared and these showed even more white feathering.

Now that a fairly sizeable stock is being produced at Slimbridge, pairs are being sent on loan to well-known breeders and zoos, such as Jersey. It is hoped that the Wildfowl Trust will be able to repeat the "Noah's Ark" operation which proved so successful in saving the Hawaiian Goose and perhaps eventually return some birds to the wild.

The National Zoo at Washington had earlier been given two pairs of White-winged Wood Ducks from Assam by Sam MacKenzie but, because of problems with importation from certain European countries, they were held up for two years and maintained by Dr. Delacour at Clères in France. Unfortunately, during that time, one female died. In 1975, a pair finally reached Washington but, not long after being released from quarantine, the male died. Two pairs are being sent from the Wildfowl Trust to the National Zoo but there are new regulations in force concerning the importation of endangered species and the White-winged Wood Duck is on the list of endangered birds so the ducks are temporarily delayed while a permit is issued. It is hoped that from these birds a breeding stock for the U.S.A. will eventually be built up.



E. E. Jackson
Young of the White-winged Wood Duck *Cairina scutulata*



Goffin's Cockatoos at four months old

BREEDING GOFFIN'S COCKATOO

(Cacatua goffini)

By E. G. B. SCHULTE (Eindhoven, Holland)

Goffin's Cockatoo is confined to the Tanimbar Islands, Indonesia. For a description and plate of this small white cockatoo see Forshaw (1973). Finsch (1863) described the species from birds in the Amsterdam Zoo. He and other 19th century authors described this bird, strangely enough, without the red lores (Russ, 1881 and Greene, 1884).

In March 1974 I obtained a pair of these cockatoos. As I had no outside aviary available at that time, I placed them in a box cage 87 x 44 x 70 cm. high, furnished with a nest box 25 x 25 x 40 cm. high. They were rather shy, especially the male, and disappeared into the box when anyone neared the cage: therefore only now and then was there an opportunity to inspect the nest. In May 1974 I saw them mating. Their display is simple: the female squats down and erects her tail, followed by mutual preening of each other's anal area; mating then follows. On 15th June I found three eggs in the box. During the day both birds remained in the nest except when feeding: in the evening I usually saw one bird outside. On 29th June there were still three eggs. Two days later on 1st July I heard a chick; it made the same sound as a young Cockatiel *Nymphicus hollandicus* being fed. On 2nd August when both parents were outside the nest box I saw one chick, almost fully feathered and on 7th September this chick was found dead in the nest.

On 5th October I again found three eggs (40 x 27, 38 x 26 and 38 x 26 mm.), young were heard on 9th October and on 1st November I saw two chicks. They had pale yellow down and pin feathers were visible on head and wings. On 23rd November their plumage was complete, only the tail feathers were not fully developed. Days were shortening but the chicks were fed after dark. On 18th December when they were about ten weeks old, the first young one left the nest, followed by the second the next day. They looked like the adults and had black irides. Three weeks later the young birds were independent; they had been fed mostly by the mother. Soon after this they were moved to another cage. In May 1975 the cockatoos nested again, hatching two chicks and I had a better opportunity to inspect them. For the first two weeks they are almost naked, having only a little pale yellow down and in the third week the first feather sheaths appear on the head and wings.

The food given consisted of sunflower, canary and hemp seed, oats, a soft food for parrots, soaked maize, bread and large quantities of chickweed. The birds did not eat fruit.

Forshaw says: "Peters 1937 and Van Bemmelen 1948 treat this

species as a race of *C. sanguinea*. I have come to the conclusion that if *goffini* is considered to be conspecific with *sanguinea*, then *ducorps* must also be included. Therefore for the time being I have treated all three as specifically distinct”.

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NOTES ON THE DISPLAY OF THE BOOTED RACQUET-TAIL HUMMINGBIRD

By A. J. MOBBS (Walsall, West Midlands)

Although Booted Racquet-tail Hummingbirds *Ocreatus* are brought into Britain (and the Continent) fairly regularly, it was not until August 1974, that I added a male to my collection. I did purchase a female in 1968; this bird had been with me two years, when it died from an unknown cause.

The male was given to me by my friend Karl-L. Schuchmann (Weiterstadt, West Germany). It was one of two which he imported himself, with a number of other species. I was promised the bird soon after my friend received it, but it did not actually come into my possession until August 1974, when my wife brought it back with her after visiting our friend and his wife. Upon arriving home with the bird, it was taken carefully from the “jacket” in which it had travelled and placed into an already prepared cage. Within ten minutes, the bird was bathing in the saucer of water provided and half an hour later, when the birdroom lights were dimmed, was seen to go to roost immediately.

The racquet-tail went into a complete moult only a matter of days after my receiving it. Fortunately the change did not affect the moult and it was completed without complications in 12 weeks. Two weeks later the bird was seen to display for the first time, when released from its cage prior to cleaning out. The display was directed towards a male Green-vented Whitetip *Urosticte benjamini* which is housed in my communal flight. Since then, whenever the whitetip escapes from the communal flight and hovers or perches near the racquet-tail's cage, the latter will display continually. Of all my hummingbirds the whitetip is the only one which triggers off the display. It is not always possible to determine why certain species trigger off displays in others. For instance, my male Horned Sungem *Heliactin cornuta* will almost lose control, so intense is its display, if the male Stripe-breasted Starthroat *Heliomaster squamosus* should leave the communal flight and hover near the sungem's cage. The sungem will also direct its display towards the starthroat even when the latter is perching quietly in the

communal flight some five feet away. Admittedly, however, at such times the display of the sungem is less intense (Mobbs 1973).

As mentioned in an earlier paper on *Eriocnemis* (Mobbs 1974), I feel certain the displays of many species of hummingbirds begin as aggression, only becoming mating display when a responsive female is found. If this theory is correct, the racquet-tail may direct its display towards the whitetip because of certain similarities between the species. The most noticeable of these being the wing action which is used each time the birds alight, in that the wings are held at an angle of 30-45 degrees for a second before being folded into normal resting position. The flight of *Ocreatus* and *Urosticte* is also very similar, being rapid but with rather slow wing beats. Although it probably has little to do with the reason why the racquet-tail displays to the whitetip, it is interesting to note that female whitetips (both *benjamini* and *ruficrissa*) are very much like female *Ocreatus* except that the latter have "leg puffs" and bodily are only half the size.

The display of the racquet-tail is performed both on the wing and while perched. In both cases the body is held in a horizontal position and the tail is vigorously lashed from side to side, thus producing a fairly loud noise. The tail movements form an arc, although so fast are they, the tail appears to be moved in a circular motion. When the aerial display is performed, as well as the tail movements described, the bird will also raise and lower the legs, thus highlighting the downy, white leg puffs. If extremely aroused, the bird will bring its head up slightly and raise the legs in the manner of the *Eriocnemis* (Mobbs 1974), thus displaying the leg puffs to even greater advantage. While performing the aerial display, the bird may remain in one position, move from side to side, or move backwards and forwards.

When displaying on the perch, as well as the tail movements already described, the bird will continually twitch the wings and raise the body well away from the perch to emphasize the white leg puffs. During the perched display, a faint buzzing noise is uttered; whether or not this is used during the aerial display, I have been unable to ascertain, mainly because of the noise made by the wings and tail at such times.

As mentioned earlier, racquet-tails are imported fairly regularly, although it is rare for males in adult plumage to be brought in. *Ocreatus underwoodii underwoodii* is brought in less frequently than *Ocreatus u. peranus*. Adult males of the former have upperparts shining green; throat and breast glittering green with remainder of underparts shining green. The downy leg puffs are white; the forked tail is dull blue-black with the two outer feathers much longer than the remainder and terminating in a bare shaft and shining purple-black spatula.

Females have upperparts shining green; underparts white, spotted

with shining green; leg puffs white. The forked tail has central feathers of shining green, outer blue-black tipped with white.

Immature males are very much like females but can sometimes be picked out by their stance; *i.e.* males appear to sit across the perch, whereas females sit upright (pers. comm. M. W. Clifford), or by their crown feathers; *i.e.* shining in the male, more dull in the female (pers. comm. Karl-L. Schuchmann).

Adult male *peranus* differ from *underwoodii* in that they have brown leg puffs (often less dense than those of the white feathered race) and black instead of purple-black spatulas. Females and immature males are much like those of *underwoodii*, except for the brown leg puffs.

Immature males of both races appear to have no fixed pattern when moulting into adult plumage. Some may commence by growing the elongated tail feathers of the adult, whereas others will moult the underparts first.

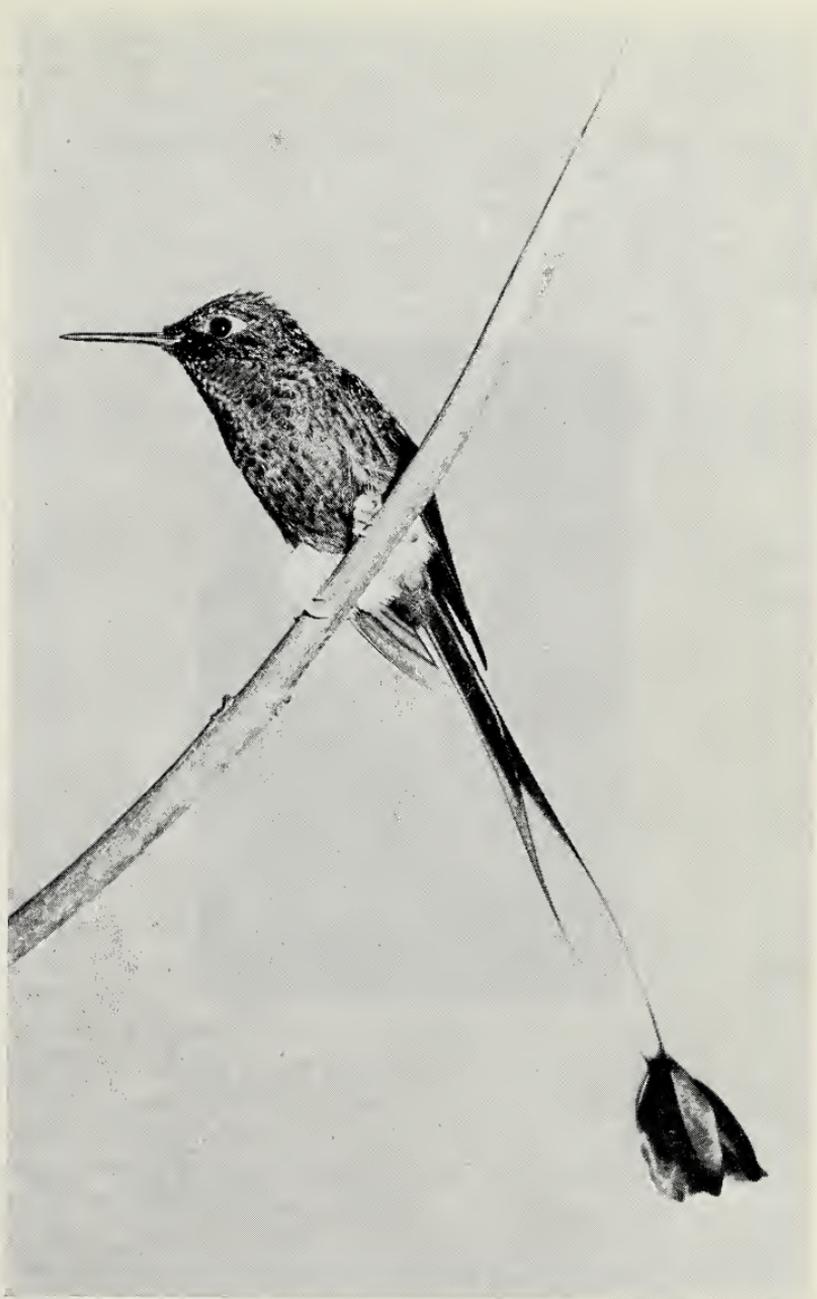
Newly imported racquet-tails usually arrive in a somewhat distressed state and because of this may require extra care if they are to survive. Even when successfully established, the species does not appear to be long-lived in captivity. I prefer to house racquet-tails in a box-cage, either singly or in pairs; however, once fully established it is rare for a pair to remain compatible in the confines of a cage. I have seen these birds housed with larger species in a communal flight, but due to their somewhat nervous disposition, it is not a practice I would recommend.

Although it is not uncommon for a female hummingbird to build a nest and sometimes lay eggs, due to the difficulty experienced when attempting to persuade a pair to mate, rarely does one hear of fertile eggs being laid. Earlier this year, Frau Schulze (Bamberg, West Germany) not only succeeded in persuading a pair of *Ocreatus u. underwoodii* to go to nest, but also in keeping the resulting young alive for seven days.

At the time of this unsuccessful but nevertheless notable breeding attempt, I was staying with friends in West Germany. It was therefore arranged that we should visit Frau Schulze the day before I was due to return home. Unfortunately the young birds died the day prior to my visit; however, I was able to photograph the nest; also the female (see plate), and inspect the young which Frau Schulze intended to preserve in spirit.

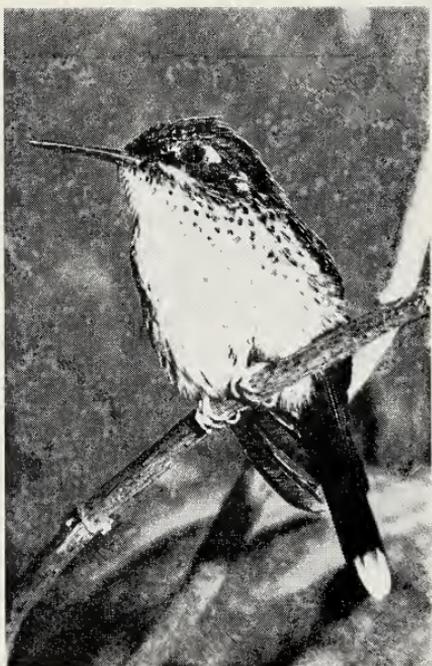
Details of this breeding attempt are as follows: The pair of racquet-tails were acquired during the autumn of 1973. In 1974 (exact date unknown), the female laid one egg. It appears the bird experienced difficulty passing the egg and because of this was almost lost.

At the beginning of February 1975, the female commenced nest building; it took three weeks for the nest to be completed. Material used included cotton wool, dog hair, moss and cobweb. The first egg was laid on 23rd February; the second two days later on the 25th.



Male Booted Racquet-tail Hummingbird
Ocreatus u. underwoodii

A. J. Mobbs



A. J. Mobbs
Female Booted Racquet-tail Hummingbird

Both eggs were laid between 8.30 and 9.00 a.m. It was noticed that immediately after egg laying, the female would leave the nest and take a long drink from a feeder. After the second egg was laid, the male had to be removed from the flight as the female became extremely aggressive towards him.

The first chick appeared on 13th March, the second the following day. It was noticed that each time the female left the nest to obtain food for the young, she always carried nesting material back to the nest. On 20th March, both young were found dead in the nest. Upon examination one of the youngsters was found to have a large amount of cotton wool in the oesophagus. A detailed account of this breeding attempt will be appearing in *DIE GEFIEDERTE WELT*.

After the loss of her young, the female racquet-tail came into full breeding condition again; however, by this time the male was in heavy moult, thus thwarting any chance of an immediate second breeding attempt.

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* * *

SPANISH NOTES—5

By ROBIN L. RESTALL (Caracas, Venezuela)

THE SERIN

The European Serin *Serinus serinus* occasionally appears in collections in Britain. However, it is an accredited British bird; but far from being the rare visitor suggested by most handbooks, it is now a regular breeding bird in southern England and is, of course, entitled to the full protection of the law. I have never seen the Serin offered for sale in Britain and any aviculturist fortunate enough to breed it would almost certainly quail at attempting to close-ring the nestlings. Supply lines are, therefore, tenuous and most Serins will find their way to British aviaries in the hand luggage of returning holiday-makers. During my five years living in Spain, I had considerable experience with the species, some of which I shall relate below in the hope that it may assist somebody in their endeavours. If only it prompts a member with a more profound or relevant experience to write, it will be worth it.

There are many *Serinus* species, nearly all being truly African birds, and the vast majority display the highly desirable characteristics (that is from an avicultural point of view) of being hardy and easy to cater for. They live almost exclusively on grass seeds and seeds of other small plants, even rearing their young on this diet. Most of them are vigorous and robust species, often very aggressive towards other male finches when breeding. The Green Singing Finch *S. mozambicus* is a classic

example, and to the finch breeders of the Canary Islands it was known, almost invariably, as the Valiant One or the Brave One.

In contrast, the two Eurasian serins (*S. serinus* and *S. pusillus*) seem to have a delicacy that catches aviculturists unaware and every aviculturist I know who has kept either, has to admit to having had some "bad luck". One can almost hear "Well, they are serins, aren't they? So they will take millet—all African finches do. But, being in the canary family, they will need some canary seed too". It never seems to occur to some folk that not every species of seed-eater will thrive on treatment suitable only for domestic Budgerigars.

The first entry for Serins in my journal is in 1970 as follows :

"SERIN. Price 15 to 100 pesetas (value then 9p to 70p) depending on sex and age. Received quite a few from April to July. Very wild and not one steadied down. I tried the odd males—Spanish style—in small cages in the kitchen and hanging in the tree outside the door. The only result of the latter was that the male Serins in the garden would fly down to the cage to attack the captive bird as a local rival. I have kept adults of both sexes, and juveniles, and suspect that the latter may be sexed by rump colour, that of the immature male being clearer and nearer to yellow. Adult male very easy to identify. Food: took everything in Canary mixture, plus the extras that I supplied. Favourite seed seemed to be lettuce, followed by niger. Also took to seeding chickweed instantly."

Then in 1971, I have another entry (24th January): "Bought four birds. A very well-marked male at 100 pesetas (app. 60p) from one dealer, a female for 20 pesetas (approx. 12p) then another fellow had a pair that I bought for 50 pesetas (30p). Placed in a small cage; within an hour all four had bathed and seemed very content and settled in—in contrast to the birds bought last year. Again lettuce seed appeared to be the favourite. On the same occasion I saw a Serin x Canary on offer. It was larger than a Serin, but showed its parentage clearly. The breeder was very proud of it and extolled its virtues as a songster. It was clearly a male but the yellow of forehead, rump and breast were not so pure as the corresponding parts on a pure Serin."

I bought a few more Serins that year; each time they settled in well. By then I just put them into a 7 ft. flight cage that has seeds and screenings to a depth of about 3 ins. They were sufficiently comfortable for the males to twitter their little songs and chase each other, but nothing ever developed.

During 1972, a neighbour's gardener took a brood of wild Serins and placed them in a wire cage by the nest. At what stage in their development he did this I do not know. According to him, the parents had continued to raise the infants in the cage, then through the wire, up to weaning. Eventually, he had a brood of independent and very steady young Serins. This man announced that he could take any number of birds in this way, that they were worth a lot of money, being virtually cage-bred, and offered them to me for about £5. He thought that I was only trying to beat him down when I told him the prices in the market. Happily the season was too far advanced for him to take any more. The sequel to his story, however, is that the following year he did it again—this time with Golden Orioles. I refused to take them (exercising great will-power, I can assure you) and eventually he released them. I am happy to say that his rather unsuccessful career

as a bird trapper ended then because he gave up gardening and moved into a city flat to work in a factory.

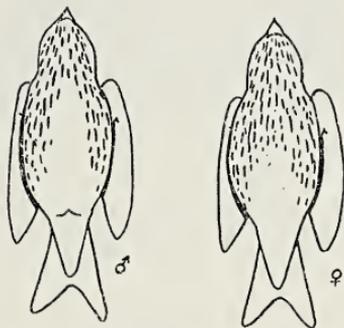
My entry for 19th June, 1973 read :

"Yesterday, at about 8.45 p.m., I went out to the garden and put the car away, when I found a newly-fledged Serin, incapable of flight it seemed, on the ground near the gate. For fear of cats, I picked it up, then remembering the gardener's story, fetched an old canary cage from the garage and placed the bird in it. I went out into the street to bring the car in and saw a second fledgling, roosting, eyes shut, in the middle of the road! This one went into the cage also. On my way into the house for a hammer and nails to fix the cage in the tree, I found a third bird sitting, huddled on the front door step. The nest had been placed in a crotch of a large branch about 5 ft. out from the trunk; the thorns on this tree were 6 ins. long and everywhere. I compromised by hanging the cage on the trunk just below the leaf canopy.

Next morning at 6 a.m. I saw the adult female find the cage and try to enter. At 6.10 she returned with food and fed the young through the wire. It seemed an almost natural thing to do. I kept a constant watch until 7.45 a.m., during which times the birds were fed many times.

At 7.30 p.m. a fourth fledgling was discovered in the garden. It, too, was unable to fly and rapidly joined its brethren. At 7.45 p.m. the female was seen feeding all four.

21st June: Female still returning regularly to feed the young. The male is frequently nearby, as it was during the nestling period, to sing. This song is not the continuous rolling song of early spring (which is probably both competitive and for courtship) but separated, clear and complete song phrases. This may well have the function of imprinting the immature birds with their species recognition sounds. The male has never once been seen to feed the fledglings.



22nd June: The four birds sit in a row and, when seen from below, the striations on the breast can clearly be seen to be different. Frank Meaden told me once that he thought that fledgling Serins can be sexed in this way. My sketch will explain better than words. Covered floor of cage with mixed seeds and included pot of water.

23rd June: Female arrived to feed the young birds at intervals of 10 to 20 minutes. They are much quieter now and have all but stopped the near incessant squeaking. They do not beg so loudly nor fight to be fed first so fiercely. Although I have not seen them feed themselves yet, it might be that they are sampling a little.

1st July: Female did not come at all today. At least two of the young Serins definitely feeding themselves.

2nd July: Still no sign of mother. I placed all four Serins into a 7 ft. flight cage with a pair of Wild Canaries. Two began feeding instantly but the other two began pursuing the two Canaries and begging to be fed. They were utterly ignored. One of these two was excessively thin and frail (and caused no surprise when it died the next day).

7th July: One of the immature Serins drowned itself in the water bowl. The surviving two (believed to be male and female) thrive.

Looking back on this exercise now, I believe that it would have helped the fledglings tremendously if I had placed an independent young Serin in the cage with them. This bird would not have prevented the mother from continuing to feed the young but would have provided both an example and stimulus to the others to feed. This example would normally have been provided by the mother during the latter days of the weaning period when she ran down her feeding service, by which time she would be being pursued by hungry and demanding youngsters.

Without further discussion, I would like to summarize the Serin from my experience :

In cage : Males are better kept alone. They sing frequently and for most of the year, except when moulting. If more than one male is kept in a cage with a female serin (almost any species will do), there is likely to be a lot of bickering and possibly serious fighting. A fit male may also chase a female too much.

In aviary : The average male will be content with a territory inevitably larger than the aviary. If more than one male is present, take care to see that they do not fight too seriously. This is most likely to happen in the spring with the lengthening daylight.

Acclimatising (or adaptability to captivity) : It must be regarded as a delicate species when newly caught. If wild birds are acquired, they should be taken in the autumn after the moult when losses will be minimised. Unmoulted immatures are delicate and both sexes are delicate in the spring. They seem to suffer from the shock of capture and take less readily to hard dry seed in the spring. The old pros in Spain would not touch them then, swearing that paired-up birds will invariably die if caught.

Travel : Of all the species that I, personally, transported the Serin was the most delicate and was the only species that always gave me cause for concern. Occasionally one would be dead on arrival (after about eight hours journeying) and on more than one occasion a bird that I had kept for six months would die within a day of arrival.

Food : A wide variety of small seed, including those not normally contained in commercial mixtures, such as lettuce, grass, alder, birch and all the weeds.

A fortnight before returning to England in summer 1974, *en route* to Caracas, I was brought two nestling Serins, pitched from a nest by latent-vandal schoolboys. I reared these successfully (with the aid of a plastic ice lolly stick and a dexterous thumb) on a thick paste of baby food, mashed green grass seeds and Vionate. They weaned very successfully on fresh green seeds of the annual grass *Poa annua*.

THE BOBWHITE QUAIL: SOME ASPECTS OF BEHAVIOUR

By R. UNWIN LAMBERT (Reigate, Surrey)

In the summer of 1971 I raised from a pair of Bobwhite Quail *Colinus virginianus* four young – two of each sex. These were hatched under a pair of Barbary Doves *Streptopelia d. roseogrisea* (“risoria”) and reared until approximately four weeks old in a heated enclosure. They were then transferred into a small aviary having a ground measurement of 6 ft. 6 in. x 4 ft. in the company of two hen Japanese Quail *Coturnix c. japonica* and a cock Painted Quail *Excalfactoria chinensis*.

The three species settled down well with no sign of aggression from the larger Bobwhites. This I had anticipated due to the fact that the parent Bobwhites lived in harmony with numerous Japanese and Painted Quail in a larger aviary.

During the following nine months I observed the behaviour of the four young Bobwhites and found that three behaviour patterns/postures emerged:—

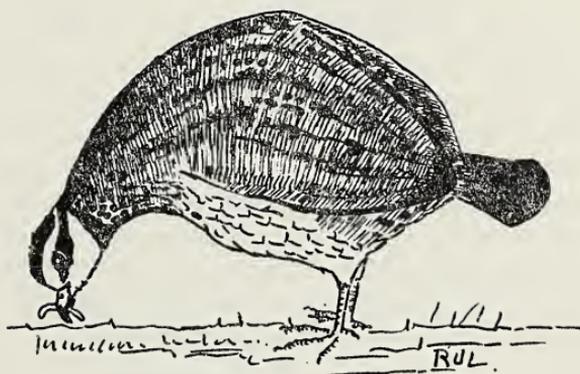


Fig. 1

Type of behaviour

- (1) 'Tidbitting' posture.
- (2) 'Curious' / 'Nervous' / 'Excited' posture.
- (3) Aggressive posture.

Behaviour posture

Tail fanned out, head lowered back arched, legs held straight. (Fig 1).
 Tail fanned out, head lowered, with neck stretched out – (cock erects head feathers) – usually with legs held straight. (Fig. 2).
 Tail fanned out, head lowered with neck stretched out – (cock erects head feathers). – Wings raised slightly away from the body, giving the bird a larger appearance. (Fig. 3).

Posture (1). This posture was displayed when an unusual food, e.g. greenfood, tufts of grass, maggots, mealworms, etc., was given. It was displayed to a larger extent when live food such as maggots or meal-

worms was given and to a lesser extent when greenfood was given. When live food was given the bird postured, as described, over the food (at times uttering a high pitched "rattling" call), sometimes pinning the food with the beak to the ground before eating it. This posture is very much the same as displayed by Japanese Quail (Lambert 1970) except that Japanese Quail do not fan out their tails, and cock Bobwhite Quail do not present live food to a hen as do cock Japanese Quail.

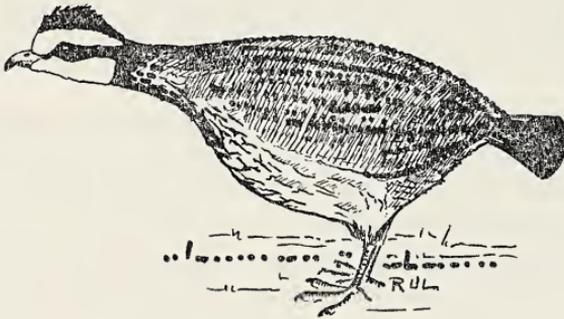


Fig.2

Posture (2). I have described this posture as widely as possible as it appears to cover several emotions, which are closely allied. For example, if alterations were made to the layout of the aviary, say by the addition of a log on the ground or if a handful of hay was given for the Japanese Quail to roost in, the Bobwhite immediately approached the object of interest with necks stretched out, tails fanned and legs straightened as if they are walking on tiptoe. The cock bird usually erected its head feathers. This posture was usually accompanied by a high pitched single call repeated several times by both sexes. The approach of the bird to the object of interest was usually (though not always) displayed in a state of nervous apprehension. Sometimes the object of interest was inspected at once, at other times the bird circled it several times with outstretched neck. When its curiosity was satisfied the object was accepted and no further interest was taken in it.

Posture (3). Until March of 1972 the four young Bobwhite Quail had lived in harmony with each other and with the other species of quail in the same aviary. On 17 March I observed mating between one pair of Bobwhites (the mated hen was distinguishable from the other hen by having a small white patch of feathers on the breast). The following day I erected two nesting screens made of wire-netting hoops supported by sticks at the entrance. These were filled with hay and straw. The placing of these screens in the aviary immediately released behaviour posture (2) in all four birds. After accepting both screens, each bird burrowed into the straw. A little later I noticed that a nesting scrape had been made at the back of one of the nesting screens. Both cock and hen birds indulged in sideways throwing using

small pieces of grass, straw and sticks.

Early in the morning of the following day (19 March) I found one of the cock Bobwhites huddled in a corner of the aviary with minor neck and back wounds. At this stage I was not at all sure of the cause of the injuries and as they were not severe enough to warrant removing the bird from the aviary I decided to leave it where it was for the time being. However, as I fed the birds in the large aviary I heard a commotion coming from the small aviary. The injured cock was being chased by both the hen with the white bib and the other cock. Both birds were in their aggressive postures (as described). Every time

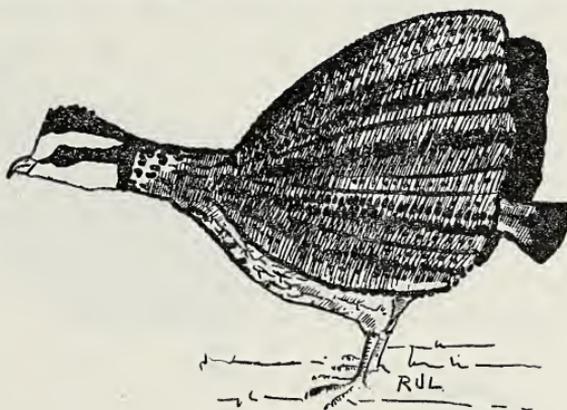


FIG. 3

the injured cock was cornered he was immediately pecked on the neck and back and in its flight, it flew twice into the air.

The less dominant hen (*i.e.* the one without the white bib) took only a minor part in the aggressive attack, being content with taking a quick stab at the injured bird if it happened to come near. Deciding it was time to interfere, I caught the injured bird and put it in a large cage. During the attack no aggression was shown towards the Japanese or Painted Quail. It seemed clear at this stage that the remaining cock Bobwhite had gained its territorial domination over the other cock and at the same time the white-bibbed hen gained her dominance over the submissive cock.

During the following week the injured bird slowly recovered in the cage and at times "crowed" repeatedly. The "crowing" call released behaviour posture (2) in the cock and dominant hen in the nearby small aviary. It was interesting to note that the dominant hen did not try to gain dominance over the other hen.

A few days after the initial attack I caught the less dominant hen and put her into the cage with the injured cock and his reactions were not as I had anticipated. Instead of trying to gain dominance over the hen, his reactions were of complete submission toward her—crouching low to the ground with closed eyes, then backing, still in a crouched

position, into her (this taking place nearly a week after the attack). The hen responded with a few hard pecks without exhibiting the aggressive posture, but keeping the cock confined to one corner of the cage. After watching both birds for some time I decided it would be wiser to return the hen to its aviary.

On 26 March (a week after the initial attack) I found the dominant cock Bobwhite attacking the Japanese Quail. One bird was in a critical state; its head was completely scalped and most of its back raw and bleeding. The other hen was unharmed physically but seemed to be in a state of shock. Both birds were removed from the aviary.

This latest act of aggression towards birds of another species was, I felt, surprising as the Bobwhite Quail in the large aviary had mated and nested but had not exhibited any aggressive behaviour towards any other species.

Finally I would mention some simple experiments I carried out with life size models of a cock Bobwhite Quail. These experiments are in no way conclusive but they were interesting. Basically I was interested to find out whether or not the bold brown, black and white facial markings of the cock bird were "recognised" and, if so, whether or not aggression would be released against the models.

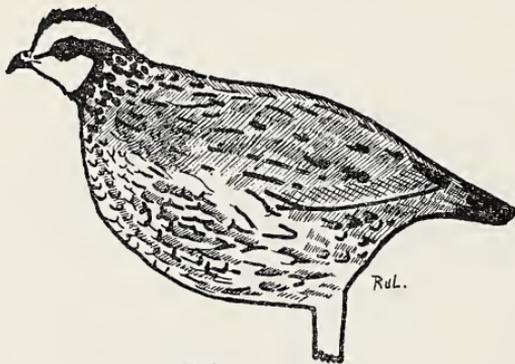


Fig.A

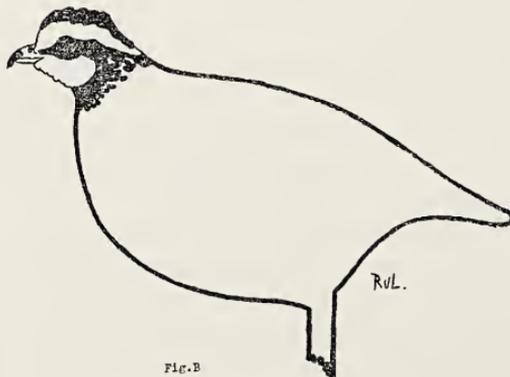


Fig.B

With this in mind I made four stylised models :—

- (a) Complete silhouetted bird, showing all markings (as far as possible) (Fig. A).
 (b) Silhouette with head and facial markings only. (Fig. B).

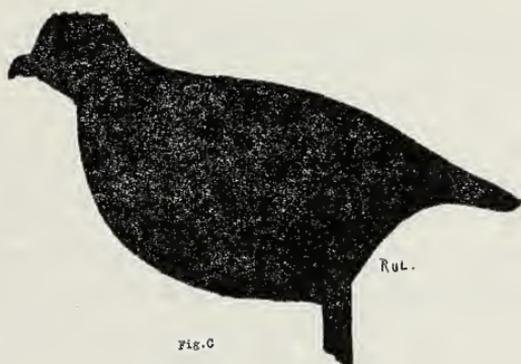


FIG. C

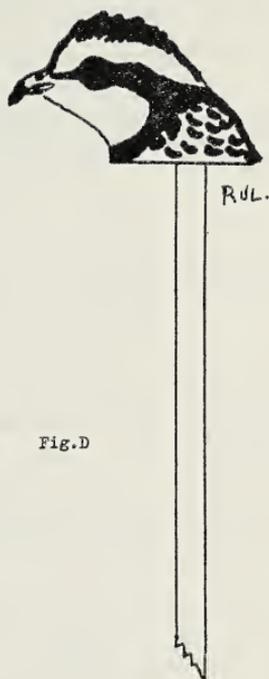


FIG. D

- (c) Silhouette only (no markings). (Fig. C).

- (d) A head only, showing facial and head markings. This model was mounted on a stick. (Fig. D).

The models were placed one at a time in different parts of the aviary and the following observations were noted :—

1. No recognition by other species (Japanese and Painted Quail).
2. No reaction by Bobwhites to plain silhouette.
3. Slight "curiosity" (posture 2) to head pattern only (model (d)).
4. Distinct "curiosity" (posture 2) combined with extreme nervousness to complete silhouette (model (a)) and silhouette with head markings (model (b)).

If all *four* models had been greeted by posture 2 then it could have been assumed that the Bobwhites were only displaying their usual "curiosity" behaviour toward an object of interest. But as the birds only reacted fully to models a and b and only slightly to d and not at all to c it can, I feel, be assumed that the bold head and facial markings were recognised.

It was noted, however, that at no time was aggression shown towards the models. I felt that this might have been due to the fact that although (a) and (b) were recognised and received a distinct "curiosity" reaction, it was either not strong enough to release aggression, or their extreme nervousness dominated their aggression. However Dr. Colin Harrison has pointed out in correspondence that the absence of aggres-

sion could be due to the failure of the models to show any change of attitude or responses and that although (a) and (b) were sufficient to arouse interest as a recognisable signal of the possible presence of other Bobwhites, the failure of the models to do anything further prevented greater arousal.

REFERENCE

LAMBERT, R. UNWIN. 1970. Notes on the breeding and behaviour of Japanese Quails *Avic. Mag.* 76, no. 5, p. 177.

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NOTES FROM THE ZOOLOGICAL GARDEN, NAPLES

By MARIE-LOUISE WENNER (Bird Curator)

The bird collection in the Giardino Zoologico di Napoli consists of some 65 species and includes such rarities as Spix's Macaw, Banksian Cockatoo and a young pair of Vulturine Parrots *Psittichas fulgidus*. There are 16 species of Loriinae and during 1974 the breeding results included 25 parrots, exclusive of Budgerigars, among them two Golden Conures (*guarouba*) that were hand-reared because in previous years the parents had killed their chicks. Red, Blue-streaked and Dusky (*fuscata*) Lorries and Ornate and Red-collared Lorikeets were also bred. Roseate Cockatoos nested but no young were raised except for one that was taken away and reared by hand.

The conures, like other seed- and fruit-eating parrots that are hand-reared are given a mixture of finely ground toasted bread (one part), one part of a proprietary cereal for infants, one part finely grated apple, $\frac{1}{2}$ part powdered milk, $\frac{1}{2}$ part Dextropur (fruit sugar), a small quantity of multi-mineral supplement and additional calcium. This is given by means of a 5 cc syringe for the first three weeks and, like the food given to lory and lorikeet chicks, it must be given warm, at about body heat, being tested by the tongue. The milk is prepared with water and the consistency of the whole mixture must, of course, be liquid enough to pass through the syringe. The feeding for the first day after hatching is done only once, the mixture being then diluted with an equal part of warm water, but thereafter the chick is fed every two hours throughout the 24 hours for at least four days, changing then to three-hourly feeding. The food should only be given when the crop is empty and after four weeks the chick need not be fed for eight hours during the night period. After about three weeks the diet is changed by the addition of $\frac{1}{2}$ part peanut butter and $\frac{1}{2}$ part sunflower seed kernels ground or chewed; also some leaves of dandelion *Taraxacum officinale* finely ground or chewed. Sufficient of the mixture to last for 24 hours can be prepared

at one time, but, of course, care must be taken to see that it does not turn sour, so it needs to be kept cold. Sodium bicarbonate in water is given if any digestive trouble is suspected.

Lories and lorikeets are fed on a mixture of a baby milk-based food (containing no fat), the cereal as given to infants, Dextropur fruit sugar, finely grated apple and, if thought necessary, a little meat extract. The milk is prepared as directed on the packet—75 cc of water to 8 grams of powder (Nativa is the product used) and to this is added 3 grams of cereal and 3 of Dextropur. One drop of multivitamin (Protovit from Roche is used) per week is given and the general regimen follows that given for the conures. As with all such hand-reared chicks, the bird must be kept very clean and the facial area washed after each meal. A teaspoon bent so as to form a narrow funnel is used and the chicks are fed alternately on each side of the bill so as to prevent any risk of deformity. The mixture for lories and lorikeets should be of the consistency of cream and, of course, must be given warm. The milk food contains mineral additives.

The chicks are kept in a box having towelling on the floor, but wood shavings (not sawdust which can get into the eyes and cause inflammation) can be used later on.

An electric lamp of 100 watts is hung above the box so as to give a temperature of 100° F. (37° C.) directly beneath it on the floor level. The heat is gradually reduced as the feathers begin to develop and this can be done by fixing the lamp a little further away. Naturally this and the general treatment, like the feeding, needs to be done with some intelligent latitude, for each chick is different as regards its needs and its development. Naturally the light bulb must be shaded in some way so that the chicks are not in a bright light. It was found that the conures were most comfortable during the early days in a temperature of no more than 85°-90° F.

NEWS FROM THE BERLIN ZOO

(January—June 1975)

By HEINZ-GEORG KLOS (Scientific Director)

Birds hatched :

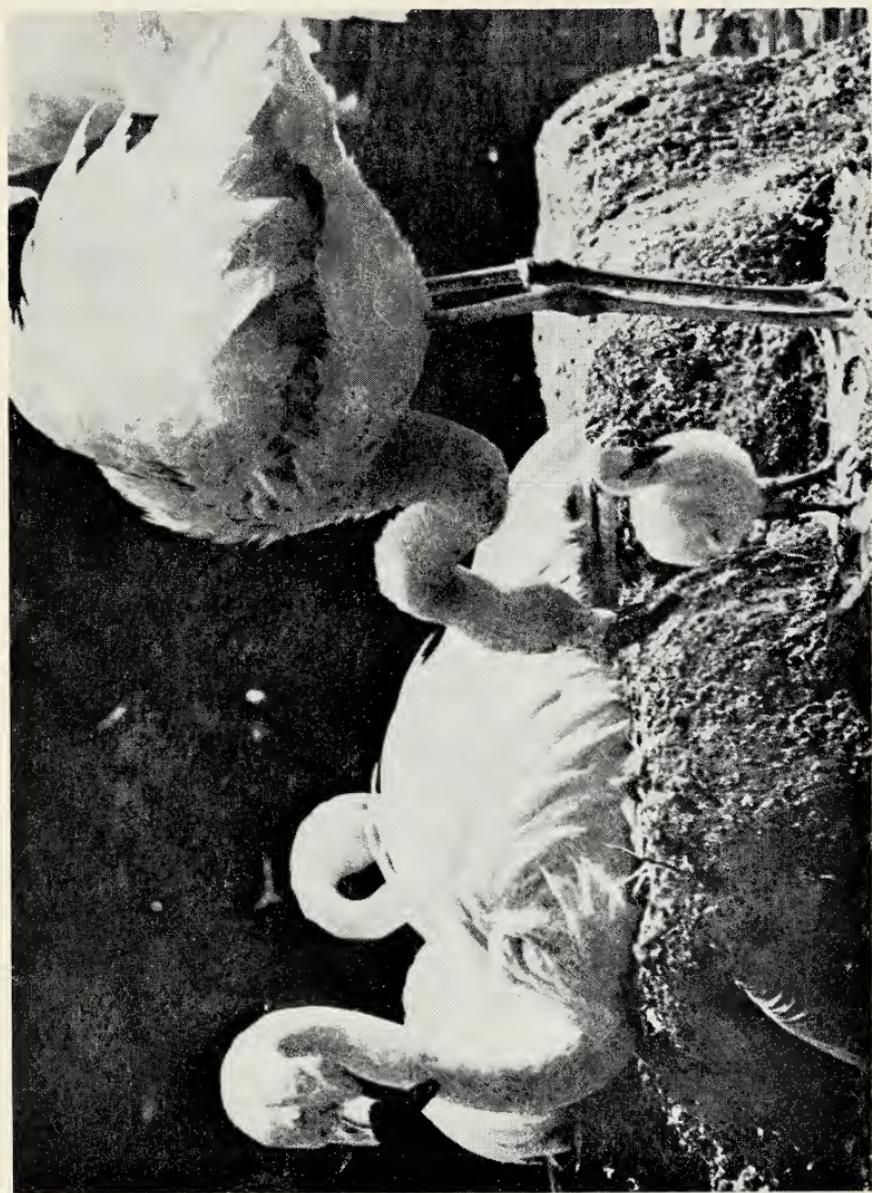
3 Rheas *Rhea americana*, 1 South African Ostrich *Struthio camelus australis*, 1 Emu *Dromaeus novaehollandiae*, 1 Black-footed Penguin *Spheniscus demersus*, 2 Silver Gulls *Larus novaehollandiae*, 1 Swan Goose *Anser cygnoides*, 2 Bar-headed Geese *Anser indicus*, 12 Pacific Brent Geese *Branta bernicla orientalis*, 22 Hawaiian Geese *Branta sandvicensis*, 4 Crested Ducks *Lophonetta specularioides alticola*, 103 Mallards *Anas platyrhynchos*, 4 Red-crested Pochards *Netta rufina*, 14 Mandarin Ducks *Aix galericulata*, 24 North American Wood Ducks *Aix sponsa*, 3 European Flamingos *Phoenicopterus ruber roseus*, 4 European Quails *Coturnix c. coturnix*, 14 Californian Quails *Lophortyx c. californica*, 2 Eastern Wild Turkeys *Meleagris gallopavo silvestris*, 4 Nepal Kalji *Gennaeus l. leucomelanus*, 1 Swinhoe's Pheasant *Hierophasis swinhoii*, 15 Korean Ring-necked Pheasants *Phasianus colchicus karpowi*, 5 Tenebrosus Pheasants *Phasianus colchicus* var. *tenebrosus*, 1 Crowned Pigeon *Goura cristata*, 1 Andean Condor *Vultur gryphus*, 1 Common Caracara *Polyborus plancus*, 1 Eagle Owl *Bubo bubo*, 2 Snowy Owls *Nyctea scandiaca*, 2 Boobook Owls *Ninox novaeseelandiae boobook*, 3 Derbyan Parrakeets *Psittacula derbyana*.

New arrivals :

2 Dalmatian Pelicans *Pelecanus crispus*, 20 Mandarin Ducks, 11 European Goldeneyes *Bucephala c. clangula*, 1 Kagu *Rhynchetos jubatus*, 2 Hooded Cranes *Grus monachus*, 3 Roseate Spoonbills *Platalea ajaja*, 4 Scarlet Ibises *Eudocimus ruber*, 3 Andean Ibises *Plegadis ridgwayi*, 1 Great Hornbill *Buceros bicornis*, 1 Little Owl *Athene noctua noctua*, 4 Red-fronted Macaws *Ara rubrogenys*, 1 Indian Shama *Copsychus malabaricus*, 2 Copper Sunbirds *Cinnyris cupreus*, 2 Eastern Cardinals *Cardinalis cardinalis*, 3 Scarlet Tanagers *Ramphocelus bresilius*, 2 Purple Sugar Birds *Cyanerpes cyaneus*, 1 Cayenne Red-breasted Blackbird *Leistes guianensis*, 2 Common Hangnests *Icterus icterus*, 2 Scaly-fronted Weavers *Sporopipes squamifrons*, 4 Pintailed Nonpareils *Erythrura prasina*, 2 Crimson-faced Waxbills *Pytilia melba*, 1 Spectacled Thrush *Garrulax canorus*, 1 Golden-crested Mynah *Ampeliceps coronatus*, 2 Blue Pies *Urocissa erythrorhyncha*, 1 Red-headed Finch *Amadina erythrocephala*, 1 Diuca Finch *Diuca diuca*.

THE KEEPING AND BREEDING OF FLAMINGOS

Near the main entrance of the Berlin Zoo is a lake where there are at present 42 Greater or European Flamingos *Phoenicopterus ruber*



Chilean Flamingos in the Berlin Zoo

roseus and 63 Chilean Flamingos *P.r. chilensis* and on a small peninsula of about 25 square metres the birds have built 22 mud nests. Adjoining the nesting area is a grass covered slope and in this enclosure the flamingos stay all the year round. Only when the temperature falls to 2–3° C. below zero so that the lake water and the food become frozen are the birds driven into a small house nearby which is heated and has a small pond. The cold periods are generally short and the flamingos do not usually have to stay for long in the house. Before the completion of this house in April 1972 the flamingos were taken into winter quarters and did not return to the lake until the end of March or early April which caused a disturbance of the courtship which takes place from the end of March onwards and so the breeding results were not what they could have been. This zoo was the first in Germany to breed the European Flamingo in the year 1963 and the Chilean in 1965, but more numerous and regular breedings took place here from 1972 onwards by which time the new winter quarters were finished and the birds did not have the disturbance of being caught and transported. So from 1963 until 1971 only 13 chicks of the European Flamingo were hatched of which two died, whereas from 1972–74 (three seasons) thirteen were raised successfully, and in the case of the Chilean seven were hatched between 1965 and 1971 of which two died, whereas in the three years from 1972 until 1974 twenty-five were hatched and 19 reared. This seems to indicate that the greater success is due to keeping the birds in the same place with a minimum of disturbance the whole year round. Since two years ago thirteen American or Rosy Flamingos *P.r. ruber* have been building their nests, but have not as yet started to breed. In 1974 nine Andean Flamingos *Phoenicoparrus andinus* which are living with six James's *Phoenicoparrus jamesi* built three nests and laid one egg in June, but it was infertile. Ten Lesser Flamingos *Phoeniconaias minor* which are living at the Bird House have not yet shown any courtship behaviour.

EUROPEAN FLAMINGO

	Number of Young	
	Alive	Dead
1963	1	—
1964	2	—
1965	2	—
1966	—	—
1967	3	2
1968	—	—
1969	—	—
1970	3	—
1971	—	—
1972	3	—
1973	4	—
1974	6	—

CHILEAN FLAMINGO

	Number of Young	
	Alive	Dead
1965	1	—
1966	—	—
1967	—	1
1968	—	—
1969	—	—
1970	3	—
1971	1	1
1972	4	3
1973	10	—
1974	5	3

THE KEEPING AND BREEDING OF THE EUROPEAN EAGLE OWL

The European Eagle Owl *Bubo b. bubo* became extinct as a wild bird in vast areas of Central Europe some years ago, but its re-

introduction in this region has been operating successfully for some time, birds bred in zoological gardens being mostly used for the purpose and, among others, the Berlin Zoo has supported this action.

In 1949 we received the first two European Eagle Owls since World War II. They were put into an aviary measuring 6 x 3 metres and 3.20 metres high. The back wall is formed by rocks and the birds like to sit on the ledges; natural branches are fixed into the sandy soil and there is a pool of constantly running water. A nest box made of wood is fixed on the wall, but the birds have never used it for nesting. The birds were, in 1949, less than one year old, so we did not expect any breeding until they were three, for although this species is fully developed at one year, it does not usually breed until three years of age. However, even then our owls showed no signs of breeding and so in 1958 we started several experiments, getting a new female from another zoo and in 1962 a second unsexed bird, but neither agreed with our original birds and were returned. At last in 1963, when we had almost given up hope, the larger of the two owls made a scrape on the ground in one corner of the aviary. She laid two white and almost round eggs and after 35 days on 7th and 8th May two chicks hatched, so after 14 years breeding had started and it has continued each year ever since. All clutches except for three have been of three eggs and of all the 37 hatched only one was not reared, this being the fourth of a brood in 1965 and it was destroyed because of suffering from serious rickets. We consider that the successful rearing could be due to the food. White mice are supplied, 10 to 15 per day for three chicks and two white rats for the parents. Twenty-two of the European Eagle Owls bred here have been given to German institutions for the conservation of wild life and the remaining 14 have been sent to zoological gardens.

EUROPEAN EAGLE OWLS HATCHED IN THE BERLIN ZOO :

	March	April	May	Number of Birds Hatched
1963			2	2
1964	3			3
1965		3	1	4
1966	1	2		3
1967	3			3
1968	3			3
1969	2	1		3
1970	3			3
1971	3			3
1972	3			3
1973	3			3
1974	3			3
1975	1			1
	28	6	3	37

BREEDING THE CARACARA *Polyborus plancus*

Large aviaries for birds of prey containing a mixed collection are much more popular than smaller cages housing only one pair. For breeding, however, the latter are better suited. Only in exceptional

cases have we had breeding results in mixed collections due to the fact that the birds disturb each other as soon as one pair starts nest-building. Since 1962, we have kept a pair of Common Caracaras living together with approximately 12 vultures (*Aegypius monachus*, *Gyps fulvus*, *Gyps bengalensis*, *Pseudogyps africanus*) in a large aviary measuring 15.60 x 9.40 x 5.80 metres. For the first time, the Caracaras bred in 1971 and raised one young, which was separated from the parents in 1974. In April 1975, mating behaviour was again observed. As soon as we saw the birds collecting nesting material and carrying it into a hollow, about 5 metres high in the back wall made of sand stone, the vultures became interested in this nesting place, so we fixed some logs in front of the cavern, allowing the small Caracaras to enter but keeping the vultures out. By this method, the nest was protected, the single egg incubated by both parents, and the young hatched in the beginning of May. It left the nest for the first time on 25th June. When we discovered it outside the hollow, it was the same size as its parents but was much paler in colour, It will be separated from the adults at the end of the year.

BIRDS IN THE BUDAPEST ZOO

By BELA VARGHA (Assistant)

The zoo of Budapest opened on 9th August 1866 when 500 animal species were exhibited there. Between 1907 and 1912 there was some reconstruction and broadly speaking, except for a few large buildings of recent years, it has much the same general lay-out as when it opened. The zoo developed well between the two wars, but the awful devastation of the second destroyed nearly everything: three quarters of the buildings lay in ruins, more than 90% of the livestock perished and only four birds were left alive. The restoration began very slowly, but by degrees the collection increased from presents, collecting, and after a while from the purchase and exchange of specimens.

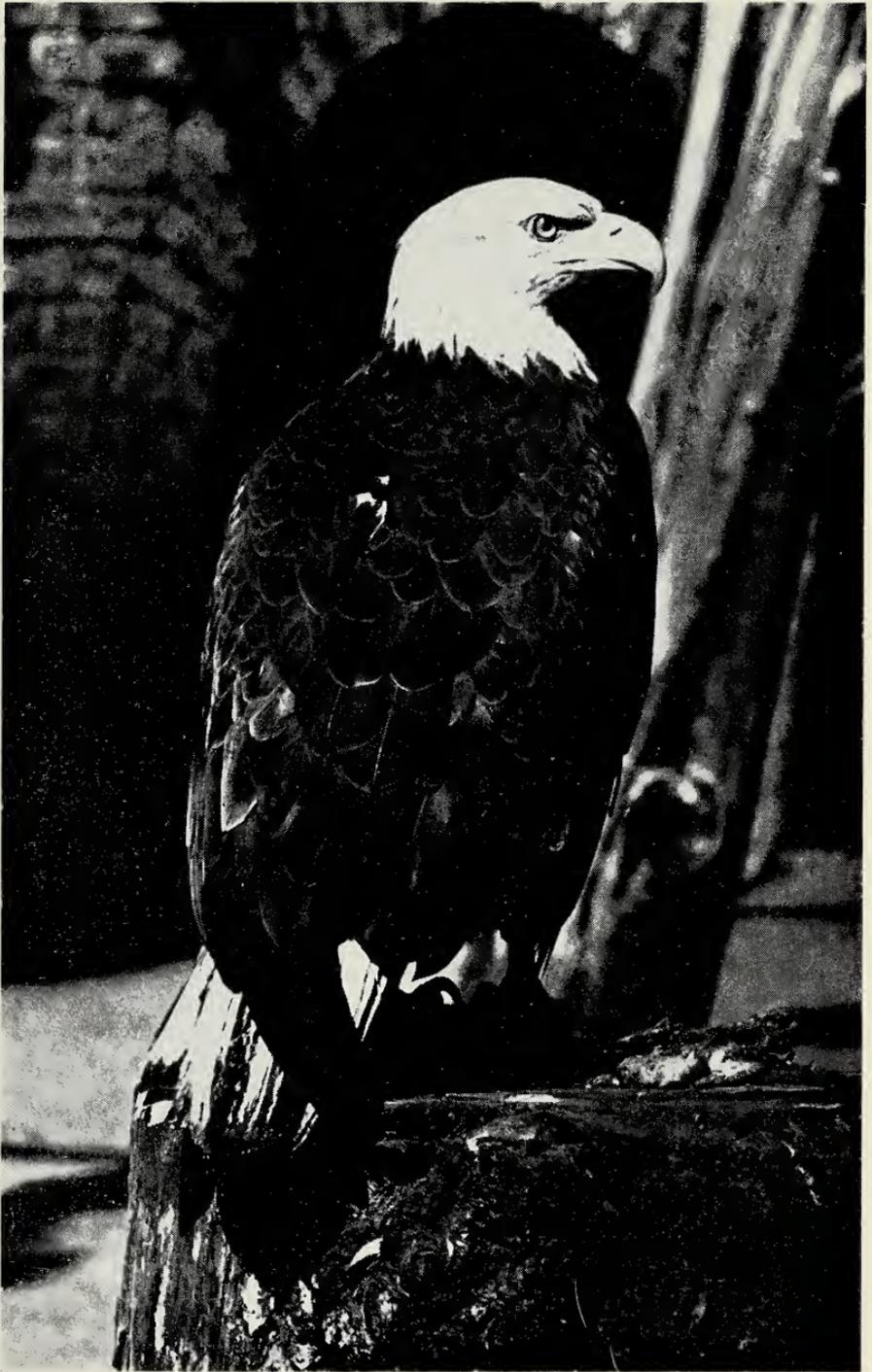
At present the number of birds is about 900-1,000 and the number of species about 170-180 of which more than half are palaeartic species. Each year some eggs or young are collected from the wild—storks, herons, waterfowl, Great Bustards and owls are collected and we rear Black-tailed Godwit *Limosa limosa*, Redshank *Tringa totanus*, Avocet *Recurvirostra avosetta*, Kentish Plover *Charadrius alexandrinus*, Stone Curlew *Burhinus oedicephalus* and White-winged Black Tern *Chlidonias leucopterus*. On two artificial lakes are exhibited all the native nesting ducks—Teal, Gadwall, Red-crested Pochard, Ferruginous Duck, Pochard and Golden-eye. A number of the usually kept species of geese are in the collection while the pheasant aviaries contain some 14 species, notably the Great Argus

Argusianus argus. In the aviaries for birds of prey we have Lesser Spotted Eagle *Aquila pomarina*, Imperial *A. heliaca* and Tawny *A. rapax*, the Goshawk *Accipiter gentilis*, Andean Condor *Vultur gryphus*, Griffon Vulture *Gyps fulvus* and Bearded Vulture *Gypaetus barbatus*. Six species of European owl are kept and three of them nested during 1974. Some fifty species laid eggs during 1974, notably Chilean Flamingo, Night Heron, Spoonbill, Marabou Stork, Black Kite, Sparrow Hawk, Tawny Eagle, Griffon Vulture, Great Bustard and Sulphur-crested Cockatoo, while Rheas, Sacred Ibises and a number of waterfowl and pheasants were among the birds reared.

Among the rarer of the native birds in the collection are Great White Egrets *Egretta alba*, Spoonbill *Platalea leucorodia* and Black Storks *Ciconia nigra* and of foreign birds the Boat-billed Heron *Cochlearius cochlearius*, Shoebill *Balaeniceps rex* Scarlet Ibises, a Bald Eagle *Haliaeetus leucocephalus* and Crowned Pigeons *Goura cristata*. Ostriches, Emus, Rheas (*americana*) and *Casuarus casuarus* have a separate house with large paddocks while Great Bustards, Marabou Storks, Crowned, Stanley and Demoiselle Cranes live nearby. The Bird House contains a wide variety of Psittacidae as well as toucans, touracos, various insectivorous birds and finches.

I would like to express my thanks to Dr. Akos Szederjei, General Director, and to Mr. Paul Modlinger, Manager, for their help in the preparation of my notes.

* * *



The Bald Eagle
Haliaeetus leucocephalus

György Kapocsy



Sacred Ibises
Threskiornis aethiopica

György Kapocsy

REVIEW

BIRDS OF THE TROPICS. By M. D. England. London. Hamlyn.
Pp. 96. 48 col. pls. Price £2.50.

This is a collection of first class photographs in colour of a wide range of birds and, as stated in the Introduction, the choice of subjects has been governed by the photographs of acceptable quality taken by the author, mostly in the wild. It is aptly described as an appetiser for those visiting the tropics, for a lot of the species depicted may be seen without too much difficulty by those visiting their various habitats. In addition to the photographs there is information contained in the lengthy captions and in articles on broadly based groups of birds. There is a map on Mercator's projection divided and lettered so that the distribution of each species is readily found by reference to the index. A chapter of particular interest to the photographer gives information and advice on photographing birds and, coming as it does from one of the foremost men in this field (and a perfectionist withal) its value is self evident. There is also a list of recommended reading and altogether this book is to be highly commended, not least in these inflationary days for its very reasonable price. An excellent choice to give as a present.

J.J.Y.

CORRESPONDENCE

THE LIMITED RELEVANCE OF SUBSPECIES TO AVICULTURE

Bernard Sayers (AVICULTURAL MAGAZINE, 81, 1975, pp. 117-118) raises a number of points which deserve comment in his letter on the relevance of subspecies to aviculture. I wholeheartedly agree that subspecies are only worthy of naming when they differ both appreciably and consistently from each other, and that there is little point in naming stages along a cline of continuous variation. However, I disagree with his contention that the Strigidae and Psittacidae abound in examples of species capriciously divided into myriads of subspecies, which to his view are unjustified and impractical.

Mr. Sayers states that it would be difficult to suggest a more obvious case of excessive division of subspecies than that of the Rainbow Lorikeet *Trichoglossus haematodus*. In an earlier letter I argued that many of the subspecies of this species can only be recognised by comparison with adequate museum material, and that a proportion of specimens can then only be recognised by reference to the locality where they were collected (AVICULTURAL MAGAZINE, 81, 1975, p. 59). However, I was not suggesting that these subspecies are unworthy of recognition. Cain (IBIS, 97, 1955, pp. 432-479) details the characters of the 21 subspecies he recognises and describes how they are all appreciably and consistently different. The only case of clinal variation where this author recognises more than one form is with the *T. h. moluccanus* and *T. h. septentrionalis* pair, where he gives these names to each extreme of a cline.

Mr. Sayers' suggestions for a revised classification are not in accordance with the criteria for which he argues. Taking just one example, *T. h. deplanchii* is listed as a subspecies of doubtful status, presumably because it appears to fit in with the cline of increasing size from north to south that is apparent in the similar *T. h. massena*. However, Cain (*loc. cit.*, p. 446) states: "many birds of the Loyalty Islands and New Caledonia show some distinctness (Mayr 1940). In *deplanchii* this takes the form of a rather faint powdering of light blue over the head. This is the only character which does not fit the cline . . ."

Thus *deplanchii* is appreciably and fairly consistently different from the other subspecies. However, it is far from distinctive and reference to numerous specimens in good light is necessary to be sure of the difference. The same applies to all of the other forms beneath the "doubtful" heading (except perhaps *septentrionalis* as mentioned above). It is essential to examine the extensive series from New Guinea populations in the American Museum of Natural History (as Cain did) to be sure of this for all subspecies, as material for these in British museums is insufficient.

When taxonomists speak of two forms as being "consistently different", they generally mean that there is little or no overlap of the characters concerned for birds in "taxonomic condition." Birds in "taxonomic condition" would normally be regarded as adults in clean, unworn plumage, and for some species might be only of one sex at one season. In those subspecies of *T. haematodus* which are distinguished by only small differences, the majority of specimens in a museum tray may be of little value for taxonomic comparisons.

Even given a fresh-plumaged, bright-eyed captive adult of *T. haematodus* it could be difficult to assign it to a particular subspecies. It may be an abnormal individual showing characters of a different form, or it may have acquired abnormality in size or coloration through ill treatment during the early stages of captivity. It might anyway come from one of the narrow zones of hybridisation where the ranges of two subspecies meet. Furthermore, it is alone and a series of more or less randomly collected specimens from the same place would probably be necessary for adequate identification of the more similar subspecies.

Knowledge of the locality from which it originated would at least allow an informed guess as to its identity. Subspecies are defined as "geographically defined aggregates of local populations which differ taxonomically from other such divisions of a species." It has thus become standard practice for museum curators to pigeon-hole specimens that are not in "taxonomic condition" (of non-migratory forms) under subspecies according to their localities of origin. This is not absurd as Mr. Sayers suggests, because any study of these unidentified birds is likely to be simplified by having them alongside the forms they probably represent.

This is no place in which to indulge in lengthy discussion of the limitations of the superspecies concept, for which readers are referred to Mayr (IBIS, 101, 1959, pp. 293-302). However, it is perhaps worthwhile to stress that it is the subjective opinions of systematists that decide how big a difference is necessary for subspecies to be recognised, and accordingly it may be pertinent to note that the concept has only limited value in the study of bird evolution. Modern students of evolutionary biology have to regard subspecies as a way of ordering material for study, not the end of the study as it was for the Victorian systematists.

The present classification of *T. haematodus* is based on the arrangement of Peters (1937, CHECK-LIST OF BIRDS OF THE WORLD 3) with revisions by Cain (*loc. cit.*). These workers used the criteria for which Mr. Sayers argues, and I haven't been able to find any obvious mistakes. It is true that some forms are rather finely split, but the divisions are reasonable and do not merely separate parts of clines. The subspecies groups listed by Cain may be sufficient for the general reader who cannot tour museums examining all of the relevant material, but that will be necessary for further useful revision of the more finely divided subspecies.

Division of *T. haematodus* into three species as advocated by Mr. Sayers seems a retrograde step. There is some evidence of gene flow or past gene flow between parts of the groups of populations he lists as species (see Cain *loc. cit.*),

and all the evidence suggests they would interbreed as freely if they met in the wild as they do in captivity. Indeed, the real problem may be that of whether *T. ornatus* and *T. haematodus* should be regarded as conspecific, rather than that of subdividing *haematodus* (cf. Cain, *l.c.*, p. 436).

Mr. Sayers also raises a nomenclatural point by referring to "*Trichoglossus haematod* (of Peters)" and later to "*T. haematodus*". Linnaeus named the bird as *Psittacus haematod*, the name ending at the end of a line. Almost all modern authors have amended it to *haematodus* on the reasonable assumption that a typographical error was made.

Mr. Sayers contends that "if a local population of a species merits being awarded subspecific status then this division is relevant to aviculture." It seems to me that adherence to this axiom dictates that only birds of known geographical origin should be kept and bred together, which is certainly not the way aviculture is usually practised, although perhaps an ideal. He goes on to add, "If however, the subspecific status is aviculturally irrelevant, then that status is unwarranted anyway." This seems to me to be saying that a subspecies should only be recognised if it is relevant to aviculture, which cannot be logically correct—are the subspecies of *T. haematodus* unwarranted because aviculturists do not obtain large series of birds from known parts of the range of the species? Aviculturists are not the only people who study birds.

The standard list of North American birds (A.O.U., 1957, CHECK-LIST OF NORTH AMERICAN BIRDS) not Bent as cited by Mr. Sayers lists ten (not nine) subspecies of *Bubo virginianus*, and at least another six occur in South and Central America (Peters, 1940, CHECK-LIST OF BIRDS OF THE WORLD IV). Similarly, *Bubo bubo* has around 20 subspecies (Vaurie, 1965, BIRDS OF THE PALEARCTIC FAUNA, NON-PASSERIFORMES). Both species have many striking local subspecies as is apparent from a superficial search of any good museum collection. Vaurie and the successive editors of the A.O.U list would undoubtedly have checked the distinctness of each of the forms they listed, and satisfied themselves that they do differ appreciably and consistently. It is less than fair to claim that such workers have "capriciously divided" such species into "myriads of subspecies which are . . . unjustified and impracticable" without first spending as many months checking specimens in the major museums as they did, and then presenting evidence to prove the point.

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D. T. HOLYOAK

HATCHING WATERFOWL EGGS BY INCUBATOR

Up to this season I have had no real success in my attempts to hatch the eggs from my waterfowl in an incubator. Normally I use bantams as foster mothers for ducks and allow the geese to hatch and rear their own young, though occasionally when a bantam has deserted or been disturbed after sitting for some three weeks, a few ducklings have hatched from the clutches finished off in an incubator. This year for the first time three species of geese have had their eggs hatched after the full incubation period in an incubator. The main problem is thought to be that of obtaining the correct humidity and one has read about keeping the water tray dry to start with and filling up after the first two weeks. This year I kept the tray full of water from the start and in addition I had a small container of water on the egg tray itself and a rag kept in this was used to moisten the eggs with warm water immediately after cooling and just before replacing the incubator lid. The eggs were turned five times daily after the first 48 hours and cooled once a day. Much thought has been given to the cooling process and, as is well known, both ducks and geese are most careful about covering their clutch with down before leaving for the daily feed—in fact I have knowledge of a number of cases where a duck has been frightened off her eggs without the opportunity to cover them and she has deserted the clutch immediately. It would appear therefore that a sudden

cooling of waterfowl eggs can be disastrous. The normal procedure that I adopt and which works perfectly with bantam, guineafowl and pheasant eggs is simply to remove the perspex lid of the incubator, replacing it after ten or fifteen minutes cooling and after the turning of the eggs—the machine incidentally is still-air Curfew. As it is housed in a stone-built outbuilding which is always at a fairly low temperature, this method of cooling the eggs was quite drastic, so I decided to emulate the goose itself, so to speak, by laying a piece of heavy blanket over the eggs immediately the lid was removed and tucking it in all round. This meant that not only much less cooling took place, but that it took place more slowly and the results, though small in numbers were quite dramatic. A young pair of Emperor Geese produced their first clutch of five eggs and the morning after the fifth was laid the goose was off the nest and looking very ill, so I suspect that she had been attacked by a rather aggressive Pink-footed Goose which wanted the same nest site. She made no attempt to return to the nest and in the evening the eggs were put into the incubator: two were infertile and the other three all hatched within a couple of hours of each other on the 24th day. They were fine strong goslings, have been reared in a brooder and are now out on grass. My established pair of Bar-headed Geese played the fool as usual, the goose laying eggs all over the place without making a nest or going broody, so I rescued two eggs from the crows and, without much hope, put them into the incubator where the one fertile egg hatched on the appropriate date. The gosling was a bit feeble at first, but was reared successfully with the three Emperor and is now out of doors. A young pair of Barnacle Geese produced three eggs and then ignored them. One disappeared but the other two produced nice goslings in the incubator on 22nd June, so that from nine eggs, all six fertile ones hatched and the goslings have so far survived, a result that could hardly be better. The incubator temperature was set at 103° F. and was checked each time the lid was removed and the variation was no more than one degree.

I should be interested to hear the views of other members. What did I do right?

A. W. E. FLETCHER

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BREEDING TERMS

As the supposed friend in the case incorrectly outlined in correspondence by Mr. Barlass, perhaps you will be kind enough to allow me to defend myself since he launched into his diatribe without having the courtesy to approach the person he was attacking so as to ascertain whether his information was correct, apparently accepting without question all that was told him by the third party. Perhaps the following explanation will put right his neglect of the rules of fairness and impartiality and his sweeping generalisations. Mr. Barlass states that his ideas of breeding terms are generally acknowledged as being correct, but that he does not know what happens in the case of eggs; however, he goes on to label as a Shylock anyone who disagrees with his ruling on a matter he says he does not know about. I belong to the minority(?) of breeders who believe that on any occasions of either birds or eggs being loaned and the venture is crowned with success, the parties share equally in cash or kind whether they are friends or not.

I will now relate the most significant incidents so that my fellow members can make an unbiased judgement. At the end of July 1974 the two young birds in question were well feathered and were apparently both hens. The bringer of the eggs was very pleased since he had two or three odd males of that species and he said he supposed he would have to let me have one of them cheap "to go with yours". I declined because I do not like the Yellow-bellied and said that I would have something else to the value. In early August one of the six Pennant's in the box died, apparently smothered, so I did not rear six as

stated by Mr. Barlass—perhaps I would have done so had I not accepted the additional two eggs. At the end of August, on the occasion a visit from the bringer of the eggs I asked what he wanted to do about the bird I considered mine and he said he had been advised by his friends that he was under no obligation to give me anything. We were friends and as such we should do these things without thought of repayment or sharing and he would do the same for me. He did offer a present of some seed in gratitude, but I pointed out that this was a great change from the previous offer of a cheap mate to go with one of the two young that I had reared and having reached this *impasse* we agreed to continue negotiations. The next offer was a 1974 Pennant's Parrakeet, but this I felt not to be fair since Yellow-bellied were worth £500-600 each and Pennant's £50. The next offer was a cock Crimson-winged (value £120 which, I believe, had killed its mate and this was refused.

The two young birds were collected early in September and I had no hesitation in letting them go since I felt sure that some reasonable settlement would be made and shortly afterwards the offer of a pair of young Yellow Rosellas *P. flaveolus* (value approximately £300-350) was made and accepted, but nothing came of it because the birds were not reared and so we returned to "stalemate". As we were both members of the Parrot Society I asked that the matter be put to the council or any three members for arbitration, but this was refused. Towards the end of 1974 I asked my friend the price of a pair of King Parrakeets *Alisterus scapularis* (value £500) giving him the opportunity to deduct a reasonable amount in settlement of the dispute, but I was told they were not for sale, though they were advertised shortly afterwards and no further offer was made to me.

I regret that matters have reached this stage, for I do not wish to fall out over the birds. At no stage did I demand anything, but if I had been the type of person Mr. Barlass suggests I am, then one of the young birds would still be in my aviaries. If it were not for my birds hatching the two eggs and rearing the young, my friend would have had an expensive omelette instead of two birds that he would otherwise have found virtually impossible to obtain, whereas I appear to be the loser all round.

JOHN WALTON

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May I make a reply to the ill-mannered and ill-founded letter written by Mr. J. C. Barlass and published in the April-June number?

It is ill-mannered since it was sent for publication without first allowing the other side the opportunity to put his case. Added to this is the fact that the egg owner had been showing a copy of the letter to other members several weeks prior to its publication—a matter of extremely bad taste.

It is ill-founded in that, in the opinion of myself and of my friends, it is not "generally acknowledged" that the first chick goes to the owner of the aviary in which it was reared; this matter is generally agreed on beforehand. It would be very unfair for someone to loan a proved breeding hen, for example, to mate with an untried cock and for the owner of the cock to take the first, and perhaps only chick just because they bred in his aviary. The writer obviously wrote the letter "off the top of his head; I invite him to check it over again and I also suggest that the egg owner also studies it carefully. If, as the writer states, it is acknowledged that the first chick goes to the owner of the aviary in which it was reared, in this case the hatcher should have one chick since the chicks were reared in his aviary although the eggs were not laid on his premises. Later the writer says that in his view (although he does not know what happens in the case of eggs) all the chicks should belong to the owner of the aviary from which they came. The chicks did in fact come, not from his friend's, but from the hatcher's aviary, for only the eggs emanated from his

friend's premises and since this is his firm belief, may we look forward to him persuading his friend to return the two chicks to the owner of the aviaries in which they were reared? "A friend in need is a friend indeed".

N. D. COOPER

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Bedford.

LONGEVITY OF A BARBARY DOVE

A hen Barbary Dove kept by me in a small aviary has recently died at the age of 17 years 15 days. She had always been paired to her brother and they reared young successfully until about 1965 in which year the chicks died at about four weeks. Between then and 1972 the bird continued to lay, but latterly the eggs were very thin shelled and she showed little interest in them.

J. D. KEELING

Darland Orchard
Rossett
Nr. Wrexham, Clwyd,
N. Wales.

BLACK APHIDES AS FOOD FOR BIRDS

I was interested to see the enquiry about black aphids (or aphides) in the Magazine. My son breeds some common pheasants for his shoot and last year we found that the chicks and their foster hens relished the black aphids infesting the creeping thistle in the fields. I do not know the name of this aphid nor whether it is the same as the "Black Army" of the broad bean.

A. P. G. MICHELMORE

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THE AVICULTURAL MAGAZINE

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Will members please donate their surplus books on birds to the Society?

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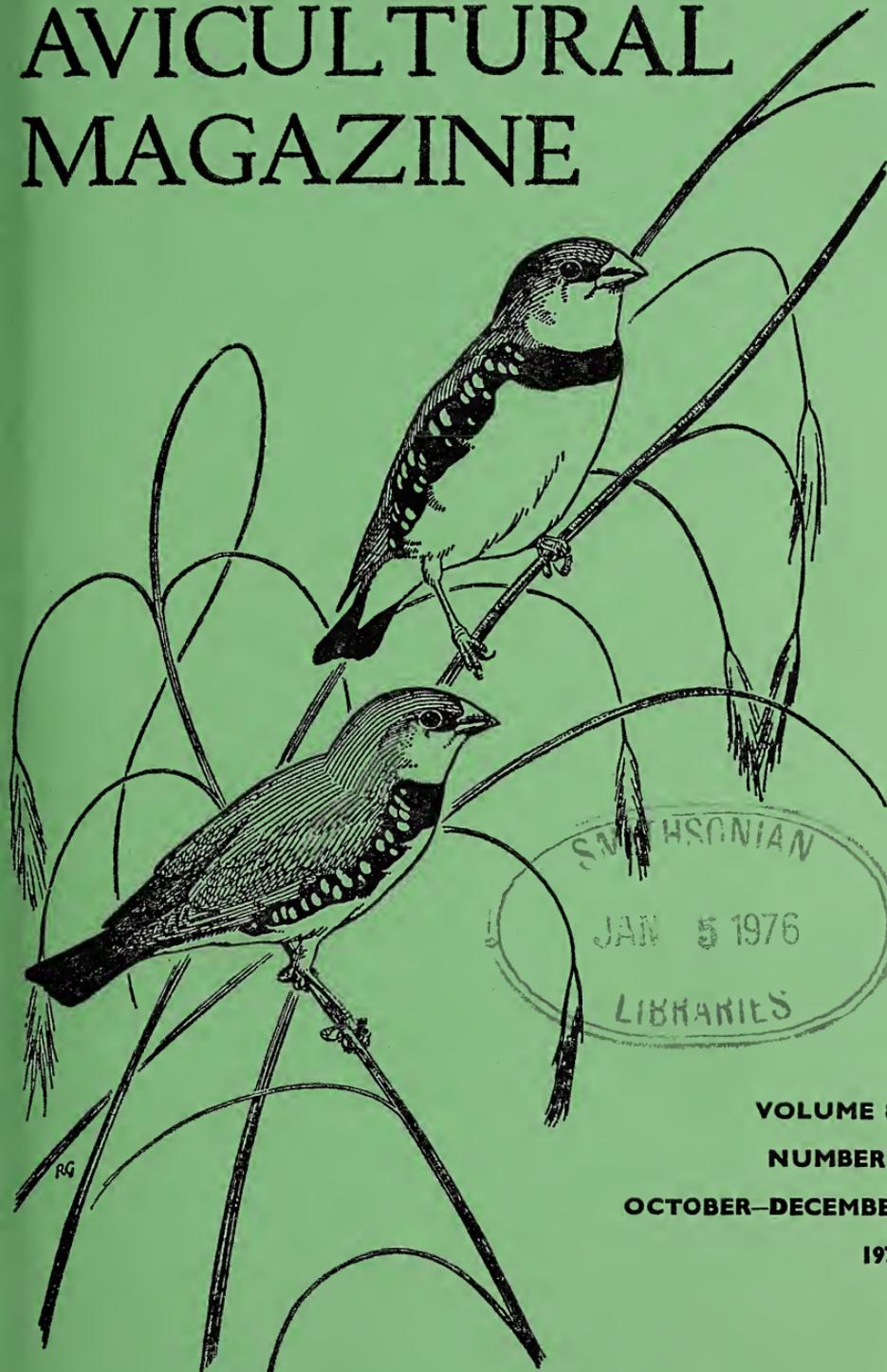
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Birds

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THE AVICULTURAL SOCIETY

Founded 1894

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OCTOBER - DECEMBER 1975

EXPERIENCES WITH FAIRY WRENS

By KERRY A. MULLER (Curator of Birds, Taronga Zoo)

Australia is renowned for its colourful variety of birdlife and being isolated geographically from the other continents, many bird species have evolved to fill the numerous ecological niches there. Over 60% of the over 700 bird species recorded in Australia are endemic.

Although some Australian bird species are familiar to overseas aviculturists and ornithologists, particularly various parrots, finches and waterfowl, the majority are virtually unknown and seldom, if ever, seen outside Australia. Among these are a group of the most beautiful of all birds, the fairy wrens in the genus *Malurus*.

There are 14 species of fairy wrens (depending on which author's taxonomy one prefers, McGill, 1970): they are all endemic to Australia except for one isolated species in New Guinea, and are one of the most characteristic genera of birds, being found throughout the continent. They live in many habitats, being found in arid deserts, mallee, forests, coastal heath and marshes and they are absent only from the high mountains and the dense rain forests.

Each *Malurus* species is restricted to a particular habitat and an experienced Australian birdwatcher can predict the presence of a particular species by locating areas of vegetation that suit its requirements. They are sedentary and territorial, and established pairs do not leave their areas unless the habitat has been disturbed.

Fairy wrens live in family flocks that vary from a pair to eight or 10 individuals. These flocks consist of a dominant breeding male and female, often accompanied by the young of one or more broods raised during the season. Often supernumerary adult males accompany the flock and are subservient in the social hierarchy to the breeding male. These retain their eclipse plumages longer than the breeding male and often closely resemble the female in appearance. This gives the observer the false impression of one male accompanied by several females. In fact, studies by Rowley (1965) on the Superb Blue Wren revealed that

Splendid Fairy Wren
Malurus splendens

Specimens in the Zoological Society's London collection drawn from life
by R. David Digby.

Plate donated by Palaquin Fine Arts, London.

the adult breeding females are very territorial and will not allow another female in their area. All young females raised during the year are driven from the territory at the onset of the next breeding season, while the young males may be tolerated.

Despite the great differences in habitat preferences among the various *Malurus* species, all require some form of dense, low vegetation for nesting, roosting and concealment, with open areas nearby for food-foraging. They feed primarily on small insects and arachnids, and occasional seeds gathered on or near the ground. They are particularly fond of termites which may form up to 80% of the diet of some species.

Some species appear not to require surface water in their diet, all their moisture requirements being contained in their food; accordingly, some may be found in very arid areas far from any surface water. This is in marked contrast to most other desert bird species, which travel great distances to find water.

Taxonomically the *Malurus* species are of great interest. They form several distinct groups, on a superspecies level, that are not recognized in current taxonomy. Normally the species within such a group are allopatric, although they are often sympatric with species in other superspecies groups (refer to maps). Within the superspecies groups there is no evidence of hybridization in the few areas where their ranges overlap.

Species fall into the following natural groups :

1. The "blue" wren group, including :

- Superb Blue Wren *Malurus cyaneus*
- Splendid Blue Wren *Malurus splendens*
- Turquoise Wren *Malurus callainus*
- Black-backed Wren *Malurus melanotis*

My experiences with the Turquoise Wren and Black-backed Wren in the field have shown that they live in similar habitats and are indistinguishable in behaviour. In my opinion they should be regarded as related subspecies. The Superb Blue Wren and Splendid Blue Wren occupy different habitats to *M. callainus* and *M. melanotis*, and behave as good species.

2. The "chestnut-shouldered" group, including :

- Variiegated Wren *Malurus lathamii*
- Purple-backed Wren *Malurus assimilis*
- Lovely Wren *Malurus amabilis*
- Red-winged Wren *Malurus elegans*
- Blue-breasted Wren *Malurus pulcherrimus*
- Lavender-flanked Wren *Malurus dulcis*

Although most of these species closely resemble one another, and many of the females are indistinguishable from each other, each occupies a different habitat in areas where their ranges converge

-  Superb Blue Wren
-  Black-backed Wren
-  Turquoise Wren
-  Splendid Wren

MAP A



-  PURPLE-BACKED WREN
-  VARIEGATED WREN
-  BLUE-BREADED WREN
-  'RED-WINGED WREN
-  LOVELY WREN
-  LAVENDER-FLANKED WREN

MAP B



-  Red-backed Wren
-  White-winged Wren
-  White-shouldered Wren

M A P C



-  Lilac-crowned Wren

M A P D



and they do not appear to interbreed. Admittedly, they are phenotypically very similar and introgression would be difficult to detect.

3. The "bi-coloured" wrens, including :

White-winged Wren *Malurus leucopterus leuconotus*

Black and White Wren *Malurus l. leucopterus*

Red-backed Wren *Malurus melanocephalus*

The New Guinea species *Malurus alboscapulatus*, the White-shouldered Wren, seems to be more closely related to these than any of the other species groups. It is also bi-coloured, but differs markedly in size and in the female plumage of some subspecies.

4. Lilac-crowned Wren *Malurus coronatus*

This species differs markedly in size, appearance and habitat from all the other *Malurus* species. It is somewhat similar to *Todopsis wallacii* from New Guinea and possibly represents a vestigial stock previously common to both Australia and New Guinea.

Although all the fairy wrens are highly attractive, they are seldom seen in collections outside Australia. The only species at all familiar to aviculturists is the Superb, or Common Blue Wren. This was first recorded as captive-bred by R. Phillipps in London, in 1902. It was bred in America in 1961 in the Boehm collection in New Jersey, and in Europe in 1973 in the Frankfurt Zoo.

Aviculturists in Australia have raised several species of fairy wrens, but their successes are poorly documented. All are protected by law, and most aviculturists who keep them do not have permits, so little news is circulated of the achievements.

An article in AUSTRALIAN AVICULTURE (August, 1950) states: "Firstly the Blue Wren, *Malurus cyaneus* has been kept for a number of years and has been bred in captivity by some dozen members at least, the first recording coming from Mr. S. Harvey. The next bird to receive attention was the Purple-backed *Malurus assimilis*, and was taken in 1947, to be bred shortly after by Mr. Wuttke, and since by several other members. Next came the White-winged *Malurus leucopterus*, and again this bird bred shortly after for Mr. F. Wilford with at least two other members having achieved this distinction since 1948. One point while on this species is that while no difficulty is experienced with other species coming into full colour, only two male White-winged have ever attained full colour in captivity. At this stage all species occurring near Adelaide had been handled and some time elapsed before specimens of the Black-backed Wren *Malurus melanotis* were taken north of Adelaide. Firstly, three birds were obtained but were lost after being in captivity for some months without reaching the breeding season. This was followed by the capture of a single pair at the beginning of the breeding season, and these birds went right ahead nesting twice for Mr. A. Phillipps after only being in captivity for a few months."

The Splendid Wren has been raised on a number of occasions in Western Australia (Pepper, 1974). At least two aviculturists are currently raising Variegated Wrens and Black-backed Wrens.

In 1970 a project was initiated at the Taronga Zoo to study the captive management, ethology, moult sequence and taxonomic inter-relationships of the fairy wrens.

The Superb Blue Wren is a resident breeding species in the zoo grounds, and no particular effort has been made to breed this species in captivity.

A total of seven *Malurus* species are now represented in the Taronga Zoo collection. These were collected (with necessary permits) on several expeditions.

In 1973 two White-winged Wrens and one Red-backed Wren were raised. I believe these represent first records for a zoo, and the Red-backed Wren may be a first captive-breeding record.

Most fairy wrens are not particularly difficult to capture in the field, once they are located. Despite the bright coloration of the males, they are adept at concealing themselves in the dense vegetation. Often their calls can be heard long before they are observed.

Family parties are territorial and follow fixed routes and routines of movement throughout the day. These patterns can be ascertained by careful observation and, by strategically locating a mist-net at ground level to intercept their movements, they can often be captured. They are adept at escaping through very small apertures, and a 1 in. mesh mist-net must be used to contain them. Some individuals can even pass through this.

Following a period of trial and error, a holding box was devised to meet their requirements in transport and temporary housing. This is made of very light plywood and measures 8 in. high, 2 ft. wide and 3 ft. deep. The front is covered with plastic flyscreen, with a cloth sleeve sewn in for access. Wrens are quite capable of escaping through standard doors and may injure themselves on wire.

Before placing them in the box, a few branches of dense shrub are put inside. This provides a place to hide, ensuring security, and absorbs shock when travelling. Without such cover the birds batter themselves against the front of the box trying to escape. Food is placed on the floor of the crate in easy view of the birds. Live termites and mealworms are offered initially, along with our standard soft-bill mixture. This consists of golden pound cake, grated cheddar cheese and house-fly larvae. A powdered vitamin-mineral mix is included in the diet.

Most fairy wrens feed readily under these conditions. They will not feed while travelling but, like all very small insectivores, must feed regularly to maintain their body weight. It is therefore advisable to stop for 10 minutes in every hour to allow them to feed.

Upon their arrival at the zoo the birds are transferred to larger

quarters and checked for disease and parasites. We have found that most species carry some strain of *Coccidia*, and antibiotics are administered to overcome this. They are closely observed to ensure that they feed well and adapt to captive conditions.

It is our practice to colour-band birds immediately after capture with plastic finch bands, and details of location and relationship are recorded. If members of more than one family group are transported together they can be subsequently identified. Family groups are later housed together and the individuals can be identified by the colour sequence of the bands. They are contact species and pairs always roost close together. The juveniles and eclipse-plumaged males often closely resemble the adult female, and the breeding pair can often be identified only by the actions of the adult male. Once the adult pair has been identified, these are removed and housed separately.

Because of the strong territoriality of fairy wrens, only one adult pair can be housed in an aviary. They are compatible with most other birds, but some coloured males will attack other small birds with similar coloration. Any young raised during the year can be left with the parents until the onset of the next breeding season, but then they must be promptly removed. In Sydney the breeding season usually commences in August.

Perhaps the greatest problem in the aviculture of fairy wrens lies in providing an escape-proof aviary. They can squeeze through incredibly small holes, and invariably will do so if they do not feel secure and "at home". This is particularly true of single birds. All aviaries used for fairy wrens in Taronga Zoo are covered with $\frac{3}{8}$ in. mesh, with all cracks cemented. We have been most successful when we provided a well-planted aviary with a landscape resembling the natural habitat and with a minimum of competition from other birds.

As already stated the birds must have thick low bushes for nesting, roosting and hiding, and more open areas for feeding. Mice must be absolutely excluded for, as the birds nest near the ground and feed on the ground, they are very vulnerable to predation.

The nest is a compact woven dome with a side entrance, located in thick plant cover near the ground. It can seldom be observed without disturbing the vegetation. Spiders' webs are a major building component, and must be provided to achieve success.

Incubation is from 13-14 days, with only the female sitting. Three eggs form an average clutch and the young leave the nest in 13-14 days. Often two or three clutches may be raised in one season, the young of the older clutches assisting in feeding the younger ones.

The moult of male fairy wrens is directly dependent on sexual activity. The breeding male of a family group retains his bright coloration longer than subservient males, and may pass a year without going into an eclipse moult. Some aviculturists have experienced diffi-

culty in inducing males to moult into breeding plumage, particularly the White-winged and the Red-backed Wrens. This problem has not occurred in Taronga Zoo, where reasonably natural surroundings are provided.

In most species the changing length of daylight is important as a stimulus to breeding, but in the White-winged Wrens the stimulant is not necessarily phototropic: this species, in common with many other desert animals, seems to be stimulated to breed by prolonged rainfall.

Properly exhibited, few birds are more beautiful or attractive than fairy wrens. We hope that, with increased success, we shall be able to make some new species available to responsible zoos in other parts of the world.

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AN AVIARY-BRED STRAIN OF THE GREEN AVADAVAT

Amandava formosa

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

At a time when attention seems to be focused on establishing aviary-bred strains of as many wild bird species as possible, of which the practical step taken by the Foreign Bird Council last December in inaugurating a scheme to encourage fanciers to establish breeding strains of 17 specified species is the most tangible evidence, it has occurred to me that news of prolonged breeding success with the Green Avadavat in a South African aviary will be of general interest. In any event, continual success with such an attractive and worthwhile aviary bird as the Green Avadavat, a species not heavily documented on the whole, deserves permanent record.

The success with Green Avadavats has been scored almost without trying by Mr. H. Steyn, President of the Rand Avicultural Society. He lives on a small farm in Roodepoort, some 15 miles west of Johannesburg. Here with ideal aviaries in an attractive setting Mr. Steyn has been pursuing his hobby for many years. He is really taken up with foreign parrakeets and Australian finches, although his interests in birds are very general and a wide variety of interesting birds is always to be viewed in his aviaries. In front of one of his

long ranges of aviaries was built a large "escape" or "protection" flight 8 ft. wide and running the full 65 ft. length of the range. The height is only 6 ft. To prevent this flight from proving an entire waste of aviary space it was attractively planted with shrubs—several varieties of *Cestrum*, honeysuckle, hawthorns, etc., the latter having subsequently proved particularly attractive to the Green Avadavats for nesting sites. There is no shelter to this aviary whatever, and apart from the protection of very limited overhead cover provided by some green fibre-glass sheeting, the birds are fully exposed to the elements. Of course the aspect of the aviary on a north-facing slope is favourable and the aviaries behind provide considerable protection. None the less, during our highveld winters, temperatures frequently drop to zero at night and that Green Avadavats have established themselves so successfully in these surroundings indicates that they can be hardy.

Through the years Mr. Steyn has kept in this flight a few pairs of birds that are interesting, but not of great value, mainly local birds. As breeding is always a top priority with him he has kept the number of birds low, which has paid dividends. For example he has recently bred two of the lovely Violet-eared Waxbill in this flight, a breeding all too seldom achieved even in this country. It was into this flight that the original pair of Green Avadavats was liberated 8 years ago.

This pair bred five young in the first season and in each subsequent year between five and nine have been reared to maturity. From time to time some of the stock has been sold. The clamour for these birds has been great, for it is an attractive bird and is here rare and seldom imported. Over the past eight years Green Avadavats have usually graced the local show bench, being exhibited not only by Mr. Steyn but also by others who have obtained birds from him. Not surprisingly those bred in captivity proved far hardier than the few freshly imported ones available from time to time. Mr. Steyn has tried to keep the number of pairs in the breeding aviary down to one or two. This has been a dicey position as losses do occur from time to time, but so far the breeder has been lucky and he considers this procedure better than overcrowding. Detailed records have not been kept, beyond that Green Avadavats have reared young for eight consecutive years; probably to the seventh generation or nearly that.

An interesting fact is that no new blood has at any stage been added and the present little flock is descended from the one original pair. There has been no attempt at selective breeding, the birds being allowed to choose their own mates. They have not deteriorated in any way, however. Society members were recently able to compare the latest generation with some newly imported specimens and they appeared to be not only steadier, but slightly larger than the fresh imports and equally well coloured. It is well known that feather

plucking among this species is frequently a problem. This has never occurred among the aviary-bred birds, whose smooth plumage has stood them in good stead on the show bench and made them very attractive exhibits.

Feeding has also been simple. No live food of any kind was used to supplement their diet, though doubtless in a flight of this size the birds have been able to find a certain amount of aphides and other insects for themselves. The only supplement food the Green Avadavats have taken to is the moistened brown bread and "Pro Nutro" pushed through the wire of the adjoining aviaries for the parrakeets.

The Green Avadavats have always constructed their own nests in the growing shrubs. These are described as rough, globular structures of dry grass, with the entrance hole in the side. They are rather larger than one would expect for the size of the bird and the only other feature about the nest-building noted through the years is the fondness for feathers to use as a lining. In South Africa the Green Avadavat has proved to be a winter breeder for the most part. Perhaps it is not so surprising that they usually come into breeding condition at this season, because in India it would be summer during those months.

As companions in their large flight the Green Avadavats have not had many birds. There has always been one pair of doves, the species being changed from time to time. On the ground a pair of quail has bred well through the years. There has usually been a pair of Violet-eared Waxbills with them, and at present there is also a pair of Red-eared Waxbills. Obviously the Green Avadavats have been fortunate in having practically no disturbance or competition for food from other birds in their aviary and perhaps herein lies the reason for Mr. Steyn's spectacular breeding success with them. None the less this delightful bird has shown that, given suitable aviary conditions, it can prove hardy and a reliable breeder.

BREEDING THE WHITE-SPOTTED BLUETHROAT

Luscinia svecica cyanecula

By M. BARBER (Ipswich, Suffolk)

In 1973 I was fortunate enough to obtain a young pair of White-spotted Bluethroats. They were in immaculate condition, the cock not yet in full spring colour however, and not until the spring of 1974 was I able to appreciate what a beautiful species they are. The hen, although more drab looking, is equal to the cock in her own right. I kept the pair together during the winter in a large flight in the birdroom, heated to a temperature of 45-50°F and after a week or so they had become very tame and would feed out of my hand. During the winter months the pair became a little aggressive (fig. 1) towards each other, so I parted them. Since they are rare and difficult to obtain I took every precaution.

They kept in good health and looked very fit when I released them into the flight in spring. The flight measures approximately 20 ft. x 10 ft. x 8 ft. and has various bushes of elder, privet and blackberry, with a small pool sunk fairly deep into the ground leaving a bank all round. Three or four inches of mud collected from nearby marshes made up the bottom of the pool and only an inch or so of water was present on top. Nettles and other wild plants grew in the rest of the flight. I put manure and animal carcasses into the flight to attract flies and other insects. With the live food available in addition to what I was supplying I thought there was a good chance that the birds might breed; but this was not to be and as the months drew on I knew my chances for 1974 had gone. During the summer months the pair had not taken much notice of each other; I was disappointed, but I still had the pair and 1975 was on the way.

As the winter months approached I decided to leave the pair out for as long as possible, and until the weather became really bad I would not bring them in. The winter of 1974-1975 turned out to be quite mild, and so I kept them out all through, feeding them on a good softbill mixture plus plenty of mealworms. During February and March I detected a marked change in the behaviour of the pair; fights broke out and on one occasion I picked up cock and hen locked in battle. A careful watch after this led me to believe that the cock was trying to become dominant and was ready to breed.

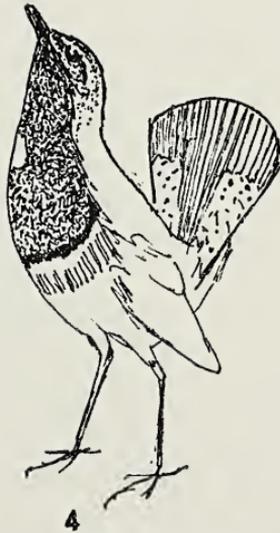
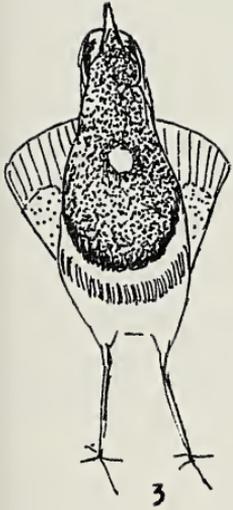
I was happy with this as long as it didn't become reversed and the hen take over. To ease the tension I opened all the further half of my aviaries which covered an area of approximately 70 ft. x 18 ft. x 8 ft., and I think this did the trick, for there was less fighting and the cock began to sing (fig. 2). At the end of March and through April the cock's song became more vigorous and the hen would

answer with song, but only in short loud bursts. By the end of April the blue on the cock's throat and chest seemed to darken to a glossy vivid blue. Combined with the chestnut-coloured breast band and the white spot it all looked quite striking. At this time I began to witness some display but it was not sustained for long.

I think I should point out here something that applies to most small softbills, and that is the need to know each bird individually, and to know its temperament and character. When pairs are put together, although some fighting will take place, provided that both birds are evenly matched and can give as good as they take I believe this aggression to be natural and part of the breeding procedure. I have found with other species that if either cock or hen is dominant from the start, this results in the death of one of them. I believe that if the pair are to breed the following should take place. The cock should make the first aggressive move and the hen retaliate, producing a state of "stalemate". The cock will then use other tactics such as song, food-offering, carrying of nest material and displays. This occurred with my Bluethroats and with other softbills that I have bred.

It was not until the end of April and beginning of May that I first witnessed the full display when I came into the flight and saw the cock and hen within a foot of each other. I had a few mealworms with me, as I make a habit of taking something to them almost every time that I enter the flight, and I threw a few on the ground. The cock picked one up and kept dropping it in front of the hen; she in turn accepted it, so I now had a good idea that breeding would take place. During display the male draws himself up tall and thin with tail raised and spread (figs. 3-4) to show all the colours that are present including the chestnut and brown tail. In this posture the cock moves around the hen swaying from side to side. The movements seem to have a hypnotic effect on the hen who remains in one place. Both birds seem to be in a trance, and although the hen may peck at the ground she keeps watching her mate. The cock appears able to open and close the white breast spot at will and sings as he displays; he sings at other times as well. The song is difficult to describe, although I have it on tape, but it is beautiful to hear and continues until it is dark at night.

I discovered the nest on 6th May. The hen had built in a biscuit tin on its side which rested on top of a five-gallon oil drum. It had previously been used as a feeding place for other birds in the flight, but I had not used it for about three years. By 9th May the nest had been completed and the first egg was laid on the 11th. A strange thing happened, for she did not lay any more until the 17th. In the meantime the first egg disappeared on the 14th. The second egg, laid on 17th May, disappeared on the 18th; but from the 19th on-



1 Aggressive posture. The birds face each other, crouching with feathers fluffed.

2 Male in song. The breast feathers relax and the white spot becomes visible as the song reaches a climax.

3 & 4 Display posture. The male sways from side to side. The vivid blue breast with white spot, is bordered below by white and chestnut-red, and backed by a brown tail with chestnut-red patches.

wards to the 23rd she laid five more eggs and started incubating when the last was laid.

During incubation the cock was seen to feed the hen on the nest. At this period he sang for most of the day, and during the last hour and a half before dark each evening sang almost continuously. On the day the young hatched he stopped singing.

On 5th June two chicks hatched, one on the 6th and two on the 7th. For the first day or two the hen brooded the young and the cock fed her on the nest while she in turn passed food on to the young. While the young were in the nest I was supplying wax moth larvae, flour moth larvae, moths, whiteworm, and mealworms of about $\frac{1}{4}$ in. at first, increasing in size as the young grew. The food available in the flight included large numbers of aquatic insects, worms, beetles, flies, aphids and probably a lot that I did not know about. All the insects that I supplied were dusted with vitamin and calcium powder.

Both parents were very tame and would take food from my hand, and I was lucky enough to be able to sit a few feet from the nest without disturbing the parents and to see what was taking place. During the period when the young still had their eyes closed, when the parents alighted on the edge of the nest there was no movement from the young until the parents made a low "chuck-chuck" sound. The young immediately responded to this by raising their heads and on one occasion while standing about four feet from the nest, I tried to imitate this by pulling my tongue down from the roof of the mouth, the young also responded.

The parents encouraged the young to pass faecal sacs by pecking at the young birds' vents and on the first few days I noticed that the parents swallowed these; but as the young became older the adults carried the sacs away. The young had greyish down on head and back, with underside bare; the inside of the mouth was orange and the outside edges of the bill pale lemon colour, becoming whiter as the young grew older.

On 18th June three young left the nest but the last two did not leave until the 21st, making the nestling period one at 13, two at 14 and two at 17 days. On leaving the nest the plumage was an almost blackish-brown, with very fine buff tick markings on back and chest, and the underparts towards the vent buff-coloured; the legs were greyish. Later the general colour appeared more brown. Their dark colour on first leaving made it very difficult to see them on the ground. By 25th June they had started to pick up mealworms themselves and by the 28-29th they were all picking up mealworms but the father was still feeding them.

Before the young were fully independent the hen had started to nest again, the cock taking over parental duties. While the hen was rebuilding the same nest the young had nothing to do with her and

she did not attempt to feed them. By 11th July the young were self-supporting, and no aggression was being shown to them by either parent.

The hen began rebuilding on the 24th June and laid the first egg on the 27th. Only three eggs were laid this time and on the 15th July two young hatched, the last egg being clear. One young one left the nest on the 25th and the other on the 26th. It was interesting to note that these left earlier, at 11-12 days. The feeding procedure was the same as for the earlier brood except that wax moth larvae were not used, owing to the risk of destroying the whole culture. I suspected during the first brood that the parents tended to split the brood between them and feed only certain young. With only two young in the second brood this was more apparent.

At the time of writing the first brood are through the moult and appear to be two cocks and three hens. At no time have I seen aggressive behaviour towards the young by the adults. I should point out that I believe this to be due to the free availability of live food. I would not advise anyone to take the same chances unless a large quantity of live food is available; nine birds of the same species can be quite a problem if the supply of such food becomes short.

As described, the White-spotted Bluethroat *Luscinia svecica* has been bred by Mr. M. Barber and this is believed to be a first success. Will anyone knowing of a previous breeding of this species in this country please inform the Secretary or Editor?

THE NORTHERN HELMETED CURASSOW

Pauxi pauxi

By J. A. TAYLOR (Tuxpan, Jalisco, Mexico)

We have raised young of the Northern Helmeted Curassow for the first time, the eggs because of their size (between 195 and 200 grms) being incubated under domestic turkeys, for we had not a suitable incubator at the time. The first egg, the only one of the clutch, was laid on March 20th and there have been four clutches, some of two eggs, laid between then and June 6th.

The incubation period was 30 days and the artificial nest was of dried grass, fresh green grass being put around the eggs during the last ten days of incubation. The mother laid sometimes in a basket fixed some seven feet from the ground and some of her eggs were laid from a branch under which we latterly fixed netting in the hope of saving the egg, but so far no more have been laid. On the 29th day of incubation the eggs were transferred to an incubator and hatching took place within 2½ hours from the "pipping" of the shell. After drying, the chicks were put into a brooder with heat lamps, but as the outside temperature was around 80° F., not much additional heat was required. The floor was covered with wood shavings and

there were perches fixed. The food consisted of mealworms, chopped egg yolk, papaya, banana, berries and lettuce plus some grit. For the first days the chick was hand-fed with mealworms and egg yolk; later the lettuce and fruit were eaten, but the mealworms were the favourite. One of the later chicks was hatched with badly deformed toes and this condition was apparently cured after five or six days of treatment which consisted of making the chick use the perches as much as possible, but there was a relapse and now the toes are crooked, though the bird perches normally.

We obtained from a zoo in Venezuela a female of the rare rufous phase of *P. pauxi*. This bird had been there for eight years and our information was that the bird had not laid any eggs during that time and there was some doubt about its sex, but only two days after arrival in Tuxpan she laid an egg on the ground. She had been put while at the zoo with a pair of Yellow-knobbed Curassows *Crax daubentoni* so we incubated the egg, but at the time of writing it has not been tested for fertility. We do not know of any hybrids between these two species having been bred. Using the work of Delacour and Amadon 1973 as a guide we had already decided that the rufous-phase bird was a female, though it is believed by people in rural areas of Venezuela that there is the rufous phase among the males of *P. pauxi*; the local name is Camaguey. Our chicks during the first few days had the head, neck, breast, back and wings of a medium brown with blackish peppering on the head, breast and back. The lower breast, belly and ventral region pale buff. Wing feathers tipped blackish-brown, giving a barred effect; these flight feathers are well developed at hatching. Bill pinkish with a light spot at the tip of the maxilla and just beyond the nostrils what might appear to be the formation of the helmet, a slightly raised area of greyish-brown.

We introduced the rufous bird into the same aviary as our normal *P. pauxi* were occupying and the male at once recognised her, extending his neck upwards to its entire length and calling to her. When given some peanuts he took one in his bill and offered it to her, calling to her and after several attempts she overcame her nervousness and took the nut from his beak. The normal female, however, was hostile to the newcomer and so we removed her and left the rufous female with him.

REFERENCE

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Northern Helmeted Curassow at 2-3 days.



BARBATULA LEUCOTIS.

1871
185

White-eared Barbet.

NOTES ON A WHITE-EARED BARBET

By EILEEN YATES (Trumpington, Cambridge)

These notes are written in view of the almost complete lack of any information concerning this species in captivity. The only reference I have been able to find in the AVICULTURAL MAGAZINE dates from the 1930's, when a single specimen figured in a list of birds brought from Africa to England by Whitley. I must stress that my observations have been made on the sole representative of the species with which I have had any contact, a bird which has been in my possession for about 18 months. Of necessity this bird is kept as something of a pet, partly because a long stay in a pet shop before I bought it had made it so used to human company that it failed to settle in an aviary and partly because, in any case, it would not mix with the parrots and small finches which make up the bulk of my collection. This is, therefore, a very individual view of an individual bird, but I trust that it might inspire others with experience of this delightful species to put pen to paper.

TAXONOMY

This is confused, partly, I suspect, because the bird differs in many ways from the other East African barbets, making it difficult to decide with which, if any, to classify it. Furthermore, some authorities recognise more than one subspecies, while others distinguish these as distinct species and still others only acknowledge one form. Thus, the B.M. (Natural History) Catalogue distinguishes two species, *Smilorhis leucotis*, and *S. kilimensis*, while Peters retains the generic name *Smilorhis*, but has five subspecies of *S. leucotis*, including *S. leucotis kenya*, *kilimensis*, *leucogrammicus* and *bocagei* along with the nominate race. Mackworth-Praed and Grant, Jackson and others refer to *Buccanodon leucotis* and subspecies, while Grzimek prefers *Stactolaema leucotis*.

DESCRIPTION

In general, variations between the subspecies as regards plumage are slight, and the description given for the nominate race in the B.M. Catalogue will serve for all:

"General colour above light brown on the mantle, upper back, and scapulars, the feathers edged with pale fawn-brown or buff; lower back, rump and upper tail-coverts blackish, the sides of the lower back white; wing-coverts and quills brown, blackish towards the ends and on the outer web; tail feathers blackish-brown; head and hind-neck black with glossy black shafts; a broad white band from behind the eye extending to the sides of the neck; sides of face, ear-coverts, cheeks, throat and chest blackish, the latter rather paler brown, especially on the sides; breast, abdomen and under tail-

coverts white; sides of body blackish, some of the feathers white edged; thighs brown; under wing-coverts and axillaries white; quills dusky below, white along the inner web." The sexes are alike.

Of especial interest are the head feathers, which have a bristle-like appearance, resembling a flattened-down version of the head feathers of the Curl-crested Aracari.

The bird is about 15-17 cm. long, thick set, with a strong black beak, which is surrounded by the characteristic bristles of the barbets. The feet are black.

An excellent colour print of the species appears in Marshall, where it is given the name *Barbatula leucotis*.

VOICE

Observers of birds in the wild have recorded a variety of calls, including trills and harsh "kaaa" sounds. My own specimen is, unfortunately usually silent. When held, it once emitted a very parrot-like squawk of protest, but this is the only call which I have definitely traced to it, although the proximity of various conures does not help in this respect. I suspect that, as the species is said to be very sociable, it requires the stimulus of its own kind to vocalise.

DIET

Mainly fruit, with sweet grapes and cherries as favourites; however, it needs some live food, as was evident by its rapid loss of condition during a mealworm shortage. A few mealworms, limited maggots (see below) and locusts are given regularly, along with anything of interest caught in the garden. Spiders seem to be very popular, and any flying insect which enters the cage is quickly caught, hornets being an especial attraction. Meat, egg, cheese and the like are refused, and soft-bill food is only taken when very thoroughly mixed with fruit.

The rate of digestion seems to be very high, and droppings deposited during the day are often similar in appearance to the original food. The first dropping in the morning is less granular in appearance and is green and white.

The bird drinks a large amount for its size, and is very fond of the nectar mixture which I give all my birds at regular intervals. (It is also fond of our neighbour's bees which are attracted to the nectar!)

HABITS

The bird is housed in a wire cage, $1\frac{1}{2}$ m x 1 m x $1\frac{1}{4}$ m, half of which is shaded over against the sun. A Budgerigar nest box with the hole enlarged serves for sleeping quarters. The bird is a "dry nester" and a recent inspection revealed that the interior of the box is perfectly clean. During the day much time is spent sitting in the entrance of this box with just the beak sticking out. At these times the bird is very alert, watching for insects, but it also retreats into the box to rest at midday. I seldom see it resting on any of the perches,

although when it does it has a curious habit of drawing up one foot almost to beak-level, keeping it well outside the feathers, in a manner totally unlike that of any other roosting bird I have seen.

A rotten log has been quickly hollowed out to form a large chamber, but the bird never rests in this and, indeed, scarcely enters it, except for purposes of enlarging it. The hole seems to be used to a certain extent as a larder. Before the introduction of the log the bird was definitely in the habit of storing oddments of food in corners of the cage, and it is often seen eyeing the inside of the hole before emerging with a dead insect, but it is impossible to say categorically that a larder is deliberately formed. However, if maggots are provided they certainly seem to be kept in the log until they emerge as "blue-bottles" (not by design—the bird refuses to eat them once they have turned to chrysalids). Many of the flies are caught and eaten, but some escape into the house, so maggots are provided in moderation only.

Fresh branches are regularly provided as perches, in view of the speed with which bark, leaves and side shoots are removed.

This bird is an enthusiastic bather. Unlike the other birds in my collection it does not spend any appreciable time actually in the water, thoroughly soaking the feathers by repeated splashings, but it repeatedly dips into the bath, almost seeming to fly through it at times. This still results in a complete soaking of the feathers. Spraying is greatly appreciated.

BREEDING

In the wild these birds are more gregarious than many members of the barbet family, and it has been reported that they sometimes share nests. (Mackworth-Praed; Grzimek, quoting Moreau, in a reference I have been unable to trace.)

There appears to be no record of captive breedings of this species, although I understand that there are a fair number of specimens in the country being kept for show purposes.

In the case of my own bird I am still hopeful of finding a mate, or group of birds. Judging from the reports mentioned above, colony breeding would seem most promising. However, I am afraid that my bird may have become too 'humanised' for any success to be likely. The plate is reproduced from the MONOGRAPH OF THE CAPITONIDAE (by permission of the Librarian, Cambridge University Library).

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NOTES ON SOME SPECIES OF PARROT IN CAPTIVITY

By GEORGE A. SMITH (Peterborough)

INTRODUCTION

Six years ago I could again start keeping birds. I could not keep, as I would have much preferred, insectivorous or frugivorous species as I have to see entirely after them myself and feeding and management has to fit in with my sometimes very irregular working hours. The aviaries I built are not heated and frost-sensitive species could not be considered. My previous experience had soured me against breeding regularly imported species, for it was always difficult to dispose of the young to satisfactory people: far too often they finished up in the pet trade because no one seemed to want them. Therefore, when it came to it, my choice had to be parrots and I started with lutino Cockatiels and New Zealand parrakeets.

My diary notes are too irregular to be able to give more than a brief outline for some of the species I have kept and those parrots whose aviaries are out of sight of the house have come in for very little watching. However, the odd notes that I do have may have some interest for fellow parrot enthusiasts. My single efficiency is that I generally have managed to inspect the nest boxes daily; made easy because they are hung on the outside of the flights and therefore the incubation and fledging dates are reasonably accurate. I try, usually with fair success, to indelibly mark each egg in the sequence in which it is laid and all chicks are close-rung with sequentially numbered rings.

Cooling of the eggs whilst they are being incubated does increase the time that it takes for the chick to hatch; therefore winter laid eggs, or eggs under indifferently sitting hens, take extra long to hatch. However, as the incubation time cannot be reduced below a certain minimum, the time that I have given is the shortest recorded interval between the laying and the hatching of an egg. Generally this is the time that it takes for the last laid eggs to hatch. Fledging times are far less certain. The first time that one sees a chick out of the box may not always be the first time that it has come out, for parrot chicks invariably return to the nest for sanctuary, or to sleep, for several days. Secondly, chicks reared by good parents, parents that will eat bread and milk—a rich source of protein—and rearing their young in the long days of summer, will have their chicks fledge much earlier than if these circumstances do not apply.

In this series I shall try to present some general information upon most of the species of parrot with which I am acquainted. To avoid repetition, some species are dealt with at shorter length than others.

THE PILEATED PARRAKEET *Purpureicephalus spurius*

The late Ken Knowles once tried to convince me that the Pileated Parrakeet was by far the most interesting of all the Australian parrots as an aviary bird. Greene (1883-87) was ecstatic about a hand-reared one kept as a cage-bird. Having seen a few in aviaries where they were always so wild that, at the best, you might just catch a glimpse of one slipping into the shelter, I thought that they would be the very last species of parrot for which I could ever whip up any enthusiasm for, above all else, I like my birds to be tame. Then in late March 1973 I bought a small collection of Australian parrots from a friend included with which was a pair of Pileated. The hen was two years old and the male a bird of the previous year and still in the green immature plumage.

They were a most pleasant surprise. Cautious they were, and still are so that one has to study them from the inside of the house using a pair of binoculars but they are almost continuously active and consequently very entertaining and the almost ceaseless chatter of the male is a wonderfully pleasing sound to have in one's own back garden. They very much remind me of kakarikis, *Cyanoramphus* species, my favourite parrots.

Unfortunately the first year the male was too subordinate to the hen to pair successfully; she fed him, instead of *vice versa*, and when she solicited for copulation, interested though he was, he twiddled with pieces of twig or a stone and, when on the ground, sometimes rolled right over onto his back. Consequently the two clutches laid that year were sterile. I bred five chicks last year and have six this.

Pileated seem fairly well established as aviary birds: I estimate that in the U.K. there are between 50 and 80 pairs. As they breed well, this does suggest an unusually high mortality rate. Those dead ones examined by myself have largely suffered with verminous enteritis (*Ascaridia* and *Capillaria*), from injury or from nephrosis associated with degenerative changes in the liver. Fortunately, as yet, I have neither lost parents or their young, but youngsters sold to others have a 60% loss over the first year.

Description:

Pileated are the single representative of their genus and are confined to the south-west corner of Australia. It had been suggested (Cain 1955) that they and the Horned Parrakeet *Eunymphicus cornutus* of New Caledonia are sufficiently alike to share the same genus, but few people have adopted this suggestion.

Despite their length (35 cms—1 ft. 2 ins.) Pileated are small-bodied birds (average weight of six was 103 grams (3 $\frac{1}{4}$ ozs.). They get their English name from the pileum (the technical name for the upper half of the head) being distinctively coloured; it is deep crimson, hence

the Australian name of Red-capped Parrot. The cheeks and rump are a glossy yellowish-green; the chest and belly deep purple-blue; the feathered part of the legs and the under tail-coverts are red; the wings and tail are a rich, very glossy green.

The rather protuberant bill, which is somewhat pinched along its sides, is not too unlike that of the Kea *Nestor notabilis* or the Slender-billed Parrakeet *Enicognathus leptorhynchus*. (Curiously such a bill is sometimes seen in Mealy and Common Rosellas *Platycercus adscitus* and *P. eximius* where the upper mandible has suffered from some injury making it grow straighter than usual.) The gap between the mandibles is present in all the other broadtails but, because of the projecting outline of the mandibles it is only in the Pileated that this gap is taken well clear of the cheek feathers.

General behaviour.

Such a powerful bill has to have an occupation and the consequence is that the perches and woodwork of the aviary housing these parrakeets can suffer severely. A friend, wiser than I, has nailed battens of wood to the inside of his flights for his Pileated to chew and this has saved his main wood structure. When the perches and wood are bitten it is not done completely haphazardly but is worked at particular spots so that deep grooves get scooped out to form notches that have all the appearance of being made with a drill laid sideways on to the wood.

Most of their time they spend on the branches and wire. They do descend to the floor but have hardly interfered with the grass, come to that they ignore all green food except for garden peas and dandelion seed heads. In contrast to all other broadtails they do not pay much attention to the buds of branches but strip the bark and leaves.

They bathe frequently, both in standing water and by rubbing themselves on the wire or grass when it is raining. In feeding, the foot is frequently used to steady food when standing on it or to hold it to the face.

The word that most aptly describes the Pileated, as it does New Zealand parrakeets, is bouncy, the male particularly so. He is seldom still: walking along the perches in a self-important way, flying to-and-fro, or scrambling through the twigs pausing to nibble or hang from the wire. Very frequently the male chatters his *di i i i i* and, even though it is the most pleasing of sounds, he must be the most continually noisy of all my parrots. This chatter is louder and slightly more harsh than the chattering flock call of both sexes. The male is seldom seen without having all the feathers of his pileum fully erect so that he has the effect of wearing a diminutive crimson-coloured guardsman's busby. The pileum is always erect during his chattering. As he lands his wings are slightly drooped showing his

yellow-green rump and during each chatter he bows very slightly forward and slowly raises the tail to an angle of about 45° . This is not a vertical up and down wagging suggested by certain authors (*e.g.* Forshaw 1973) and it is not performed by the female; therefore I think that it has no analogy whatsoever to the lateral tail swishing of several broadtails. Like a fidgety child, a male appears unable to keep still, but has to scratch his head, take hold of something in the bill, fly off, as like as not to land to scratch his head as if he were verminous, or to fiddle with his feet. Why the chatter, why the continually raised crest, why the obvious almost unremitting nervous excitement? Twice I have found the male sitting entirely oblivious of me seemingly stunned, whereas a moment or two beforehand he was his usually sprightly self. Like male domestic turkeys he very probably was suffering from apoplexy from an elevated blood-pressure. I believe that this chatter may have two functions, firstly to demark his territory and secondly to stimulate the female into reproduction, yet I have read somewhere, that several pairs can be kept in the same aviary. Last year, as the chicks fledged, the male severely attacked the female, desisting when the chicks went back inside the nest hole and eventually I had to remove him. Was he "defending" his chicks against the only available "enemy"?

Some of the chattering notes given by both sexes are very like the flocking calls of New Zealand parrakeets; so is the fidgeting, continual movement. Likewise each flight is accompanied by a chattering call as they land. Typical of Australian broadtails they never sit in physical contact with each other, nor mutually preen. They have a particularly cold marriage where affection is non-existent and only regurgitatory feeding and feeding the young seem to bind them together.

Breeding

The chattering, wild singing and strutting of the male takes place the year round except possibly when moulting. The hens are much quieter and less outgoing and it is this, as much as the duller plumage, which distinguishes them so easily. In normal circumstances a female tends to move off to avoid the nearness of the male or she will lunge at him with an open beak to make him fly off, but in the spring she tends to hold her position while he cavorts in her vicinity. This being such contrary behaviour for her he then, with much changing of position, as if he were very uncertain of himself, and obvious daring, regurgitates to feed her and then, very likely, he will speed off to have another chattering fly around. I have yet to see my hen raise her cap feathers. The male several times, in what appears to be an ecstasy of feeling, has been seen to roll right over on to his back in the grass.

Once the box is put up in early February the male shows as much interest as the hen; yet I have not seen him enter the box until the

chicks are three-parts grown. He does sometimes chew away at the entrance hole from time to time. My female always spends weeks and weeks chewing away at the interior before she finally lays her clutch of six, rather small, eggs (average weight of 18, as laid, was 7.2 grams). The sequence between the eggs is the usual two days less a few hours. By the time that the first egg is laid there is a litter several inches deep of wood shavings on the floor of the box. Egg laying, for the past three years, has commenced on the 116th day of the year, 137th and 130th (this year). Incubation, with my hen, only starts as the clutch nears completion and the shortest incubation period, recorded for several eggs, has been 19 days.

When they hatch, the chicks are typical broadtails with long, white, rather thin down eventually replaced by a darker, grey down that comes with the feather pins and there is the invariable white nape-spot of broadtailed parrots. Their bills, as far as I can detect, look rather as other broadtails; but the parents, with their elongated bills appear to have some inefficiency in feeding them as the chicks, from the earliest age, always have much food smeared over their heads, something that I have not noticed with broadtails but which is common with American parrots. The eyes first start to open at about seven days; at approximately the same age the feet start to colour and the tracts of pin feathers can be made out. Growth is extremely rapid and the first chicks leave the nest when 33 days old. Like all the parrots known to myself, they return to the nest to roost for several days. When they fledge the chicks appear to be disproportionately small but very soon feather up to adult size. They are green with red vents and do not moult into the adult plumage until the following year. I find them impossible to sex by colour; however, young males have been heard 60 days after hatching to sing and chatter and at about 90 days, when other chicks are relaxed, perhaps preening themselves or sunning, the presumed young males will regurgitate and feed the resting bird. Mr. Alfredo Marques tells me that some he has bred have themselves bred the following year when still in immature plumage; this is exceptional.

Perhaps because they nest so late and usually are moulting heavily by the time that the chicks fledge they appear to be able to raise only a single nest. I know of no exceptions to them being single-brooded, unless the first brood is lost.

THE SPLENDID GRASS PARRAKEET *Neophema splendida*

The Splendid, like the Turquoise Grass Parrakeet *N. pulchella* is one of the species listed by the I.U.C.N. as being in danger of extinction. Fortunately both species are very well established in European aviaries, as they appear to be no more difficult to breed than is the Budgerigar. So common is the Splendid that there may be two or

three thousand, perhaps even more, in the U.K. in late July of each year. Unfortunately many carry mycoplasma and the stress of moult, the weather, draughts and damp lower their resistance to this micro-organism. So that with mycoplasmosis ("contagious conjunctivitis"), other diseases, intestinal worms and injuries, these high numbers are cropped right down to perhaps 250 pairs by the beginning of the breeding season. Consequently they are never common enough to be caged as pets or much exhibited at bird shows.

A curious feature is that very many are so verminous with feather mites that the underside vanes of the wing feathers are frequently quite silvery-white from their nits (eggs).

Turquoisines and Splendids are said to be "very much alike" and "closely related" (Macdonald, 1973). Behaviourally Splendids (is this why they are so vulnerable to introduced predators, including man?) appear to be naturally confiding whereas Turquoisines strike me as being extremely cautious. I believe, from my observations, that the courtship display of these two species is different; but cannot say so with certainty as my Turquoisines are completely out of sight of the house and are too wild for close observation. Hybrids between closely related species of bird are generally fertile. The fact that the several (50+) hybrid offspring of this mating that I have investigated were infertile, even in the male sex, does suggest that these two species have probably diverged several millions of years ago (Prager & Wilson, 1975).

I have bred both normal and blue (actually to me they are sea-green, for the yellow pigments are not actually suppressed as in blue Budgerigars or Ringnecks) Splendids. However, as my aviaries are not suitable to keep them during the winter months I have reluctantly given up keeping them.

Description

This is the Scarlet-chested Parrot of the RAOU and is the size of the Budgerigar (the wild Budgerigar and not the hypothyroidic, caponized-looking show monstrosity) and weighs about 36 grams (average of ten individuals). Both the sexes have grass-green backs, tails and wings but their particular glory is that the male has a wonderfully, almost iridescent blue head (the hen only has her face blue) and the lesser wing-coverts are also blue. The amount of red (surely not scarlet?) on the chest of the male is very variable: selection among "fanciers" has increased the red so much that in some individuals it practically covers the entire chest and abdomen. Likewise selection for brightly coloured "thighs", which are of a red-orange shade, coupled with the selection for red bellies has given most spectacularly beautiful birds. As the colour of the thighs is not sexually determined, hens show the same brightly coloured thighs as males.

General behaviour

It is odd that Immelmann (1968) should have credited grass parakeets with great climbing ability for they are extremely terrestrial, have feeble little bills and probably obtain very little, if any, of their food from bushes and trees. They will use the bill to scale netting but they generally hop or walk from twig to twig more like passerines than parrots which, as a group, continually use the bill as a third foot.

For the size of the bird they eat large quantities of green food and my aviary flights have to be returfed annually for, like Port Lincoln Parrakeets (*q.v.*), they chew stalks of herbaceous plants to extract much, if not all, of their water requirement in the protein-rich juices which they squeeze from the plant, and this chewing kills the grasses. Mine may well be exceptional, but I cannot get them to eat any form of berry, though they love apple and bread and milk.

They are very pronounced sun-bathers; when so doing they droop the wings, flare the tail and puff the body feathers and appear to be almost in a trance. They also bathe frequently and foliage-bathe; but I have not seen them rain-bathe. A very few odd individuals will stand on green food to steady it; however the majority make no feeding use of the foot whatsoever: there is an observation by Mats Tel (Smith 1973) of a Splendid holding food up in a foot. Splendids appear to be sociable although I have never kept more than a single pair in each aviary to see if they would fight when breeding.

The voice is a very pleasant finch-like twitter. It is interesting that Aymara and Lineolated Parrakeets *Bolborhynchus aymara* and *B. lineola*, parrotlets (*Forpus* species), Madagascar Lovebirds *Agapornis cana* and grass parakeet *Neophema* species—all of which feed largely from the ground on the shed seed of herbaceous plants—should have approximately the same sounding twittering call-notes and the same kind of finch-like twittering song in the male.

Breeding behaviour

Splendids appear to reach sexual maturity well before they are a year old. I have had 100% fertility with five month old birds. Even when courting, a pair never sit in close physical contact nor do they mutually preen one another. A courting male will fly rapidly to and fro, the wings making a fluttering noise, to perch near the hen with the wings drooped—displaying their cerulean blue—then dropping from the perch he will rapidly flutter off again. Sometimes as the male approaches the female he will rapidly duck his head, fluff the body feathers and flutter the wings rapidly: exactly the movements that he would make were he bathing in standing water. During this always very quick “dry bathing” movement he buzzes a *grrrrr* sound which is best described as being very like the muffled buzzing of a large fly caught in the web of a spider. These two displays may well be directed more against rivals than particularly at the hen, for the

self-same fluttering to and fro is also seen under mildly stressful circumstances as at the close approach of another male or when I stand adjacent to the nest box and look directly into the flight. It has not been noticed when the birds were not breeding. The dry-bathing movement and its accompanying buzzing noise are also performed at the entrance to the nest, commencing during courtship and continuing until midway through the incubation period. It is also seen when the male is offered pieces of green food through the wire which he is thwarted from approaching because of my too close presence. As part of their courtship, and at no other time of the year, except when feeding the hen and chicks, regurgitatory feeding takes place.

A noticeable feature of some parrots when under some slight nervous tension is to click the beak. They apparently produce this chattering noise by "gnashing" the mandibles together. I have sometimes noticed a male Splendid sitting still, and I believe at the time either unaware or unconcerned at my presence, chattering his bill three times and then giving a low teeing noise: the resulting sound sounded like *tic tic tic spleeee*.

Copulation is the invariable Old World parrot form where the male steps right on to the back of the hen. It takes place from one side only.

My hens usually take a little nesting material into the box but how it gets into the box I do not know for, though I have watched them very carefully I have not seen them tuck this nesting material into the body feathers for transport. The eggs, which weigh about 4 grams (average of $22 = 3.96$ g), take 19 days to hatch and are laid at intervals of somewhat less than two days so that a clutch of six takes about eight or nine days to complete. Only the female incubates. The male occasionally feeds the hen by going directly into the box, but far more usually calls her to the entrance and feeds her there as she protrudes her head. The chicks have long white down and slightly pink bills and develop the usual white nape-spot of broadtailed parrots when the darker down forms about a week later. Usually the chicks are closely brooded for ten days or so by which time they are three-quarters their final weight and thickly covered with pin feathers. As they progress they climb up to the entrance hole to twitter their food-soliciting call and bob the head up and down. The earliest that I have had a chick fledge was at exactly 21 days old, but this must have been extraordinarily precocious for they usually do not fledge until 28 days plus.

Like most other broadtailed parrots, if two nest boxes are provided the hen will usually start a second clutch and be in the early stages of incubation before the first brood are fledged—the cock rearing them entirely on his own.

THE PORT LINCOLN PARRAKEET *Platycercus zonarius*

Since Condon (1941) it has become usual to separate the genus *Platycercus* into the rosellas *Platycercus* and the Australian ring-necked parrakeets *Barnardius*. I find it impossible to accept this division as it is largely founded on four particularly trivial differences: (1) The yellow nape of *Barnardius* is a not uncommon signal mark in parrots and elsewhere, e.g. the Yellow-naped Macaw *Ara auricollis* and the Yellow-naped Amazon Parrot *Amazona ochrocephala aureopalliata*, it is not considered of generic value. (2) The scaly-looking mantle and covert feathers of rosellas. (3) Rosellas form larger-sized flocks. (4) The amount of bone margining the ear canal—rosellas have a slight arc of bone and *Barnardius* lacks this—but as both types of ear are represented in the Red-rumped Parrakeet *Psephotus haematonotus* (Holyoak 1973) this also counts for little.

Apart from my own pair, which are a hand-reared male and a wild-caught female, both imported under licence, and their several progeny, I have examined about a dozen other Port Lincolns including a further five wild-caught individuals, smuggled out of Australia via Singapore and sold openly to the trade last year. As a result of this small, and therefore certainly very biased, survey I completely endorse Forshaw's (1964) opinion that the wild population contains a large number of individuals varying between the Port Lincoln *P. z. zonarius* and the Twenty-eight Parrakeet *P. z. semitorquatus*. One explanation for the very wide distribution of "intermediates" with population of "pure" Twenty-eights to extreme west of their range and a population of "pure" Port Lincolns to the east of their distribution—the Port Lincoln type of smaller body size, lacking a band of red at the base of the bill and a yellow belly predominating in the intermediates—would be that the two subspecific forms had originally developed in complete isolation from one another. Since then the range of the Port Lincoln subspecies has expanded westwards to contact the Twenty-eights which then have hybridized. Because there is probably little biological advantage of one subspecific form over the other, or perhaps because of hybrid vigour, there is now found a hybrid swarm rather than a comparatively narrow hybrid zone between the two extremes.

Description

For a complete description see Forshaw (1964, 1973); otherwise it might be sufficient to say that they are big (120-150 gram) glossy green parrots with black heads and a yellow band across the nape of the neck. They are of the same shape as the better known rosellas.

Status in captivity

In Europe and the U.K. they are still rather uncommon, although they are well established and there should be little need for further importations. I would hazard a guess that in the U.K. there are about

sixty to seventy individuals, the majority of which are closer to the Port Lincoln type. Most of those bred find their way to the Continent.

General behaviour

These are extremely terrestrial and are seen as much on the ground as perched. A most noticeable feature of their feeding behaviour is that they cut off pieces of plant stalk, such as grass, and run these through a munching bill to extract the juices. This is so evident that even when chickweed is fed they soon leave off searching for the seed capsules and start eating the stalks as well. Plant juices are rich in protein and a source of water which might explain how these birds survive in hostile environments. An oddity of my pair of birds is that they prefer canary to almost all other seeds and eat very little sunflower, will take bread and milk, eat all kinds of fruit and appear to prefer the kernel of hawthorn *Crataegus monogyna* drupes to any form of food. They never eat hemp, although I can get the young to do so for a few weeks and then they too stop. I doubt that a Port Lincoln eats as much seed in a day as does, say, a grass parrakeet.

The hand-reared male is tame but like other tame broadtails he reacts towards me as he would to another of his own species, that is he will make direct attacks if I come too close but does not if I keep a little distance between him and me. A very noticeable feature is for both sexes to lie pressed close to the perch in a copulatory stance. This, I am certain, is a form of concealment for they only do it when one is standing some little way off. They are quite active, pleasantly noisy and bathe a lot. The adjacent pair of Cloncurry *P. barnardii macgillivrayi* have never been seen to bathe at all.

Breeding behaviour

If my pair are in any way typical they appear to be extremely willing to nest; the snag is that the male eats the eggs if he can and consequently I have to remove them as soon as they are laid. This means that he has to be removed the evening that an egg is expected and returned after laying. Following the fourth egg I remove him until the chicks hatch when he is returned from the adjacent aviary and he helps feed them, for otherwise he is a model parent. His removal does not affect the fertility of the subsequent eggs—she usually lays seven. Incubation takes 19 days and the young fledge at about 35 days old.

Courtship is difficult to describe, not that it doesn't take place, but because as with most broadtails it appears to be a practically identical display between the two sexes. The pair swish their tails from side to side especially when they are disturbed. The tail is flared and this is always accompanied by a rapid chattering. This chattering and tail-swishing is seemingly directed against other birds, a declaration of war. Likewise the position whereby the male mostly, but the female

sometimes, stands tall on his legs, pulls the head on to the chest and pushes the wing-butts forward. This is a direct threat. Males (I have not heard it from females) give a tut-tutting noise when they are mildly annoyed.

This year, although I have had two fertile clutches, I have still to get chicks. The weather was very cold and I believe that because the hen has to feed herself during incubation—the cock being locked away next door—that the embryos were too often chilled and died. She is sitting again as I write, on six eggs some of which, I hope will be hatched and reared now that the weather is much warmer.

THE MANY-COLOURED PARRAKEET *Psephotus varius*

Manycolours do not appear still to be common: I would be very much surprised if there are more than 150 breeding pairs in the U.K. This is a disappointingly low number for they seem just as easy as Redrumps *P. haematonotus* to house and to get to lay eggs. Probably the reason that the number available increases so slowly is that many hens become indifferent to the need to brood their chicks once they are more than a day or so old. This would be alright if the weather was favourable. Secondly they seem more susceptible to worm infestation, pseudotuberculosis and probably other diseases than are Redrumps. This sensitivity to disease is certainly aggravated because most people seemingly expect their birds to subsist entirely on seed. Mine, just like the rest of my collection, have a small amount of bread and milk daily often supplemented with green foods and fruit when available.

My original pair of Manycolours were bought from Dr. and Mme. Swaenepoel in 1970. That year, and every year since, I have successfully reared some chicks. The original cock died in 1972 of an "aberrant eperythrozoon infection". This unpredictable and always fatal disease is spread from wild birds by biting insects and is an autumnal scourge of some parrots in the eastern, drier half of England. The hen I lent to an acquaintance, such is the difference between friends and acquaintances, and have not heard from the acquaintance since. For three years I used to purposely mate brother and sister and repeat this with their offspring to see if they carried any abnormalities of colouring. After three generations of this very close inbreeding, fertility was still not affected. Now I outbreed always selecting for brightness of colour. Fortunately two years back I was able to acquire a particularly brightly-coloured male from Holland and the factors for this appear to be dominant, for all his sons have an equal brightness.

General behaviour and breeding

These are precisely like Port Lincolns in courtship and general behaviour, including the clicking of the male but they appear to be

more affected by day-length and I have not had them breed after mid-summer's day.

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To be continued.

SPANISH NOTES—6

By ROBIN L. RESTALL (Caracas, Venezuela)

INSECTIVOROUS BIRDS

I end this rather miscellaneous collection of notes by mentioning some of the softbills that came my way but, unfortunately, my experiences were too short to be able to write much.

Several Redstarts, both Black and Common, passed through my bird room. For some reason they only ever turned up in the market as single birds. The only certain thing that I can report about them is that I never lost one and that they seemed to be very easy to "meat off". A trapper called at my house once to offer me some Stonechats. He claimed to have had them for three days (demonstrating that they would live in confinement!), but I guessed that they had been caught that morning. I had not the faintest need for them and said so. The price kept dropping and when he tossed in a male Black Redstart I took them.

Somewhere back in the recesses of my bird brain I recalled Frank Meaden telling me that the male Stonechat would dominate the feeding pots and should be segregated. Well, I could not segregate these. There were three pairs, plus the Black Redstart and I ended up by putting them into a 6 ft. flight cage altogether. On top of the accommodation problem, there were very few mealworms available. To begin with I gave To-Vo, moistened with honey and finely-grated carrot, sprinkled well with grated cheddar cheese and then topped with Vionate-dosed mealworms in all stages. Two of the Stonechats died almost at once, but the remaining two pairs did very well indeed. They settled down to a daily routine of the above diet with

30 mealworms a day between the four of them (the Redstart was removed). There was never any fighting at the food bowl. In the hand, they were impressively fine and delicate birds. They would "chat" like stones knocked together frequently and were very alert. After six weeks, I released them in perfect condition.

One day at the office I was brought a box with "an injured tropical bird" inside it. It had flown into the glass doors of the office entrance and stunned itself. Through the holes in the side of the box it seemed like a thin-billed Avadavat. The bird was a Firecrest: I placed it in a wire-fronted and wire-topped cage with lots of bowls of food and water. It spent all its time on the roof of the cage attempting to get out. The next day it was dead and, as far as I could tell, it had not touched any food at all. It seems as though this is a typical problem with this kind of bird. Mr. Meaden suggested that, had I placed a pot of mealworms up high, it would probably have taken them. The problem was that it did not recognise the floor of the cage as a source of food.

A couple of years later, I had the chance of a pair of Willow Warblers and, remembering the Firecrest, placed them in a long, low-roofed cage covered over with muslin. My bird journal contains the following:

"To begin with, I gave exclusively mealworms of all sizes, pupae and beetle, well dusted with Vionate. After $2\frac{1}{2}$ days, *i.e.* sixth feeding, I gave some soft food sprinkled with cheese and finely cut striplets of raw ox heart topped with a dozen chopped mealworms. They ate the cheese, meat and mealworms but not the softfood. Not surprising really; they probably were not hungry by the time they reached it! Next day, they definitely took some of the soft food (To-Vo mixed with finely grated carrot)."

I never reduced the mealworms below the dozen a day level but, even so, an average of six a day is not exactly a banquet. They stayed in lovely condition.

By experimenting and varying the presentations, I discovered that by mixing the striplets of raw ox heart with the mealworms before sprinkling on to the soft food, they would take it all.

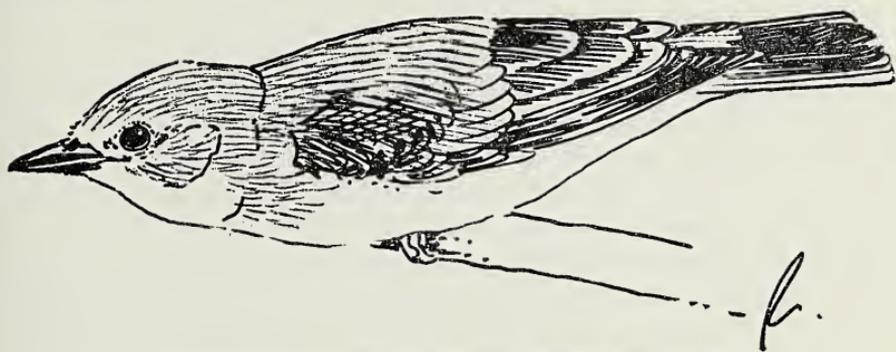
On another occasion, I landed up with a cage full of odd softbills. Sometimes I would release birds immediately, but my curiosity, plus the knowledge that I would never have opportunities like this again, often got the better of me. This particular lot included five Spotted Flycatchers. They shook me somewhat and I must admit that I was not confident. My journal reads

"Very shy and wild. Placed bowl of mealworms at either end of cage (about 4 ft. long) and they were hardly eaten at all; still some left at evening feed time. Gave them supper of soft food mixed with cheese and sprinkled with chopped up mealworms. Next morning, repeated. That afternoon gave fresh soft food, this time cheese sprinkled on top, then striplets of raw ox heart, then chopped mealworms. Next day all topping had gone and half of the soft food gone. It definitely had not been scattered in search of mealworms."

In fact, those five Spotted Flycatchers were terribly easy to keep and

really amazed me.

I kept Pied Flycatchers every year and the first time I saw one was in a cage full of bustling and hopping Wheatears and Stonechats. It was cowering in a corner. The dealer gave it to me since I was obviously so concerned for it and he clearly believed that it would die. Because of pressure on available cage space (the perennial blight while abroad), I placed it in a cage with some Whinchats and some other softbills. Mealworms were in short supply and things did not augur well for the hapless bird. It had a habit of "freezing" horizontally (crouched) facing me, whenever I entered the room and would stay in that position until I left. Its condition, under these circumstances, was near to being a trance for I could actually place my hand in the cage and lift it from its perch. I soon took pity on the bird and



Crouching concealment posture of Pied Flycatcher.

released it. The interesting thing about this, however, is that it had no live food at all, for its lively companions would scoff the lot long before it recovered.

Another time I came across this species in the market when the dealer had nine. I had promised to keep an eye open for a couple of pairs for a friend who was very keen to try to breed them. It was August and the plumage patterns were confusing. My journal entry for that day reads :

"17th August: Three males were easy to select, one was an eclipsed adult and the other two were probably early birds of the year. The remaining six were very difficult, being immatures but out of their speckled fledgling plumage. So, to avoid silly speculation, I took all nine, hoping to be able to tell at leisure later and release the odd ones before long. I placed all together in a two metre flight cage along with some Serins and wild Canaries for company. Placed three bowls of mealworms in the cage, also a bowl of Avi-vite mixed with mashed chicken liver and honey that had been sprinkled with chopped mealworms. Let's see if the famous flexibility of the Pied Flycatcher to adapt to food source makes this an easy meating off."

The next day, 18th August :

"Every single mealworm had disappeared by nine the next morning. I crumbled softfood, sprinkled it with a little finely chopped raw ox heart,

grated cheese and about forty mealworms, all chopped up. With mid-morning post, mealworms arrived and I was able to give a few more.

19th August: Food this morning, large flat bowl of honey-moistened Avi-vite, sprinkled with thin strips of ox heart, Vionate and chopped up mealworms. One Pied Flycatcher flew to bowl and called shrilly before eating, a series of *peep*, as if announcing the news before tucking in. All very fit and lively. Am giving 100 (carefully counted) mealworms at a meal. It looks and sounds a lot, but isn't so much when divided between nine birds, particularly the latecomers.

20th August: I get the feeling that they are only taking the mealworms and are very reluctant to take strips of meat, etc. Stood at entrance to bird room after giving a second bowl of mealworms. A large bowl with about 40 mealworms had been given at 2 p.m. At 3 p.m. I placed another 20 in the bowl. After two or three birds had taken a worm, I noticed that a male had mounted guard over the bowl. All were obviously not starving, but as the odd bird flew down to feed so this male rose towards it and drove it back. With the first feed of the day all got to the bowl, driven on by hunger and at the 2 p.m. feed I noticed some birds playing tug-of-war with the mealworms. However, with feeding only mornings, or early mornings and evenings, it is possible for a dominant male to take over the ownership of the bowl as soon as the first rush is over, and thus cause the half-starving of weaker/more timid individuals."

Not wishing to experiment, I released the promised five and soon arranged for the departure of two pairs. Shortly afterwards, I received another Pied Flycatcher. I arranged, through a dealer that I knew, to borrow a Peregrine Falcon for use at a Sales Conference. The theme was falconry and, in the part where I took the rostrum and with appropriate visual aids likened a good salesman to a falcon, I was to have a live bird on my wrist. Being Spain, of course, nothing goes quite to plan and a fine male Kestrel turned up. Nobody knew the difference at the conference! With the bird came a live Pied Flycatcher "for its lunch".

I promptly gave the Kestrel chicken livers, and ran the flycatcher in a cage along with some Nightingales and Wheatears. Its lesser size notwithstanding, it showed none of the shyness hitherto experienced, was always first to the food bowl and had taken several mealworms before I had finished feeding them.

One day, a neighbour brought me a Blue Tit. It was newly fledged, but the soft edge to the bill was barely visible. Apparently, it "just fell on to my balcony". They lived on the fifth floor in the middle of Madrid. It was 9.15 in the evening. I didn't know whether the bird was weaned or self-feeding so, still holding it from its box, I took a mealworm, squashed the head and pushed it into the bird's bill. It held it firm. So I placed the bird in a cage. It held firm to the worm, then swallowed it quickly. Three mealworms were given, all squashed heads and all swallowed rapidly. These were picked up from a shallow dish, held by the foot, chewed up and swallowed. By 9.30 p.m. the young Blue Tit had taken six mealworms, and a little water. It was very unsteady on its feet. I remember being impressed by its tiny head. Despite its apparent instability, it was quite capable of tipping over, stretched-out, almost upside down, to take food—then right itself. This

was rather than hop onto the food bowl.

Two days later, it was taking Avi-vite with grated cheese and a little baby food; also mealworms and maggots. The live food was always held in the foot, pulled and squeezed dry until only the skin is left. This is then either dropped or occasionally swallowed. It proved to be a delightful bird, but its never-ending movements and restlessness make it an unsuitable bird for a cage. It would, no doubt, be best in a roomy well-planted aviary, but who would care to provide valuable room to such a common species? I've no doubt that it could be bred with little difficulty.

I often saw Great Tits on offer. They were invariably expensive (two or three times the price of a Nightingale for example) and were quickly sold. I suppose that they can be trained and become enchanting pets. However, my interest was in other directions, and the butcher reputation that Great Tits have certainly discouraged me.

My first Meadow Pipit *Anthus pratensis* was selected from a cage crammed full of Goldfinches, with an assortment of odds and ends such as Linnets and Rock Buntings. Since it was different, and I clearly showed an interest in it, the dealer shot the price up to the equivalent of about 20 pence. Being short of space I popped it into a cage with a Robin. Almost at once, it took a mealworm and a sip of water and I knew that it would be all right. It settled in well, but was always nervous whenever I entered the room and took a while to calm down. It seemed to be content to take Sluis Universal, moistened with honey, plus a few mealworms each day. It protested vigorously whenever a strange bird was billeted—however temporarily—in its cage. It would sit perched, chirruping sweetly and softly for fairly long periods. At night, it would roost, head under wing, in a corner of the cage on the floor.

Over the next couple of months the Meadow Pipit had remained in the same cage, but had received Siskins and Crested Larks as guests, finally settling down with the Robin and a female House Sparrow and I was able to watch its feeding habits. It would select a morsel from the bowl of soft food, then run off, drop it to the ground, pick it up again and then swallow it. One regular habit was to fly from its favourite perch, hover in mid-air and then return to the perch. It remained in perfect health for several months before eventually being released in the countryside well away from trapping areas.

The only other pipits that I kept were also individual birds. I found a Red-throated Pipit *Anthus cervinus* in a cage full of waxbills and munias among the stall dealer's stock in the Ramblas of Barcelona. (Incidentally, any reader who is visiting or passing through Barcelona on a weekday will find a visit to the bird dealers there of some interest.) This unfortunate bird was on its last legs, no doubt finding a diet of panicum millet not very satisfactory! I had practically no mealworms

at the time and was somewhat at a loss. Rather naively I hoped that the soft food being taken by the Nightingales, together with a few mealworms, would be such an improvement on panicum millet that the bird would respond. Alas, it was terribly emaciated and succumbed about a week later.

Happily, the reverse was the case with Tawny Pipits *Anthus campestris*. These birds seem much larger (though my field guides say that there is only half an inch difference) and much more robust. During a two-year period, I received three of these birds, releasing the first two in the belief that I would never receive another, then keeping the last one in vain! Each settled in remarkably quickly, "meating off" as if born to it.

My first Nightingales *Luscinia megarhynchos* arrived at the beginning of the season in 1970. I had seen an odd bird, sold, in a dealer's cage in the Sunday morning market and indicated a desire for two or three. I left my address as a measure to endow the enquiry with my sincerity and promptly forgot the matter. One evening a few weeks later, there was a knock at my door and there was the dealer, dirty and sweaty, fresh (?) from the country with a dozen sorry-looking Nightingales. I had not one single mealworm and a telephone call to England that evening could not bring any within five days; luckily the trapper had brought a sack with a hundred or so equally sorry-looking grasshoppers.

That night I took each bird and force fed it a fat and nourishing grasshopper. Next day I released a lot of grasshoppers into two roomy cages and hoped for the best. I soon discovered that grasshoppers had to be "de-hoppered", by having the rear legs nipped off. Such a hapless insect then walked about until a hungry Nightingale polished it off.

Grasshoppers were very satisfactory food but only as part of a totally accepted diet. I found them to be of little help in "meating off". Normally, I chopped up mealworms over a bowl of soft food, and found that this invariably worked. Chopped-up grasshoppers simply dried out and did not appear to enhance the soft food one bit. I have no idea why a chopped mealworm should retain its appetite appeal, but a grasshopper not!

I found that good live food in *adequate* quantity was absolutely essential for the first two or three days. With a free supply of mealworms for *liberal* lacing of the soft food, plus enough to ensure that each bird had a few on which to go through the night, I was able to "meat off" this species invariably within a fortnight. Mealworms and any other live food then became a daily treat, often a very little one.

Keeping several birds in one medium-sized cage has proved successful for periods of a few weeks, but I have never tried longer. In the spring of 1974, I bought two believed pairs and had to isolate each bird within two days; the males were singing vigorously and chasing

other birds. Normally, however, I have found that they mix very well with Wheatears, Whinchats, Larks, etc. The main risk in keeping more than one bird in a cage is that the fittest or strongest bird will eat all the mealworms first.

In the earlier years, I supplied these birds with Sluis Universal insectile food or Avi-vite, moistened with honey or fresh cream cheese, sprinkled with grated (granulated) cheese and then a few chopped mealworms. In subsequent years I varied this recipe tremendously. The base was always either Avi-vite or To-Vo from Holland. This latter food had a fair amount of freeze-dried mini-shrimps and other goodies, and the makers strongly recommended that it be moistened with grated carrot. When so moistened it certainly has a lovely texture. I then mixed ground, poached ox heart, or finely chopped raw ox heart or chicken giblets. On occasion, I would add finely chopped hard-boiled egg, grated cheeses, finely chopped cooked chicken, peanut butter, tenderly poached liver, mashed; also provided a good animal protein mixer. As a rule, I always re-moistened dry food with runny honey. The food would then have finely grated cheese poured over it, stirred a little. The mealworms, whether beetles, pupae or larvae, would be chopped, well dusted with Squibb's Vionate and then sprinkled on top of the bowl of food.

During the five years, several Black Redstarts *Phoenicurus ochruros* passed through my hands and I managed to assist in forming a couple of pairs for a breeding project. One entry in my journal for January, 1971, reads :

"Female. Rather nervous about this bird as it was very fluffed up and obviously extremely unhappy in the dealer's cage. However, I placed it in a small travelling cage in the back of the car together with a dish of mealworms. By the time we reached home it had eaten five of them. I ran it with a Robin and a Meadow Pipit. At first, it covered a bit and seemed particularly nervous about the Robin. By mid-January, it had become confident and hops about, behaving naturally enough, flicking its tail and curtsying like any healthy Redstart would do. It occasionally sits facing into a corner, head up, when I am in the room, working, but this is undoubtedly a reaction to my entrance. After a while, when I have settled down to painting or writing, it behaves perfectly calmly."

A couple of years later, I again had a female Black Redstart, this time placed in a cage with two male Wheatears *Oenanthe oenanthe*.

My journal entry for September, 1973, reads :

" . . . received two 'females'—Wheatears—in beautiful condition, but on second thoughts they could be immatures of indeterminate sex, or newly-plumaged males. Books surprisingly unhelpful on autumn plumages and immatures. Within 24 hours they were taking softbill mixture (Avi-vite) with a few mealworms chopped up on top. They share cage with female Black Redstart. One evening gave fresh soft food, with freshly grated cheese on top, finely cut strips of raw ox heart on that, topped with chopped (7 or 8) mealworms. The next morning I found the Redstart dead. The day before, I had noticed a Wheatear going to the food bowl, eat some, and stay resting perched on the edge of the dish. The Redstart clearly wanted to eat, but would not go too close to the bowl because of the

Wheatear's presence. The latter was not at all aggressive, just passive. I decided to watch this situation carefully because the Redstart, which was also new, might not get its share and should be moved. Obviously, I did not act quickly enough."

A species that I found very satisfying indeed was the Bluethroat *Luscinia svecica cyanecula*. This is the white-spotted morph that is resident in Spain. I first received a male in the late autumn of 1972. The trapper spun a yarn about having driven 300 kilometres into the Gredos mountains and the high price had to include his cost of petrol. I was too excited to care. The royal visitor had a large cage to itself (resulting in the kind of overcrowding accident just related) and a double ration of mealworms. I was very careful in the weaning programme and did not push the bird at all. The throat patterning gradually became apparent as the winter wore on and by mid-April the bird was in glorious colour. It first started singing in January, a very short staccato burst, almost invariably during the night. As the weeks went by, so the song and its frequency developed. By the beginning of April, this bird was in full song, rending the night (and often the day) with great bursts of Nightingale-like song. I cannot find my notes on song at the moment but I seem to recall the character of the song as being mid-way between those of a Robin and a Nightingale.

The behaviour of the bird was interesting. It would flirt its tail wide and cocked high, displaying the bright rufous edges of the upper part and scold me like an angry chat. It zipped about its cage like a demon, displaying and scolding whenever and all the while I was present and active.

A female arrived in September. It was in excellent condition, but either very shy or shocked. It stood utterly still until disturbed, when it would panic. The chestnut of the tail was very noticeable, though not as bright as on the male. The throat markings struck me as being very distinctive and the shape and posture very Robin-like. For the first four days it took mealworms exclusively, but by the eighth day it was happily taking the same diet as that given to the Great Reed Warblers. Subsequently, I received two more pairs of Bluethroats and in every case, the difference in behaviour between male and female was very noticeable. With familiarity came a certain amount of contempt but, as a rule, I would say that they are quite easy to adapt provided that one has a good supply of mealworms for the first few days.

Once accustomed to artificial foods, I found that they would eat anything; I also found that they were great bathers, using up all the water within a couple of hours. I, therefore, doubled the size of the water pot but the water still went and the only result was to make the cage wetter.

I managed to get a couple of pairs of Bluethroats over to England to Frank Meaden for ASPEBA breeding. Each pair was given a large, very richly planted outdoor flight and the birds were able to revert

totally to their natural behaviour. That is to say, they became invisible. I have tracked Bluethroats by the song in two areas near Madrid; I knew that my birds had come from one of these places but I was never able to see one. On a subsequent visit to Frank, I sat quietly with a can of mealworms in one of these aviaries and successfully photographed Bearded Reedlings, Nightingale, Stonechats and one or two other desirable species. The mealworms tempted them into the open—all except the Bluethroats.

Another species that gave me great pleasure was the Great Reed Warbler *Acrocephalus arundinaceus*. I was asked by an old trapper if I was interested in the species. Since I had never seen or even heard of the species in captivity, I said that I was. However, I stressed umpteen times that it must be a pair, male *and female* and that, if in doubt, I would take several birds in order to choose a pair. To my surprise, a pair turned up at the house the very next evening. I was absolutely delighted but tried to appear nonchalant. "Are they both males?" I asked. I was instantly assured that they were. (This was no doubt a combination of typical Mediterranean wanting-to-please by giving the desired answer, plus the belief that males are always worth more than females.) I went through the, by now, old rigmarole of complaining about idiot interpretations of my requirements, that I wanted a pair in order to breed them, that I did not want only males for singing purposes, etc. The counter argument was ingenious—the females are all on the nest, brooding eggs and cannot be caught (this was June, 1972). The result was a reduction in price, plus a promise that he would take a brood and hand rear it, thereby guaranteeing me a tame hen for breeding. Needless to say, the said brood did not turn up.

I was convinced that both these birds were, in fact, males. Both were noisy, uttering snatches of their song and scolding me with great profanity. Not having any knowledge or experience of them at all, I supplied live food with a lavish hand and was depressed by their voracious appetites. They were the equal of any Starling in their ability to polish off 20 mealworms in five seconds flat. It was with some relief that I managed to get a willing friend to take a carrying box in his hand baggage on an early flight to England. The aviculturist who had happily offered a roomy, planted aviary for breeding them was unfortunate enough to manage to lose one while releasing it in the flight. I cursed the man for an idiot, then promptly did the same myself a week later! Rather than release the second bird deliberately it was given board and lodging in the expert care of Frank Meaden in the hope that I would manage to come across another.

That winter the bird—it was a male—went into one of the heaviest moults that Mr. Meaden had ever seen; certainly the bird would not have been able to fly and one wonders whether this is a natural process.

Certainly, living in dense reed beds in equatorial Africa, it might not be a serious liability.

It was 15 months before another Great Reed Warbler came my way. I had had a letter from England saying that if a female did not appear, the lone male would be released before the migration period ended. Shortly after this, I found a dealer in the market who had a cage containing Reed Warblers, Whitethroats and a single Great Reed Warbler. There was also a Garden Warbler and a pair of Willow Warblers. I took the lot and rushed home. Unlike the two of the last year, or the surviving male, the Great Reed Warbler was silent. I placed it in a roomy flight cage with a pair of Black-eared Wheatears that had settled perfectly (and, what is more, were almost indifferent about mealworms) and everything went perfectly.

To my joy, a pair of Great Reed Warblers turned up a week later, and I ran the three together in a flight of their own. From their behaviour, I was certain that one was a male, and the other two females. Although they are very nearly identical in appearance, the male seemed to be bolder, fuller throated, larger headed and infinitely more egotistic and extrovert—and noisier!

The diet that these birds seem to thrive on was the following :

- (a) bowl half-filled with Avi-vite moistened with either honey, water, grated carrot or cream cheese;
- (b) this is then sprinkled generously with grated cheese;
- (c) this is then sprinkled with finely chopped calves' heart or kidney (not necessarily cooked) which has been mixed with a little soft food, a few chopped mealworms and Vionate;
- (d) and finally, if supplies were good, a few fat mealworms might be cut in half and scattered on top.

Almost all of this was eaten with no waste or scatter.

I managed to take these birds to England to join forces with the lone bird. The comparison was interesting. The "old timer" was larger and fatter. The new male, while being leaner, was similarly vociferous; all four hopped about excitedly like a reunion of aunts at a wedding. That was in October, 1973.

The four birds over-wintered perfectly and Mr. Meaden was able to place each pair in a separate and suitably large well-planted aviary.

In August, 1974, during my only too brief sojourn in England between Spain and Venezuela, I managed to call Mr. Meaden who brought me up to date on the progress of the Great Reed Warblers. It seemed as though they had nested but not gone any further than laying without brooding.

A HAND-LIST OF THE BIRD SPECIES OF THE WORLD AND OF THEIR ENGLISH NAMES : ORDER ANSERIFORMES

By D. T. HOLYOAK (Brighton, Sussex)

Despite the great development of modern ornithology, no convenient and up to date list of the bird species of the world is available. Lack (1966) has argued the need for such a list for the use of ornithologists who do not have access to the systematic literature and for the convenience of those who do, and Voous (1969, 1973) has discussed and provided part of a list of recent Holarctic species, which should lead to much greater uniformity of usage. Voous has rightly emphasised the difficulties in extending a Holarctic list to cover all living birds, but such a list is perhaps most greatly needed for tropical regions. Some of the difficulties in preparing a complete list can be avoided if an index rather than a formal systematic listing is attempted, but frequent revision would be necessary as the inadequate taxonomic knowledge of many tropical birds is improved.

For several years I have worked intermittently on an index of all bird species, which is now approaching completion, although much checking and revision needs to be done. That part of the list covering the Anseriformes is given here in order to provoke comment and criticism of the treatment adopted, choice of English names and other matters. Throughout the list families have been arranged alphabetically within orders, genera alphabetically within families and species alphabetically within genera. This is done only in order to make the list self-indexing and to remove the innumerable problems of the relative positions of taxa. I believe that alphabetical listings, although convenient for a purpose such as this, have no useful place in taxonomic accounts which are anyway usually provided with indices (*cf.* Hall 1968).

My choice of English names has been governed mainly by the extent of usage rather than by appropriateness, length or other considerations. Where difficult choices have had to be made the suggestions of Eisenmann (1955, 1966) and Voous (1973) have usually been followed.

Before publication of the complete list it is intended to seek the advice of specialists on particular groups of birds (including the Anseriformes) for their criticisms, and hopefully to thereafter amend the list at intervals, although this will necessarily depend on how many "life-listers" buy it.

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ORDER ANSERIFORMES

- | | |
|----|---|
| | Family ANATIDAE ¹ : Ducks, Geese and Swans |
| 1 | <i>AIX galericulata</i> MANDARIN DUCK, Mandarin |
| 2 | <i>Aix sponsa</i> WOOD DUCK, Carolina Duck, North American Wood Duck |
| 3 | <i>ALPOCHEN aegyptiacus</i> EGYPTIAN GOOSE |
| 4 | <i>AMAZONETTA brasiliensis</i> ² BRAZILIAN DUCK, Lesser Brazilian Teal, Greater Brazilian Teal, Schuyll's Teal |
| 5 | <i>ANAS acuta</i> ^{3 4} PINTAIL, Common Pintail, Northern Pintail, Kerguelen Pintail, Crozet Pintail |
| 6 | <i>Anas americana</i> ⁵ AMERICAN WIGEON, Baldpate, American Widgeon |
| 7 | <i>Anas aucklandica</i> ⁶ NEW ZEALAND BROWN TEAL, Brown Teal, Auckland Island Flightless Duck, Auckland Island Teal |
| 8 | <i>Anas bahamensis</i> ^{4 7} BAHAMA PINTAIL, Bahama Duck, White-cheeked Pintail, Galapagos Pintail |
| 9 | <i>Anas bernieri</i> ⁸ MADAGASCAR TEAL, Bernier's Teal |
| 10 | <i>Anas capensis</i> CAPE TEAL, Cape Wigeon |
| 11 | <i>Anas castanea</i> CHESTNUT TEAL |
| 12 | <i>Anas clypeata</i> ⁹ SHOVELER, Northern Shoveler |
| 13 | <i>Anas crecca</i> ¹⁰ TEAL, Common Teal, European Teal, Green-winged Teal |
| 14 | <i>Anas cyanoptera</i> CINNAMON TEAL, Northern, Tropical, Andean & Borrero's Cinnamon Teals |
| 15 | <i>Anas discors</i> BLUE-WINGED TEAL |
| 16 | <i>Anas erythrorhyncha</i> RED-BILLED PINTAIL, Red-billed Teal, Red-bill |
| 17 | <i>Anas falcata</i> FALCATED TEAL, Bronze-capped Teal |
| 18 | <i>Anas flavirostris</i> ¹¹ SPECKLED TEAL, Andean Teal, Merida Teal, Chilean Teal, Yellow-billed Teal, Sharp-winged Teal |
| 19 | <i>Anas formosa</i> BAIKAL TEAL, Formosa Teal |
| 20 | <i>Anas georgica</i> ¹² YELLOW-BILLED PINTAIL, Brown Pintail, Chilean Pintail, Niceforo's Pintail, South Georgian Teal |
| 21 | <i>Anas gibberifrons</i> ¹³ GREY TEAL, Andaman Teal, East Indian, Rennell Island & Australian Grey Teals |
| 22 | <i>Anas hottentota</i> ¹⁴ HOTTENTOT TEAL |
| 23 | <i>Anas luzonica</i> PHILIPPINE DUCK |
| 24 | <i>Anas melleri</i> MELLER'S DUCK |
| 25 | <i>Anas penelope</i> ⁵ WIGEON, European Wigeon, Eurasian Widgeon |
| 26 | <i>Anas platalea</i> ⁹ RED SHOVELER, Argentine Red Shoveler |
| 27 | <i>Anas platyrhynchos</i> ¹⁵ MALLARD, Wild Duck, Hawaiian, Laysan, Mexican, Mottled & Florida Ducks |

- 28 *Anas poecilorhyncha*¹⁶ SPOTBILL DUCK, Black Duck, Spot-billed Duck, Indian, Chinese & Burma Spotbills
- 29 *Anas querquedula* GARGANEY, Garganey Teal
- 30 *Anas rhynchotis*^{9 17} BLUE-WINGED SHOVELER, Australian Shoveler, New Zealand Shoveler
- 31 *Anas rubripes*¹⁸ BLACK DUCK, North American Black Duck
- 32 *Anas sibilatrix*⁵ CHILOE WIGEON, Southern Wigeon
- 33 *Anas smithi*^{9 19} CAPE SHOVELER, South African Shoveler
- 34 *Anas sparsa* AFRICAN BLACK DUCK, Black Duck, Abyssinian & Gabon Black Ducks
- 35 *Anas specularis* BRONZE-WING DUCK, Spectacled Duck
- 36 *Anas strepera*²⁰ GADWALL, Coues's or Washington Island Gadwall
- 37 *Anas superciliosa* GREY DUCK, New Zealand Grey Duck, Pelew Island Grey Duck, Australian Black Duck
- 38 *Anas undulata* YELLOW-BILLED DUCK, Yellow-bill Duck, African & Abyssinian Yellowbills
- 39 *Anas versicolor*²¹ SILVER TEAL, Puna Teal, Northern & Southern Versicolour Teals
- 40 *Anas waigiuiensis*²² SALVADORI'S DUCK, Salvadori's Teal
- 41 *ANSER albifrons* WHITE-FRONTED GOOSE, European, Greenland & Pacific White-fronted Geese, Tule Goose
- 42 *Anser anser* GREY LAG GOOSE, Western & Eastern Greylag Geese
- 43 *Anser brachyrhynchus*²³ PINK-FOOTED GOOSE
- 44 *Anser caerulescens*^{24 25} SNOW GOOSE, Blue Goose, Greater & Lesser Snow Geese
- 45 *Anser canagicus*²⁶ EMPEROR GOOSE
- 46 *Anser cygnoides*²⁷ SWAN GOOSE, Chinese Goose
- 47 *Anser erythropus* LESSER WHITE-FRONTED GOOSE
- 48 *Anser fabalis*²⁸ BEAN GOOSE, Western, Yellow-billed, Johansen's Middendorf's, Russian, Eastern & Thick-billed Bean Geese
- 49 *Anser indicus*²⁹ BAR-HEADED GOOSE
- 50 *Anser rossii*²⁴ ROSS'S GOOSE
- 51 *ANSERANAS semipalmata*³⁰ MAGPIE GOOSE, Pied Goose
- 52 *AYTHYA*³¹ *affinis* LESSER SCAUP
- 53 *Aythya americana* REDHEAD
- 54 *Aythya australis* WHITE-EYED DUCK, Australian & Banks Island White-eyes
- 55 *Aythya baeri* BAER'S POCHARD
- 56 *Aythya collaris* RING-NECKED DUCK
- 57 *Aythya ferina* POCHARD, Common Pochard
- 58 *Aythya fuligula* TUFTED DUCK
- 59 *Aythya innotata* MADAGASCAR WHITE-EYED DUCK, Madagascar White-eye
- 60 *Aythya marila* SCAUP, Greater Scaup
- 61 *Aythya novaeseelandiae* NEW ZEALAND SCAUP, Black Teal

- 62 *Aythya nyroca* FERRUGINOUS DUCK, White-eyed Duck, Ferruginous & White-eyed Pochards
- 63 *Aythya valisineria* CANVASBACK
- 64 *BIZIURA lobata* MUSK DUCK
- 65 *BRANTA bernicla*³² BRENT GOOSE, Brant, Black Brant, Light-bellied & Dark-bellied Brent Geese
- 66 *Branta canadensis*³³ CANADA GOOSE, Cackling Goose, Richardson's Goose
- 67 *Branta leucopsis* BARNACLE GOOSE
- 68 *Branta ruficollis*³⁴ RED-BREASTED GOOSE
- 69 *Branta sandvicensis*³⁵ HAWAIIAN GOOSE, Ne-ne
- 70 *BUCEPHALA albeola* BUFFLEHEAD
- 71 *Bucephala clangula* GOLDENEYE, Common Goldeneye
- 72 *Bucephala islandica* BARROW'S GOLDENEYE
- 73 *CAIRINA moschata* MUSCOVY DUCK
- 74 *Cairina scutulata*³⁶ WHITE-WINGED WOOD DUCK
- 75 *CALONETTA leucophrys*³⁷ RINGED TEAL
- 76 *CAMPTORHYNCHUS labradorius* LABRADOR DUCK (extinct)
- 77 *CEREOPSIS novaehollandiae* CAPE BARREN GOOSE, Cereopsis
- 78 *CHENONETTA jubata* AUSTRALIAN WOOD DUCK, Wood Duck, Maned Goose
- 79 *CHLOEPHAGA hybrida* KELP GOOSE, Patagonian, Lesser-Falkland & Greater Kelp Geese
- 80 *Chloephaga melanoptera* ANDEAN GOOSE
- 81 *Chloephaga picta*³⁸ UPLAND GOOSE, Falkland Upland, Lesser Magellan & Greater Magellan Geese
- 82 *Chloephaga poliocephala* ASHY-HEADED GOOSE
- 83 *Chloephaga rubidiceps* RUDDY-HEADED GOOSE
- 84 *CLANGULA hyemalis* LONG-TAILED DUCK, Oldsquaw, Old Squaw
- 85 *COSCOROBA coscoroba* COSCOROBA SWAN
- 86 *CYANOCHEN cyanopterus* ABYSSINIAN BLUE-WINGED GOOSE, Blue-winged Goose
- 87 *CYGNUS atratus* BLACK SWAN
- 88 *Cygnus buccinator*^{39 40} TRUMPETER SWAN
- 89 *Cygnus columbianus*^{39 41} WHISTLING SWAN, Bewick's Swan, Jankowski's Swan, Eastern Bewick's Swan
- 90 *Cygnus cygnus*³⁹ WHOOPER SWAN
- 91 *Cygnus melanocoryphus* BLACK-NECKED SWAN
- 92 *Cygnus olor* MUTE SWAN, White Swan
- 93 *DENDROCYGNA arborea* BLACK-BILLED WHISTLING DUCK, Cuban Tree Duck, West Indian Duck, Black-billed & West Indian Tree Ducks
- 94 *Dendrocygna arcuata* WANDERING WHISTLING DUCK, Water Whistle Duck, Whistling & Spotted Tree Ducks
- 95 *Dendrocygna autumnalis* RED-BILLED WHISTLING DUCK, Black-bellied Tree or Whistling Duck, Red-billed Tree Duck
- 96 *Dendrocygna bicolor* FULVOUS WHISTLING DUCK, Fulvous Tree Duck
- 97 *Dendrocygna eytoni* GRASS WHISTLING DUCK, Grass Whistle Duck, Plumed or Eyton's Whistling or Tree Duck
- 98 *Dendrocygna guttata* SPOTTED WHISTLING DUCK, Spotted Tree Duck

- 99 *Dendrocygna javanica* LESSER WHISTLING DUCK, Whistling Teal, Indian Whistling Duck, Javan Tree Duck
- 100 *Dendrocygna viduata* WHITE-FACED WHISTLING DUCK, White-faced Tree Duck
- 101 *HETERONETTA atricapilla* BLACK-HEADED DUCK
- 102 *HISTRIONICUS histrionicus* HARLEQUIN DUCK, Harlequin
- 103 *HYMENOLAIMUS malacorhynchus* BLUE DUCK, Mountain Duck
- 104 *LOPHONETTA specularioides*⁴² CRESTED DUCK, Patagonian & Andean Crested Ducks
- 105 *MALACORHYNCHUS membranaceus* PINK-EARED DUCK
- 106 *MARMARONETTA angustirostris*⁴² MARBLED TEAL, Marbled Duck
- 107 *MELANITTA fusca*⁴³ VELVET SCOTER, White-winged Scoter
- 108 *Melanitta nigra*⁴⁴ COMMON SCOTER, Black Scoter
- 109 *Melanitta perspicillata* SURF SCOTER
- 110 *MERGANETTA armata*⁴⁵ TORRENT DUCK, Peruvian, Colombian & Bolivian Torrent Ducks
- 111 *MERGUS albellus*⁴⁶ SMEW
- 112 *Mergus australis* AUCKLAND ISLAND MERGANSER (extinct)
- 113 *Mergus cucullatus*⁴⁷ HOODED MERGANSER
- 114 *Mergus merganser* GOOSANDER, Common Merganser, American Merganser, Asiatic Goosander
- 115 *Mergus octosetaceus* BRAZILIAN MERGANSER
- 116 *Mergus serrator* RED-BREASTED MERGANSER
- 117 *Mergus squamatus* CHINESE MERGANSER
- 118 *NEOCHEN jubata* ORINOCO GOOSE
- 119 *NETTA erythroptalma*⁴⁸ SOUTHERN POCHARD, African Pochard, South American Pochard
- 120 *Netta peposaca*⁴⁹ ROSY-BILLED POCHARD, Rosy-bill
- 121 *Netta rufina* RED-CRESTED POCHARD
- 122 *NETTAPUS auritus* AFRICAN PIGMY GOOSE, Pygmy Goose
- 123 *Nettapus coromandelianus* WHITE PIGMY GOOSE, White-quilled Pygmy Goose, Cotton Teal, Cotton, Indian or Australian Pigmy Goose
- 124 *Nettapus pulchellus* GREEN PIGMY GOOSE
- 125 *OXYURA australis* BLUE-BILLED DUCK, Australian Blue-billed Duck
- 126 *Oxyura dominica*⁵⁰ MASKED DUCK
- 127 *Oxyura jamaicensis*⁵¹ RUDDY DUCK, North American, Colombian & Peruvian Ruddy Ducks
- 128 *Oxyura leucocephala* WHITE-HEADED DUCK, White-headed Stiff-tail
- 129 *Oxyura maccoa* MACCOA DUCK, African Maccoa Duck
- 130 *Oxyura vittata*⁵² ARGENTINE RUDDY DUCK, Lake Duck
- 131 *PLECTROPTERUS gambensis* SPUR-WINGED GOOSE, Black Spur-winged Goose
- 132 *POLYSTICTA stelleri*⁵³ STELLER'S EIDER
- 133 *PTERONETTA hartlaubi* HARTLAUB'S DUCK, Eastern & Western Hartlaub's Ducks
- 134 *RHODONESSA caryophyllacea* PINK-HEADED DUCK (probably extinct)

135	<i>SARKIDIORNIS melanotos</i> ⁵⁴	COMB DUCK, Knob-billed Goose, Knob-bill, South American Comb Duck
136	<i>SOMATERIA fischeri</i> ⁵⁵	SPECTACLED EIDER, Fischer's Eider
137	<i>Somateria mollissima</i>	EIDER, Common, European, Northern, Pacific, American & Faeroe Eiders
138	<i>Somateria spectabilis</i>	KING EIDER
139	<i>STICTONETTA naevosa</i>	FRECKLED DUCK
140	<i>TACHYERES brachypterus</i>	FALKLAND STEAMER DUCK, Falkland Flightless Steamer Duck
141	<i>Tachyeres patachonicus</i> ⁵⁶	FLYING STEAMER DUCK
142	<i>Tachyeres pteneres</i> ⁵⁶	FLIGHTLESS STEAMER DUCK, Magellan Flightless Steamer Duck
143	<i>TADORNA cana</i> ⁵⁷	CAPE SHELDUCK, South African Shelduck
144	<i>Tadorna cristata</i> ⁵⁸	CRESTED SHELDUCK (extinct)
145	<i>Tadorna ferruginea</i> ⁵⁷	RUDDY SHELDUCK
146	<i>Tadorna radjah</i>	BURDEKIN DUCK, Moluccan, Black-backed, Australian & Red-backed Radjah Shelducks, White-headed Shelduck
147	<i>Tadorna tadorna</i>	SHELDUCK, Common Shelduck
148	<i>Tadorna tadornoides</i> ⁵⁷	AUSTRALIAN SHELDUCK, Mountain Duck
149	<i>Tadorna variegata</i> ⁵⁷	PARADISE DUCK, New Zealand Shelduck
150	<i>THALASSORNIS leuconotus</i>	WHITE-BACKED DUCK, African & Madagascar White-backed Ducks

Notes

- 1 based mainly on Johnsgard, 1965, Handbook of waterfowl behaviour, London, pp. 352-354, with modifications from Voous 1973, Ibis, 115, pp. 620-621 and other sources;
- 2 often formerly placed in genera *Anas* or *Nellion*;
- 3 includes *A. a. eatoni* (Kerguelen or Eaton's Pintail) and *A. a. drygalskii* (Crozet Pintail), often regarded as a distinct species;
- 4 formerly placed in genus *Dafila*;
- 5 formerly placed in genus *Mareca*;
- 6 includes *A. a. aucklandica* (Auckland Island Teal) which formerly was placed in genus *Nesonetta*, and often formerly regarded as a distinct species from *A. a. chlorotis* (New Zealand Brown Teal) and *A. a. nesiotis* (Campbell Island Teal);
- 7 includes *A. b. galapagensis* (Galapagos Pintail), formerly regarded as a distinct species;
- 8 possibly best treated as a subspecies of *A. gibberifrons*;
- 9 formerly placed in genus *Spatula*;
- 10 includes *A. c. carolinensis* (Green-winged Teal), sometimes regarded as a distinct species;
- 11 includes *A. f. andium* (Andean Teal) and *A. f. altipetens* (Merida Teal), which may together constitute a distinct species;
- 12 includes *A. g. georgica* (South Georgia Pintail), *A. g. niceforoi* (Niceforo's Pintail) and *A. g. spinicauda* (Chilean or Brown Pintail), sometimes regarded as three distinct species;
- 13 includes *A. g. albogularis* (Andaman Teal), formerly regarded as a distinct species;
- 14 formerly known as *A. punctata*;
- 15 includes *A. p. laysanensis* (Laysan Duck), *A. p. wyvilliana* (Hawaiian Duck), *A. p. diazi* (Mexican Duck) and *A. p. fulvigula* (Mottled or Florida Duck), all of which were formerly regarded as distinct species; *A. oustaleti* (Marianas or Oustalet's Duck) is probably a population of hybrids between *A. platyrhynchos* and *A. superciliosa*;
- 16 includes *A. p. zonorhyncha* (Chinese Spotbill), sometimes formerly regarded as a distinct species;
- 17 includes *A. r. variegata* (New Zealand Shoveler), sometimes formerly regarded as a distinct species;
- 18 sometimes formerly regarded as a subspecies of *A. platyrhynchos*;
- 19 formerly known as *Spatula capensis*;
- 20 formerly placed in genus *Chaulelasmus*; includes the extinct *A. s. couesi* (Coues's or Washington Island Gadwall), formerly regarded as a distinct species;
- 21 includes *A. v. puna* (Puna Teal), which may be a distinct species;
- 22 formerly placed in genus *Salvadorina*;
- 23 perhaps best regarded as a subspecies of *A. fabalis*, although Voous (1973, Ibis, 115, p. 620) and some other authors prefer to keep it separate; its treatment is largely a matter of convenience rather than of taxonomic assessment, and it is perhaps most convenient to afford it specific status;
- 24 formerly placed in genus *Chen*;
- 25 includes *A. c. caerulescens* (Blue Goose) and 'hyperboreus' (Lesser Snow Goose), now regarded as colour-phases, but formerly considered distinct species; also includes *A. c. atlantica* (Greater Snow Goose), which was formerly regarded as a distinct species;
- 26 formerly placed in genus *Philace*;

- 27 formerly placed in genus *Cygnopsis*;
 28 *A. neglectus* (Sushkin's Goose) is probably a rare colour-phase of *A. fabalis*;
 29 formerly placed in genus *Eulabeia*;
 30 commonly separated from the other Anatidae in a subfamily Anseranatinae;
 31 genus formerly known as *Nyroca*;
 32 includes *B. B. nigricans* (Pacific Brent Goose or Black Brant), sometimes regarded as a distinct species;
 33 includes *B. c. hutchinsii* (Cackling or Hutchins's Goose) and other small forms that have sometimes been regarded as distinct species;
 34 sometimes formerly placed in genus *Rufibrenta*;
 35 formerly placed in genus *Nesochen*;
 36 formerly placed in genus *Asarcornis*;
 37 often placed in genus *Anas*;
 38 includes *C. p. leucoptera* (Falkland Upland or Lesser Magellan Goose), formerly regarded as a distinct species; *C. dispar* is an old name for *C. p. picta*;
 39 sometimes formerly placed in genus *Olor*;
 40 commonly regarded as a subspecies of *C. cygnus*, which it may well be, but separated here following Voous (1973, Ibis, 115, p. 620);
 41 includes *C. c. bewickii* (Bewick's Swan) which with *C. c. jankowskii* (Janowski's or Eastern Bewick's Swan) was often formerly regarded as a distinct species;
 42 sometimes placed in genus *Anas*;
 43 includes *M. f. deglandi* (American White-winged Scoter) and *M. f. stejnegeri* (Asiatic White-winged Scoter), which have sometimes been regarded as one or two distinct species;
 44 formerly placed in genus *Oidemia*; includes *M. n. americana* (American Black Scoter) which has occasionally been regarded as a distinct species;
 45 includes *M. a. colombiana* (Colombian Torrent Duck), *M. a. leucogenys* (Chilean Torrent Duck) and *M. a. armata* (Peruvian Torrent Duck); formerly regarded as three distinct species;
 46 formerly placed in genus *Mergellus*;
 47 formerly placed in genus *Lophodytes*;
 48 often formerly placed in genera *Nyroca* or *Aythya*;
 49 formerly placed in genus *Metopiana*;
 50 formerly placed in genus *Nomonyx*;
 51 includes *O. j. ferruginea* (Peruvian Ruddy Duck), formerly regarded as a distinct species, but *O. j. andina* (Colombian Ruddy Duck) is intermediate;
 52 has been regarded as conspecific with *O. j. ferruginea*, but breeds alongside this form locally;
 53 sometimes placed in genus *Somateria*;
 54 includes *S. m. sylvicola* (= *S. m. carunculata*) (South American or American Comb Duck), sometimes regarded as a distinct species;
 55 formerly placed in genera *Lampronetta* or *Arctonetta*;
 56 formerly regarded as conspecific with *T. brachypterus*;
 57 formerly placed in genus *Tadorna*;
 58 formerly placed in genus *Pseudotadorna*.

Family ANHIMIDAE¹: Screamers.

- 1 *ANHIMA cornuta* HORNED SCREAMER.
 2 *CHAUNA chaviara* NORTHERN SCREAMER, Black-necked Screamer.
 3 *Chauna torquata* SOUTHERN SCREAMER, Crested Screamer.

Note

- 1 follows de Schauensee 1966, The species of birds of South America.

THE WHITE-COLLARED PIGEON

Columba albitorques

By CARL NAETHER (Enicino, California, U.S.A.)

Wood pigeons, usually fairly large and more or less modestly coloured birds, are found in many countries: in captivity, owing to infrequent imports, they are rarely kept. In this rather short article I want to comment briefly on the White-collared Pigeon *Columba albitorques*; also called Abyssinian Rock Pigeon. This interesting pigeon is at home in eastern Africa, where it ranges from Eritrea to central Abyssinia. According to Mackworth-Praed and Grant, authors of the substantial handbook titled AFRICAN HANDBOOK OF BIRDS, Series One, "Birds of Eastern and North-eastern Africa," Volume 1, the general behaviour of the White-collared Pigeon is quite similar to that of the European Wood Pigeon, with which no doubt many readers are fairly familiar.

The general plumage colour of the White-collared Pigeon is a bluish or blackish-slate. It derives its name from the attractive, pure white collar, which extends across the nape, from ear to ear, being widest at the back. The long pointed neck feathers are iridescent green. The sexes are alike so far as plumage colour is concerned, but the hen is slightly smaller than the cock. Young White-collared Pigeons lack the handsome green gloss of the neck feathers.

The White-collared Pigeon's preferred habitat lies in the lofty mountain gorges and plateaux, where it is accustomed to nest in rock and cliff holes. In the city of Addis Ababa it is said to associate frequently with the Speckled Pigeon in pairs or in small flocks, which, like most wood pigeons, feed on grains, green food and wild berries in season. At times quite large congregations of White-collared Pigeons descend on ripening grain fields, where their intensive foraging causes considerable damage.

Much like a typical rock pigeon, this species generally sets its more or less flimsy nesting platform of straws and sticks in half-dark, sheltered rock and cliff cavities, which are usually quite inaccessible to and difficult to locate by predators. In Addis Ababa, however, this pigeon appears to have become rather bold, if not fairly tame, nesting there in and about buildings. The usual clutch of this pigeon consists of two creamy-white eggs, which hatch in from 14 to 16 days, the time varying somewhat with climatic and other conditions. At the age of about four weeks, the young pigeons leave the nest. At first, being unable to fly well, they perch in trees not far from their nest, gradually lengthening their flights in order to accompany their parents *en route* to feeding and watering locations.

That the White-collared Pigeon is very seldom imported is evident from its being rarely found in captivity. I have made inquiries concerning its current status in American aviaries and was unable to locate this interesting pigeon in any private or other collection. Jean Delacour kept a single White-collared Pigeon for quite a number of years at Clères, France. He may have kept others but did not report any nesting of this species. My correspondence of quite some time ago with the late Professor A. Ghigi, indicated that the White-collared Pigeon as well as the Snow Pigeon *Columba leuconota* were favourites of his. He was successful in breeding both species in his extensive enclosures at Bologna, Italy. Regrettably, he did not provide any details of the nesting behaviour of either species. Should any member reading this perchance be keeping and breeding White-collared Pigeons, his detailed comments on this important phase of their behaviour in captivity would doubtless interest wild-pigeon enthusiasts.

NEWS FROM THE BERLIN ZOO

(July-September, 1975)

By HEINZ-GEORG KLÖS (Scientific Director)

Birds hatched :

15 Rheas (6 white) *Rhea americana*, 4 South African Ostriches *Struthio camelus australis*, 4 Black-necked Swans *Cygnus melanocoryphus*, 3 Black Brent Geese *Branta bernicla orientalis*, 1 Barnacle Goose *Branta leucopsis*, 1 Common Shelduck *Tadorna tadorna*, 2 Ruddy Shelducks *Tadorna ferruginea*, 3 Egyptian Geese *Alopochen aegyptiacus*, 3 Abyssinian Blue-winged Geese *Cyanochen cyanopterus*, 1 Oystercatcher *Haematopus ostralegus*, 10 Chilean Flamingos *Phoenicopterus r. chilensis*, 1 Andean Flamingo *Phoenicoparrus andinus*, 2 Eastern Wild Turkeys *Meleagris gallopavo silvestris*, 3 Ocellated Turkeys *Agriocharis ocellata*, 1 Olive Pigeon *Columba aquatrix*, 1 Laughing Dove *Streptopelia senegalensis*, 1 Crested Quail Dove *Geotrygon versicolor*, 3 Barn Owls *Tyto alba*, 3 Laughing Kingfishers *Dacelo gigas*, 2 Fairy Bluebirds *Irena puella*, 1 Greater Hill Mynah *Gracula religiosa intermedia*.

New arrivals :

6 Guano Cormorants *Phalacrocorax bougainvillei*, 2 Ruffs *Philomachus pugnax*, 2 Lapwings *Vanellus vanellus*, 1 Allen's Gallinule *Porphyryla alleni*, 3 Grey-backed Trumpeters *Psophia crepitans*, 12 American Flamingos *Phoenicopterus r. ruber*, 1 Red-crested Wood Partridge *Rollulus roulroul*, 2 Japanese Quail *Coturnix coturnix japonica*, 2 Painted Quail *Excalfactoria chinensis*, 3 Vulturine Guinea-fowl *Acryllium vulturinum*, 1 Mikado Pheasant *Syrmaticus mikado*, 2 Wood Pigeons *Columba p. palumbus*, 4 Crested Pigeons *Ocyphaps lophotes*, 1 Kestrel *Falco t. tinnunculus*, 1 Cockatiel *Nymphicus hollandicus*, 1 Green Hanging Parrot *Loriculus exilis*, 1 Brown-headed

Parrot *Poicephalus senegalus*, 2 Canary-winged Parrakeets *Brotogeris versicolor chiriri*, 2 Tawny Frogmouths *Podargus strigoides*, 2 Rhinoceros Hornbills *Buceros rhinoceros*, 2 Pied Barbets *Tricholaema leucomelana*, 1 Scarlet Cock of the Rock *Rupicola peruviana*, 1 Golden-fronted Chloropsis *Chloropsis aurifrons*, 1 Yellow-bellied Leiothrix *Leiothrix luteus*, 1 Indian White-eye *Zosterops palpebrosa*, 2 Siskins *Carduelis spinus*, 1 Goldfinch *Carduelis c. carduelis*, 2 Hawfinches *Coccothraustes coccothraustes*, 2 Red-billed Weavers *Quelea qu. quelea*, 2 Piping Crows *Gymnorhina tibicen*.

THE BREEDING OF SNOWY OWLS

In 1958 we received a female Snowy Owl from Hagenbeck and a male from Copenhagen in the following year. They soon settled down in their spacious aviary which is 6 m. long, 3 m. wide and 3.20 m. high. At the back is a natural rocky wall where the owls prefer to sit; a large wooden nesting box is fastened there but has never been used for nesting by the birds. At the base of the wall water is permanently running into a small pool and perches are fixed into the sandy soil. In the third year after the male's arrival the birds scraped a hollow in the front corner of their enclosure and in the second half of May four eggs were laid. After 32–34 days the four chicks hatched—at the end of June, 1962—and during the following years the owls have nested regularly, except for 1973 when they did not breed. In 1966 the nest was destroyed when the waste-pipe of the pool was blocked and the aviary flooded. This clutch had been the largest of all; it consisted of nine eggs—in the wild the number of eggs varies between three and ten or more per clutch. All the other clutches from our pair have been smaller, *i.e.* two of 2, three of 3, three of 4, two of 5, one of 6 and one of 7 eggs. The eggs are laid at an interval of one to 2½ days. From the literature we know that the main nesting period is from the middle until the end of June, but our Snowy Owls have nested from mid-April to mid-May and the chicks have hatched from mid-May to mid-June, most of them at the end of May. During nesting time only white mice and rats are given to the birds, about five mice for each young bird and two rats for the parents per day. Altogether 48 Snowy Owls have been bred: 47 have been sold to other zoos and one female has been kept and is mated to a male from Osnabruck, but the pair have not yet started to breed.

NEWS AND VIEWS

Writing to M. Delacour from Jalisco, Mexico, Mr. Jack A. Taylor says: We have three Horned Guans *Oreophasis derbianus*, two of them obtained as eggs from a nest in the area of the Volcano de Tacana in Chiapas, Mexico, and the other as a chick. The eggs were flown here under broody hens and actually started to hatch on the trip. The chicks were fed on mealworms, fruit, large amounts of lettuce and alfalfa and the lettuce is still one of their favourite foods. The nest was in a tree and was hollowed out of the plants growing on and around the trunk. In your book *CURASSOWS AND RELATED BIRDS* it is stated that the nest of the Horned Guan had never been recorded and it was not known if the birds nested in trees or on the ground. This nest was high above the ground and the area where it was found is at an altitude of some 11,000 feet.

Of the Highland Guan *Penelopina nigra* we have obtained pairs of wild birds, the first being adult and the others chicks; we have also raised a number of them in 1974 and 1975. We have not found them difficult to rear; the diet consisted mainly of fruit, grain, green food and game bird feed. The chicks that we raised last year are now starting to lay.

* * *

Mr. P. Duijzend, a member of the Society since 1927, writes from Leersum, Holland, to say that a female South African Shelduck *Tadorna cana* which he acquired in 1928 died in June this year. It was one of 15 which his father imported from Pretoria; some were sent to Clères and the rest kept by Mr. Duijzend and successfully bred from. This original female survived the war and other vicissitudes including blindness in her old age and Mr. Duijzend wonders whether 47 years is a longevity record for this species.

* * *

Professor Carl Naether writes: In July I had the pleasure to visit Mr. Guy Hughes who maintains what is perhaps the largest and most varied collection of foreign doves and pigeons in California, if indeed not in the United States. Spread out over a number of acres, the aviaries are located on the outskirts of the town of Colton, approximately 40 miles east of Los Angeles.

Mr. Hughes keeps numerous pairs of Barbary (Ringneck) Doves in small cages solely for the purpose of hatching the eggs and rearing the young of those rare species which fail to brood their own and in addition to the common and white varieties, I saw those with splashed (black and white), pink and even frilled-feathered plumages. Of the less common foreign species there were Luzon and Bartlett's Bleeding Heart, Common and Brush Bronzewing, Australian Crested, Partridge Bronzewing, Tambourine, Blue- and Green-spotted Wood Doves, Plumed Doves, Wonga, Nicobar and Crowned Pigeons and very many

more species. These are housed in separate very spacious enclosures with no solid shelters. They are fed on various small grains; also milo corn and popcorn, and in place of live mealworms the birds are given chopped cheese and hard-boiled egg, which protein rich food is much relished. Needless to say Mr. Hughes is a most successful breeder of foreign doves and pigeons.

* * *

Mats Tell, writing from Ljungbyhed, Sweden, says: Most Swedish aviculturists have, like myself, very few young birds this year, while others have had excellent results. I bred four Virginian Cardinals, two Silver-eared Mesias, two Sun Conures, two Crimson-winged and 14 Bourke's Parrakeets. There were no Aymara Parrakeets; one pair had infertile eggs and the second hatched only one chick and let it die. The Turquoise Parrakeets had fertile eggs that did not hatch and Lesser Patagonian Conures did not breed. Birds bred in Sweden during 1975 include *Emblema picta*, Fawn-breasted Waxbills, Bolivian Yellow-bellied Tanagers *Tangara boliviana mexicana* and Purple Glossy Starlings, Red-masked Conures *Aratinga erythrogenys*; Meyer's and Double Yellow-headed Amazon Parrots have also been bred.

* * *

A very successful breeding season of the Wildfowl Trust's Slimbridge collection includes the laying of fertile eggs by 1974 bred White-headed Ducks *Oxyura leucocephala*—not a single instance, but by five 10-month-old females. The age at which the wild White-headed Duck begins to breed is, like that of so many birds, not known.

* * *

The Annual Report for 1974 of the Norfolk Wildlife Park records the breeding to the third generation of both the Stone Curlew *Burhinus oedicephalus* and the Wheatear *Oenanthe oenanthe*. There can be few insectivorous passerine birds that have been bred even to the second generation in captivity—or any other of the seven species of *Burhinus* either.

* * *

On a page of very interesting avicultural news in the Wildfowl Trust's September 1975 Bulletin, Dr. Kear suggests that possibly the choice of nesting site in waterfowl could be influenced by where the birds themselves were hatched, those from incubators having perhaps no particular taste in the matter. It would presumably be even more likely in the nidicolous than in the nidifugous and it would be interesting to know for instance whether House Sparrows raised in usurped House Martins' nests themselves prefer House Martins' nests in which to breed.

* * *

Sgnr. Bertagnolio writes to say that after a number of years the Egyptian Vulture *Neophron percnopterus* is again breeding (a single

pair) in the Tolfa Mountains to the north of Rome.

* * *

Writing from Westlake, Ohio, Mrs. Rose T. McManamon says that a tame Cockatiel, hatched in April 1952 has recently died. The bird lived in her house and was able to come and go from the cage as it wished. In addition to talking and singing, it performed some tricks and was "house-trained". It appears as if 23 years, 4 months and 20 days must be a longevity record for the Cockatiel.

* * *

Dr. Pierre Lamoure has bred the Violet-eared (or Sparkling Violet-eared) Hummingbird *Colibri coruscans* in his aviaries at Saint-Péray, France, two young ones being reared.

* * *

The Red-headed Barbets depicted in the July-September Magazine were drawn from life by Mr. R. David Digby.

* * *

M.H.H.

REVIEWS

FLAMINGOS. Edited by JANET KEAR and NICOLE DUPLAIX-HALL.

Berkhamsted. T. & A. D. Poyser, (1975). Pp. 246. Seven colour and 48 monochrome illustrations. Price £8 net.

This excellent book results from, and forms the Proceedings of, an international Symposium held at the Wildfowl Trust in 1973 and also sponsored by the ICBP, IWRB and INTERNATIONAL ZOO YEARBOOK. The erudite and informative introduction by Sir Peter Scott, is followed by sections on populations, ecology and conservation of flamingos, flamingos in captivity, ethology and taxonomy of flamingos and flamingo physiology. The chapters are by 30 authors of varying disciplines from many parts of the world. Though all the sections will be of great interest to aviculturists, that on flamingos in captivity will be particularly useful. This contains valuable papers on capture, hand-rearing, and the breeding requirements of flamingos and accounts of the experiences in the Copenhagen and Basle Zoos. It is a pity that the paper by S. T. Johnstone "Breeding Flamingos at Slimbridge" published in the AVICULTURAL MAGAZINE (May/June 1973, Vol. 79, No. 3) was probably too recent to be included in the bibliography, as this is one of the best articles of its kind that has ever been published in the Magazine, and one that would be of great value to any potential breeder of flamingos.

The Editors are to be congratulated on the content and presentation of this outstanding contribution to the knowledge of this remarkable group of birds.

P. B-S.

FINCHES AND OTHER SEED-EATING BIRDS. By ROBIN L.

RESTALL. London. Faber & Faber (1975). Pp. 333. One col. pl., 32 photos and 159 drawings. Price £7.

In this excellent book the author deals with all species of the families Emberizidae, Fringillidae, Estrildidae and Ploceidae that are at all likely to be obtainable by aviculturists in Britain or Europe. Indeed, a few species that are hardly likely to be are, wisely in my opinion, included where, as in the case of the bullfinches, discussion of the nearest relatives is of particular interest in connection with a popular and widely kept species. In all about 350 species are described, many of them illustrated by attractive black and white sketches by the author. There is a coloured plate, also by him, showing the heads of adult males of 21 species of the genus *Serinus*.

Each family, subfamily and group of species within it is discussed and then follows the list of species, each of which is described and, where known, its needs in captivity indicated. The author has, wisely, not in general tried to make bird-keeping sound simpler and less troublesome than it must inevitably be if birds more demanding than Bengalese or Barbary Doves are to be adequately cared for. He has also been careful to state that in some cases his own experiences have been different from those of others. He appends a list of species that have been bred in captivity *and* recorded in British literature. In this list the reviewer, with somewhat mixed feelings, finds himself not only credited with the breeding of those waxbills with which he succeeded, but with two—Jameson's Firefinch and Black-crowned Waxbill—with which he did not!

Obviously no book is flawless : there is a list and useful discussion of some books and periodicals likely to be of interest to aviculturists, but it seems a pity that no references are given of the works of some of the German ornithologist-aviculturists, especially Nicolai's publications on parasitic whydahs, estrildids and the Bullfinch. Most of us will disagree with points here and there and may suspect that the peacefulness of some of the author's birds may have been due to their not having come fully into breeding condition. In the caption of the serin plate, row three is omitted and rows four and five wrongly captioned as three and four. It is, however, always easier to criticise a good book than to write even a bad one. This is decidedly a good book and not expensive as present day prices go. It can be warmly recommended to all aviculturists.

D.G.

CORRESPONDENCE

HATCHING WATERFOWL EGGS BY INCUBATOR

Major Fletcher's letter in the July-September Magazine really asks whether it is necessary for eggs of waterfowl to be cooled during their incubation. The literature I consulted was extremely vague, unless one accepted the traditional practice as proven fact. Therefore, as this is a particularly interesting subject, I telephoned the two major hatcheries in the U.K., thinking that any worthwhile commercial enterprise raising tens of thousands of ducks for the table would have to be conversant with most modern theory and practice of hatching waterfowl eggs.

From my conversations it appears that, although it still may be observed in some Continental hatcheries to purposely cool eggs, this is not now done in Britain. Both hatcheries supply continual warmth to their eggs and, exactly as with poultry, the greatest success of all comes when the incubator is filled to its maximum capacity and when a previous hatch, or series of hatches, have preceded it. This ideal state is therefore one which supplies a continual non-varying temperature. Therefore the bigger the incubator and the more heat-retaining its contents the better, for in these circumstances a good stable temperature is held. They have found by experiment that cooling waterfowl eggs reduces their hatchability.

The greatest cause of loss was by bacterial contamination created by dirty egg-shells. Therefore, to reduce this pollution, eggs intended for incubation should, if possible, be removed from the nest as laid: one person said that a delay of two or three hours was unnecessarily long. When collected, the eggs are dipped into an "egg-disinfectant" before storing. Unlike poultry, the eggs of waterfowl do not keep particularly long (seven days was quoted as a maximum period for storage); after this time embryonic deaths rapidly rise. Because these were both commercial hatcheries neither would let me have precise figures, although both admitted that hatching was as high as for poultry under good management which is, as I know, 85% or even higher.

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GEO. A. SMITH

LOVEBIRDS IN EAST AFRICA

I was most interested to read Mr. M. Ellis's comments upon my letter "Introduced Lovebirds in Mombasa" in the January/March issue of the Magazine.

Although during my visit to the coast of Kenya I did see "literally hundreds" of Fischer's Lovebirds *Agapornis fischeri* on no single occasion did I ever observe more than a flock of 30 to 40 and therefore, I hasten to say, in case my letter has been misinterpreted, they were never seen in a flock of anything like a hundred birds at any one time. The "hundreds" mentioned were seen along several miles of coast—perhaps it was the same colony I saw over and over again, but I do not think so.

For the last 20 years or more I have maintained a small liberty flock of Fischer's, varying between a dozen or 20 birds, and I do know they never stray very far from their aviary; I have seen them towards a mile away, but never further and am under the impression that they are a bird that does not wander far away from home territory.

On a previous visit to East Africa in 1970 I was fortunate to see a few pairs of Fischer's Lovebirds in one of the Game Parks—I think the Serengeti in Tanzania, but am not certain as I have mislaid my notes of that visit.

During a day spent in 1974 on Lake Naivasha observing the water birds, I did see a couple of lovebirds and definitely identified them as Masked *Agapornis personata* or Yellow-collared as they are known in that locality. The game ranger with us at the time also saw them, agreed they were *A. personata* and said I was lucky to have seen them as they were not a common species around Naivasha.

Applegarth
Singleton,
Lancashire

J. C. BARLASS

THE TRADE IN WILD BIRDS

No member of our Society can by now not know something of what the international trade in wild birds involves, and we must all have thought about our part in it. There are two issues: the moral—are we justified in inflicting suffering and death during transit on rather large numbers of birds so that we may enjoy their beauty and satisfy our curiosity by their study, in our aviaries? and the practical—how do we balance the possibility that we may be assisting in the extermination of rare species against the possibility that we may assist in their preservation by conserving a breeding nucleus in captivity? I believe there is no absolute answer to either the moral or the practical question and find it hard to agree with those who are convinced that the trade is altogether wrong and should be banned outright, or with those who wish to keep it as free as it has been in the recent past.

However, one cannot ignore the simple fact that the increase in demand for exotic birds in recent years has occurred at a time of greatly increased pressure on wild bird populations in the tropics for other reasons; I do not believe that even the greatest optimist could contend that the arguments of Frith (1974), Martin (1973) and Yealland (1974), writing in our Magazine on the effects of culling wild bird populations, are groundless. So, I find it very odd that our Society should appear to take no part in the activity now in hand internationally to regulate the trade. We are, after all, the group of people whose interests are perhaps most immediately concerned; we should be among those with the greatest experience in the techniques of shipping birds by air, and we are a Society of international membership with a voice in many countries.

It seems to me that there is also a possibility that as a Society we could, at this point in time, play a practical and progressive role and I propose that our President and Council take the initiative on our behalf. What I propose is that they should give immediate support to the Royal Society for the Protection of Birds in their campaign for the regulation of the trade.

I imagine that most members would support—at least in general terms—the main recommendations which the RSPB has recently put to the British Government. For those not familiar with them, they are essentially as follows: that the Government is urged at once to ratify the 1973 Washington Convention on Endangered Species, that limits should be set on the importation of birds likely to suffer high mortality in transit and that all birds should enter in properly labelled containers and only through a few, professionally staffed reception centres. Are there any members of our Society unable to support these recommendations? I doubt it, so let our President and Council offer the RSPB our support without delay.

As Jean Delacour reminded us in his article in our 75th anniversary supplement in 1969 “Innumerable species, which have never before been seen outside of their native countries . . . are frequently exported in numbers—in fact, they have been captured too much; the early losses have been tremendous by lack of careful and knowledgeable handling and restriction of such activities is urgently needed”. Indeed it is! It is intolerable that six years after Delacour wrote those lines our Society has taken no action to support or advise those organisations which are taking some steps in the right direction. If we wish to retain any credibility as responsible students of birds, we can no longer stand aside. Let us take at least the modest step I have proposed without any further delay or debate: our longer term response to the situation can then be worked out at our meetings with more leisure.

ALAN R. LONGHURST

Heckwood
Sampford Spinney
Yelverton, Devon

Council has recently been co-operating with the RSPB in this matter and will continue to do so.—*Ed.*

THE SMUGGLING OF RARE AUSTRALIAN PARROTS

As an aviculturist I was indeed pained, though not surprised, to read of the tragic fate that overtook the 14 rare parrakeets being smuggled out of Australia in January 1975. I do not think the supposed high prices of Australian parrots in Europe have been exaggerated and I fear that the smuggling with its attendant suffering and losses will continue despite the increased penalties.

However, people who know Australian parrots, those in Australia in particular, must be aware that the Hooded and Golden-shouldered Parrakeets do well in captivity and I saw, while on a trip to Europe in 1971, both of these breeding prolifically in avicultural establishments in Holland and Switzerland, so while I deplore the fact that these two beautiful parrots are, through aviculture, having their numbers depleted in the wild state, I am grateful that they appear to have a fairly secure position in aviculture today and that in the future it might even be possible to reintroduce them to the wild state from our aviary supplies should they be lost through factors like drought, deforestation for agriculture, an inability to adapt to change and the like. I regard the true aviculturist, as distinct from the mere collector, as the aider, not the enemy of the conservationist. It is even perhaps arguable that, had the present day "know how" in aviculture existed at the turn of the century, the closely related Paradise Parrot might have been propagated successfully under controlled conditions. I have never seen aviculture listed as one of the causes of the decline of this parrot and do not know of any species that has actually been made extinct through trapping for aviculture, but species like the Nene or Hawaiian Goose and one or two species of pheasant have virtually been saved by aviculture. By no means do I condone the activities of the smugglers, but I feel that the efforts of the Fauna Squad could possibly be directed towards ensuring that a strictly controlled number of the rare parrakeets, properly trapped and handled, be made available from time to time to provide the beneficial new blood for the aviary-bred strains both in Australia and overseas. In South Africa the Transvaal Provincial Administration had enough foresight in 1966 to build a special fauna station near Pretoria where certain suitable species, trapped only in the right season by departmental officials, are correctly housed until adjusted to aviary life. These birds are then made available under permit to genuine aviculturists after their aviaries have been inspected. A moderate charge is made to cover costs and this station has gone from strength to strength, the number of species deemed suitable for sale to aviculturists has continually been increased and a range of experimental breeding aviaries at the station is planned for the near future. But most pleasing of all is the fact that, once a legal source of birds became available, the illegal trapping that had defied the law for decades virtually disappeared, to the inestimable benefit of all our birds.

So it would be in Australia if the Department of Conservation were to provide a limited, legal, even expensive source of birds for export. Such birds would only be trapped professionally, in strictly controlled numbers and in the right season: the numbers taken would depend on the strength of the species in the wild state as estimated at the end of each season and the rare ones perhaps only taken every other year or at even longer intervals and in very small numbers, while species unsuited to aviculture would never be trapped. The birds would be housed and exported under the best conditions and they would provide some revenue for the Department for the furtherance of its activities; also they would bolster the aviary-bred strains of Australian birds throughout the world—and the smuggler would cease to calculate his smuggling as a reasonable risk.

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F. C. BARNICOAT

OBSERVATIONS ON *Trichoglossus haematodus*, *Amazona* and *Forpus* SPECIES

Whereas I agree with much of what Mr. David Holyoak has to say about the various geographical races—subspecies—of *Trichoglossus haematodus*, I

have never been too happy about the inclusion of Weber's Lorikeet *T. h. weberi*, for although racial forms should interbreed freely with one another, this might not necessarily apply for Weber's.

Weber's Lorikeet, with its all-green colour (no intermediate forms here) and its very small size, is similar to the Perfect Lorikeet *T. euteles*; so close a resemblance that Mivart, who could never be accused of "lumping", recognised the other races of *T. haematodus* as full species but made Weber's a subspecies of *T. euteles* (MONOGRAPH OF THE LORIIDAE). In three adjacent aviaries, ideal for making comparisons, Mr. Ray Kyme of Boston, used to house the Perfect, Weber's and the Rainbow *T. h. rubritorquis* Lorikeets. I have spent several hours looking at all three and, in my opinion, Weber's seemed to have more in common with the Perfect. Mr. Kyme tells me that this holds for courtship behaviour, voice, incubation and fledging times. And my observations on the skeleton, although the physical size of the species concerned may be more relevant, substantiate this.

The Perfect Lorikeet has an extensive range and Lomblen, one of the islands in this distribution, is close by the island of Flores. The sole *Trichoglossus* on Flores is Weber's, but some of the islands the Perfect Lorikeet inhabits are shared with one of two different *T. haematodus* subspecies. The Perfect and *T. haematodus* therefore do not hybridise. Of which species unless one uncritically accepts Peters, is Weber's a subspecies? Cain is no help in this puzzlement as he totally ignored the Perfect Lorikeet in his otherwise excellent paper.

Which brings us back to the basic point, which is, who ultimately decides what is and what is not a species? A superb example concerns the widely-distributed, and therefore very variable, Yellow-fronted Amazon Parrot *Amazona ochrocephala*, the most northerly population of which is the giant-sized Double Yellow-headed Amazon *A. o. oratrix*. Away towards the other end of South America is found the Blue-fronted Amazon Parrot *A. aestiva* which differs from the nominate form of the Yellow-fronted practically by only having blue on the face. To my considerable perplexity the Blue-fronted is said to be a full species because it is isolated geographically, yet when hybridised with the Yellow-fronted the offspring are indistinguishable from the latter bird. The Double Yellow-headed when hybridised with the nominate form of the Yellow-fronted gives an intermediate-looking offspring that looks every inch a hybrid. In other words there is apparently more genetical difference between subspecies, in this case, than with the species.

Lastly, could anyone who breeds the Green-winged Parrotlet *F. xanthopterygius* observe whether their males stand with both feet on the back of the female when pairing? Signor Bertagnolio's observation, in the Magazine, concerning his pair which do so is very interesting. Exceptions to any behaviour pattern are worth recording: I had a Budgerigar which scratched its head with the left foot under the wing and the right foot over the wing, the left leg being slightly deformed. Otherwise this parrotlet is exceptional to seemingly all other American parrots, including the Celestial *F. coelestis* Parrotlet (Boorer 1964: AVIC. MAG. 70:23-24) and the Blue-rumped Parrotlet *F. cyanopygius* (pers. ob.) in that treading males retain a grasp with one foot on the perch.

GEO. A. SMITH

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ROTHSCHILD'S PARRAKEET

I have recently added to my collection a specimen of what I believe to be Rothschild's or the Intermediate Parrakeet *Psittacula intermedia*. First described by Rothschild in 1895 from a single skin, the bird was, he said, intermediate between *P. himalayana* and *P. cyanocephala*.

Dr. Biswas wrote about it in the JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY (Vol. 56, No. 3, pp. 558-562) and regarded it as a distinct species that has escaped the notice of ornithologists because of its probable localised distribution.

I think my bird is an immature male, for the wing patches are not distinct and the collar not yet fully developed. In size the bird is larger than the

Blossom-headed and smaller than the Slaty-headed with a bill measurement of 20 mm. and wing of 160 mm. The colour of the head is brighter than that of the Rosy-headed due to very little tint of lilac, but far less brightly coloured than the Blossom-headed. There is a trace of the black neck ring, but on the nape there is some reddish colour resembling somewhat that on the nape of the Rose-ring Parrakeet and below the ring there is some verdian green. The bill is larger than that in the Blossom- or Rosy-headed and of a more reddish-orange colour and the bird in general is distinctly different in colour from the Rosy-Blossom- or Slaty-headed and looks, I think, like a hybrid between Blossom-headed and Rose-ring.

SHARAD R. SANE

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Forshaw (PARROTS OF THE WORLD) says: "I have examined six specimens in the Rothschild Collection at the American Museum of Natural History: in my opinion one is almost certainly an immature specimen of *P. himalayana* and the other five, all adult males, are hybrids as suggested by Husain".—*Ed.*

BRITISH AVICULTURISTS' CLUB

Whilst fully sharing Mr. Arthur Prestwich's regret at the demise of the British Aviculturists' Club (his letter, AVICULTURAL MAGAZINE, January/March 1975) I would respectfully point out that the decision to dissolve the Club was not an arbitrary one taken by "the present régime" but the wish of the overwhelming majority of members who had been sent a questionnaire concerning their views about the Society's social activities. I count myself fortunate in having attended as a guest some very enjoyable B.A.C. dinners but the fact has to be faced that, with the soaring inflation of recent years, the cost of such an evening now would be prohibitive to most members. The Wine and Cheese parties are proving very popular with members and their guests who can spend a convivial evening with refreshments and an illustrated talk for a very modest price.

I could not let this opportunity pass without paying tribute to the great contribution which Mr. Prestwich made to the Society during his long term of office, both as founder and Secretary of the B.A.C., and as Honorary Secretary and Treasurer of the Avicultural Society. I am sure that all members would wish to thank Mr. and Mrs. Prestwich for their many years of hard work and to hope that they are enjoying a happy retirement.

MARY H. HAYNES

VISIT TO BIRDLAND

Over 70 members and their guests gathered at Birdland, Bourton-on-the-Water, on 20th September, 1975, at the invitation of the owners, Mr. and Mrs. Len Hill. The main object of the occasion was to thank Miss Phyllis Barclay-Smith, C.B.E., for editing the AVICULTURAL MAGAZINE for 34 years, and after an excellent lunch the President of the Society, Monsieur Jean Delacour, presented to Miss Barclay-Smith a cheque for £225 which had been subscribed by members of the Society. M. Delacour paid tribute to Miss Barclay-Smith's great contribution to the Magazine of which she had been the Editor for nearly half of its life, including the very difficult war years. He felt sure that all members would want to join him in thanking Miss Barclay-Smith and wishing her a long and happy retirement. In reply Miss Barclay-Smith recalled the many great aviculturists and bird collec-

tions which she had come to know during her editorship and the friendship she had received from members all over the world.

During the afternoon members were able to walk round the gardens and admire the many attractive and interesting exhibits for which Birdland has become famous.

We are most grateful to Mr. and Mrs. Hill for arranging such an enjoyable day and particularly for their generosity in donating the whole proceeds from the sale of luncheon tickets (£158) to the Society.

M.H.H.

SOCIAL MEETINGS—1976

Wine and Cheese parties will be held on 19th January, 17th May and 18th October, 1976. British Isles members will be notified of the details of these meetings by inserts in the appropriate issues of the Magazine. Overseas members are always welcome guests and if their visit to this country coincides with a meeting, they should contact me for further information.

H. J. HORSWELL,
Hon. Secretary.

ANNUAL SUBSCRIPTION—1976

The accounts to December 1974 are enclosed in this Magazine. Members will readily see that it is necessary to increase the subscription and we once again appeal to you all to increase our membership. For some time now, this Society, like all similar organisations, has been fighting a losing battle against inflation. We have resisted raising the subscription for as long as possible but, in view of the very large recent increases in printing and postage costs, Council has reluctantly decided that the cost of membership must be raised to £5.00 (U.S. \$13.00) on 1st January, 1976.

We would point out that the only costs involved in publishing and distributing the Magazine are printing and postage—the Editor and the secretarial staff give their services for nothing, and every other possible economy, however small, has already been made. We hope you will agree that the standard of the Magazine has greatly improved recently, particularly with the introduction of high quality colour plates, and that even at the increased price, the Magazine is still remarkably good value compared with similar journals. The Society is entirely dependent on Members' subscriptions, donations and advertisements for its income and we trust that we can continue to rely on your support.

Members who pay by standing order are asked to notify their banks of the increase and a form for this purpose is inserted in this Magazine, together with the subscription renewal form for members paying direct.

HON. SECRETARY AND TREASURER.

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THE AVICULTURAL MAGAZINE

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ADDRESS OF EDITOR

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NEW MEMBERS

The 57 candidates for membership in the July/September 1975 number of the AVICULTURAL MAGAZINE were duly elected members of the Society.

CANDIDATES FOR MEMBERSHIP

- MR. CHRISTOPHER ALLOWAY, The Yews, Felmingham, North Walsham, Norfolk NR28 0LA.
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- MR. S. HADDON-RIDDOCH, Blairinrash, Tullimet, Ballinluig, Perth.
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- MR. R. F. PAINE, Brean Down Bird Garden, Brean Down, Nr. Burnham-on-Sea, Somerset.
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- MR. N. RAMEN, Spar Shop, Howe Lane, Goxhill, Barrow on Humber, South Humberside.
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Large collection of Avicultural Magazines and also large collection of "Zoo Life" in first-class condition. Would exchange birds for them.

Charles Trevisick, Harbour View, Ilfracombe.

The charge for Members' advertisements from 1st January 1976 is 10p per word. Payment must accompany the advertisement, which should be sent to The Hon. Secretary, H. J. Horswell, 20, Bourdon Street, London W1X 9HX. All Members of the Society are entitled to use this column, but the Council reserves the right to refuse any advertisements they consider unsuitable.

THE AVICULTURAL MAGAZINE

BEING THE JOURNAL OF
THE AVICULTURAL SOCIETY

Edited by
J. J. YEALLAND

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JANUARY - MARCH 1976

HOOPOES

By J. DELAGOUR (Clères, Seine Maritime)

Hoopoes are very interesting and attractive birds, and are quite unlike any others. There is only one species, *Upupa epops*, widely distributed in central and southern Europe, Asia, Africa and Madagascar. The southern tropical subspecies differ only in the darker redder tone of the plumage, the absence of the pale whitish marks next to the black bars on the crest and a few other insignificant variations.

I have seen them all in the wild state and they all behave in the same way. They frequent open country and farmland in areas where there are enough old trees to provide the holes in which they nest. They walk a great deal, finding their food on the ground. It consists mostly of worms, large insects and their grubs which are found by probing the soil and vegetation, the long bills being well adapted for this purpose. They gather a good deal of their food among the droppings of domestic cattle and other large mammals.

Hoopoes are rare summer visitors in Britain and northern France and I have seen them wild at Clères on only a few occasions. Nests have been found several times in the hollows of old trees in orchards. A brood of four was brought to us in 1947: they were reared and eventually presented to Mr. Alfred Ezra at Foxwarren Park where they bred. We kept and reared a few at Clères a little later on. The dark Asiatic and African races have been kept and bred in several European and American collections.

The sexes are similar in plumage, the males being usually slightly larger and brighter in colour. In suitable countries they are fairly abundant, but they prefer those with a warm summer in the northern part of the range.

Hoopoes are excellent aviary birds, being quaint and pretty. Their undulating flight displays the beautiful barred wings and they spread

Hoopoe

Upupa epops

Drawn by D. M. Reid Henry

Plate donated by Palaquin Fine Arts, London.

and close their lovely crests as they move about. They need a large open aviary where they can walk at leisure on sand and grass. They are easy to feed on an insectile mixture, soaked dog biscuit, minced meat and insects, particularly mealworms. They nest readily if suitable hollow logs or boxes are available; they are tame and confiding and are harmless to other birds.

THE NESTING AND HAND-REARING OF THE RED-BILLED BLUE PIE

Urocissa erythrorhyncha

By PETER R. RICHARDS (Cookham Dean, Berks)

This attractive crow has been bred several times in captivity and there is a first breeding report recorded by Dr. Maurice Amsler (AVICULTURAL MAGAZINE, 1915), who lived at Eton only a few miles away from my home.

I bought a pair of rather moth-eaten birds from a dealer at the National Cage Bird Exhibition at Alexandra Palace in December 1972. They were introduced into an outside aviary 6 ft. x 12 and 6 feet high, and they settled down quickly, feeding on a diet of day old chicks (incidentally they hardly ever eat the remains of yolk, unlike my other crows), maggots, bread and turkey-rearing pellets. There is a small *Philadelphus* bush in the middle of the aviary and a sheet of corrugated polythene sheeting as protection from the worst of the weather on top.

They moulted and looked immaculate in summer of 1973. Fortunately they are members of an eastern race and have rather bluer plumage than some birds seen in captivity, and deep coral bills and legs. I had selected the largest and smallest of the birds on sale and fortunately they turned out to be a true pair. In 1973 I noticed the cock bird feeding the hen but nothing else happened: in 1974 the cock bird fed the hen regularly and in June he began to collect and carry small twigs. I hastily constructed the framework of a nest out of wire netting and fixed it in the *Philadelphus* bush and he completed a nest. The hen was induced to roost on the nest and for a while my hopes were high, but before anything happened she started moulting. In 1975 the cock continued to ply the hen with food, interest was maintained in the same nest, and building began in March. This was done entirely by the cock, and I have never seen the hen contribute to the nest-building. In spite of the cold weather (it snowed) nest-building continued; courtship seemed to consist entirely of courtship feeding, the tail being spread only in threat and aggressive displays. On the 7th April the first (white with chocolate spots) egg was laid, a second on the 8th and a third on the 10th. The nest was not

very robust and the eggs could be seen through the bottom. The hen did not sit at all tightly; in fact she only seemed to incubate when I went near their aviary during the first week. After that she sat more steadily, being fed by the cock who was not seen to incubate at all. One egg unfortunately broke, but two chicks hatched together on the 28th April (incubation time *c.* 20 days). The chicks were naked and pink but changed to grey by three days old. They were also not brooded closely except when I disturbed the hen, when she immediately went to the nest and scolded me loudly in the typical magpie chatter, her tail spread widely. Feeding was done mainly through the hen, the food being collected by the cock who passed the food to her. The chicks grew fast and by the twelfth day (9th May) they were approximately half-grown. Their heads and backs were feathered and their flight feathers were coming through; however they were surprisingly naked compared with young Rooks or Jackdaws of the same age and development. I decided at this stage to hand-rear them, which proved very easy. By seventeen days they were two-thirds grown, their heads were well feathered, the white mark of their parents was considerably more extensive, spreading over the top of the head to the base of the bill, making them look like little Badgers. They were sitting on the side of the nest by the 18th May (21 days), and they left the nest for good on the 28th May (30 days). Unfortunately a nasty yellow swelling had made its appearance on the shoulder and hip of the smaller bird at this time and a week later the larger chick developed similar lumps. At first the birds were not affected, but by the middle of June they were unable to fly and became lame as these swellings increased in size. Alas, the lumps turned out to be due to aspergillosis, a fungus disease, the spores of which my birds had inhaled somehow, perhaps from damp hay; anyway the disease progressed and they both died at the end of June aged fifty days. At this time they were fully grown, feeding well and they looked more like young European Magpies *Pica pica* than their parents; their heads were a softer black, their underparts white, backs grey and only their wings and tails, which were two-thirds grown, were blue like those of the adults: the bills and legs were flesh pink.

All was not lost, for the hen laid again nine days later, in the same rather dilapidated nest (no attempt being made to re-line it) on the 18th May, laying five eggs by the 22nd May. Incubation proceeded on the same rather unsteady lines and the first bird hatched on the 5th June, two more on the 6th (18-19 days) and another on the 7th June (18 days). The last egg was infertile. They seemed to thrive, but when I came down to feed them on the 9th June the nest was empty. On examination of the aviary there were little bits of the chicks all over the place, and I suppose the parents had eaten them. However, the hen laid another five eggs nine days later, starting on

the 17th June. These hatched between the 6th and 9th of July, one egg being clear. The nest was very dilapidated indeed by now and I was fearful that the young might fall through the bottom and when one young bird disappeared on the 13th and two more on the 14th July, I rescued the remaining chick, aged 10 days, and hand-reared it. This time I kept it well away from any straw or hay, and it has grown into a nice little bird, which at the time of writing, 25th September, is beginning to moult into adult plumage and its bill is beginning to turn coral red.

No further clutches of eggs were laid and the parents began to moult on the 7th August. At the moment the moult is almost complete and the cock is showing interest in the nest again, although I have not seen him feed the hen.

The nestlings were hand-reared on the diet supplied to the parents.

HAND-REARING GREEN WOOD HOOPoes AT THE NEW YORK ZOOLOGICAL PARK

By DONALD BRUNING and JOSEPH BELL

The Department of Ornithology

A pair of Green Wood Hoopoes *Phoeniculus purpureus marwitzi* received at the Bronx Zoo during the summer of 1970, was part of a collection of African species acquired for the huge World of Birds display, then under construction. As each of the new building's twenty-five natural habitat type settings was completed and landscaped, birds were introduced. Apart from allowing them a longer period to become established before the formal opening of the new facility (in June 1972) this procedure also provided time for the many adjustments to both the collections and the plantings of each display to achieve proper balance and to minimize various maintenance problems.

It was apparent that the wood hoopoes presented such a problem soon after they were released in a heavily planted display for African birds, early in 1971. Attracted to the host of parasitic insects on the new plantings, their constant gleaning activity resulted in serious damage, particularly to tender new leaves and buds. The problem was resolved by moving the wood hoopoes to a two-level swamp display where thick plantings of dwarf Japanese palm *Rhapsis excelsa*, bamboo palm *Chamaedorea elegans*, and the climbing aroid *Monstera deliciosa* are confined to a series of islands in a large, shallow pool that covers the floor of the exhibit. A dozen tall swamp cypress *Taxodium distichum* trunks that rise more than 11 metres to the fully skylighted roof, offered an even more fertile foraging ground than the live plants.

Cylindrical in shape, with a diameter of about 10 metres, the swamp was conceived to illustrate the nesting stratification that occurs in any type of forest: platforms and hollows are provided at every level to encourage the breeding activity of a variety of species, including Black Rails *Limnecorax flavirostra*, Sun Bitterns *Eurypyga helias*, Red-rumped Woodpeckers *Picus erythropygus* and several species of touraco (Musophagidae).

The wood hoopoes explored every cavity in their new environment. On a number of occasions it seemed almost certain that they were nesting, but on investigation no eggs were found. The only recorded captive breeding for this species was at the Winged World in 1968 (AVICULTURAL MAGAZINE 74:5:184-185) and it was hoped that this accomplishment might be repeated at the Zoological Park.

Finally in the latter part of May 1973, a keeper reported that both wood hoopoes were carrying food to a pocket on the side of one of the tree trunks, used as a container for air plants (bromeliads). Close observation revealed that they were indeed feeding a small chick. The young bird grew rapidly and ventured from the nest for the first time late in June. Although every possible precaution was taken (including draining the pool each night) the chick drowned soon after the pool was filled, on the seventh day after fledging.

Notwithstanding this tragedy, the pair was determined to nest and by September they were back on eggs.

The site chosen this time was a hollow in a dead tree branch that extended across the display just above the water's surface; easily accessible for both observation and management. Two chicks hatched on the first of October and by mid-month they could be seen regularly extending their heads from the hollow to be fed by their parents. Rather than run the risk of losing this clutch, they were removed from the nest hollow at the point when they were fully feathered and ready to fledge. Placed in a small cage equipped with a heat lamp and a nest hollow similar in size and conformation to their natal home, it was necessary to force-feed them for about ten days before they began to pick up food on their own. Daily weights of the chicks and measurement of the food offered to them were valuable tools in monitoring their progress (see chart on feeding). Both were fully grown and starting to show adult coloration in their plumage by early December.

At the same time that the young wood hoopoes became fully independent, another clutch of four eggs was discovered in the swamp's nest hollow. Unfortunately these were found broken several days later and two subsequent clutches met with the same fate.

When five eggs were discovered on 10th February, 1974, it was decided to remove them for artificial incubation. Two of these proved fertile and hatched on the 22nd and 23rd of the same month.

Averaging just over three grams at hatching, the blind, nearly naked chicks were placed in a small hollow nest, made from a section of heavy cork oak *Q. suber* bark, and kept in an incubator at a temperature of 95 degrees Fahrenheit with fairly high humidity (above 80 per cent) to avert any dehydration problems at this early stage of development. Very small pieces of newly-born white mice and bits of Gaines Dog Meal (a commercially prepared ration) were offered from the tips of forceps at intervals of two hours from seven in the morning until five o'clock in the afternoon.

The young wood hoopoes grew very rapidly, more than quadrupling their original weights during the first week and passing the 35 gram level at the end of the second (see growth rate graph). At one month of age they were feeding on their own, growing long tail feathers and generally resembling adults, only lacking bright red bills and feet, a change that does not occur until they are between six and seven months.

To date 15 Green Wood Hoopoes have been reared at the Zoological Park: four of these were hatched in an incubator. A number of other hatchlings from the very prolific breeding pair did not survive the delicate period as nestlings or subsequent "breaking-off" to independence.

Although captive management of this species is no simple task, the success achieved thus far has clearly indicated the value of the effort. Realising this, the Los Angeles Zoo has very kindly loaned a single male in their collection and space has been provided in our new off-exhibit breeding facility to attempt pairing the young birds and carry the project forward on a long term basis.

On 25th August, 1975, the 16th fledgling wood hoopoe emerged from a nest hollow in the African Jungle exhibit at the World of Birds. This was particularly significant since it is a second generation here at the zoo. The parents of this chick hatched here in October 1973 and April 1974.

GREEN WOOD HOOPOE
FEEDING SCHEDULE

<i>Days of Age</i>	<i>Times Fed Between (7 a.m. and 7 p.m.)</i>	<i>Items Fed</i>
1-5	5-6	2-4 tiny pieces of baby mouse each
6-12	6-7	2-5 pieces of baby mouse and Gaines dog meal
13-21	4-5	5-8 pieces of baby mouse and dog food, crickets and meal-worms
22-45	2-3	Eating out of food pan



W. Meng
Green Wood Hoopoes at 12 days old



W. Meng
Green Wood Hoopoe at about seven weeks old

WEIGHTS OF
HAND-REARED GREEN WOOD HOOPOE CHICKS

Day	<i>Chick No. 1</i>	<i>Chick No. 2</i>	Day	<i>Chick No. 1</i>	<i>Chick No. 2</i>
1	3.2 gms	3.1 gms	16	40.8 gms	41.5 gms
2	3.1	3.4	17	44.0	44.5
3	4.1	4.0	18	47.5	45.4
4	5.1	5.4	19	48.8	51.0
5	6.4	7.8	20	48.6	55.0
6	9.4	10.2	21	52.0	57.0
7	12.8	12.9	22	55.0	58.5
8	15.2	17.4	23	57.5	60.0
9	19.5	27.7	24	59.5	63.2
10	21.7	25.8	25	61.4	60.2
11	25.5		26		59.5
12	28.0	32.0	27	59.8	60.1
13	31.2	34.8	28	59.5	61.5
14	35.0	36.0	29	60.1	63.0
15	36.5	38.5			

* * *

NOTES ON ESTABLISHING AND BREEDING EUPHONIAS

By JOHAN INGELS (Destelbergen, Belgium), JOZEF MAROY (Maroy-Zoo, Waregem, Belgium) and ERIK NØRGAARD-OLESEN (Janderup, Denmark).

Although euphonias are imported in reasonable numbers, established pairs are rarely seen in confinement and in spite of an obvious sexual difference, breeding results have always been somewhat rare. In 1967, five Velvet-fronted Euphonias *Euphonia concinna* were reared at Winged World, Heysham and Morecambe, England (Nørgaard-Olesen, 1970). During the period 1969-71 Ingels succeeded in rearing four male and three female Purple-throated Euphonias *Euphonia chlorotica* from one pair (Ingels, 1971). In 1970, one Thick-billed Euphonia *Euphonia lanirostris* was reared at the Jersey Zoological Park (Roles, 1971). The only other species known to have been bred successfully is the Violaceous Euphonia, or so-called Violet Tanager *Euphonia violacea* (Drake, 1937; Lint, 1972).

Compared with the number of euphonias imported, these breeding results are disappointing. This could be due partly to the difficulties experienced when attempting to establish newly imported birds and partly because certain breeding activities are shared by the male and female, thus requiring both birds to be in breeding condition for some length of time (see later).

Newly imported euphonias are often heavily infected with coccidiosis and occasionally with salmonellosis, both difficult to cure in small birds. A systematic control by a veterinary laboratory of the droppings of newly imported euphonias, revealed that approximately 65% suffered from coccidiosis (Vandevijver, 1975). Whole consignments of tanagers have been struck down with salmonellosis shortly after arrival in western Europe; most of these birds became infected in their country of origin, due to being housed in infected cages (Ingels, 1974). Euphonias are most sensitive and usually are the first to succumb in mixed shipments.

On importation euphonias are also extremely sensitive to malnutrition. After their arrival, should they be kept purely on a fruit (mostly banana)—“universal” food diet, a liver disease may develop, which more often than not proves fatal.

We have had reasonable success in establishing euphonias with a food containing the following ingredients: finely chopped apple, pear, soaked currants, plus a little banana, with some grated cheese, boiled minced meat and egg, mixed with a blend of good insectile foods and multi-vitamin powder. A liberal portion of deep-frozen ant pupae and “white” mealworms is added to this mixture. As well as this softfood, a nectar mixture for nectar-feeding birds is offered.

One should avoid giving newly imported euphonias too much banana and “universal” food, or a diet with a high sugar content.

A strict control on disease by regular checking of droppings, should be maintained. It is possible to cure coccidiosis and salmonellosis by adding a drug containing sulfamezathine to the birds' nectar; the dosage being 2.25 g (approx. 35 grains) of sulfamezathine to 1 litre (approx. $1\frac{3}{4}$ pints) of nectar. The treatment should be carried out for 5 consecutive days after which a rest period of 7 days is required before again dosing the birds for a further 5 days. During the 7 day period, a polyvitamin mixture should be added to the nectar.

Even when the above treatment is carried out, sudden loss of flesh (the well-known "going light"), followed a few days later by death, is still prevalent when attempting to establish newly imported euphonias.

If an attempt at breeding is to be made, a pair should preferably be housed on their own. When mixed with larger tanagers, the stress of being continually on their guard appears to prevent them settling down and coming into breeding condition. The pair of Purple-throated Euphonias mentioned above, reared seven young within three years in a 90 m³ (approx. 3300 cubic feet), densely planted outside aviary, which they shared with a breeding pair of Golden-masked Tanagers *Tangara larvata*.

Most tanagers, including euphonias, which arrive during the summer will breed successfully only after being kept in confinement for at least a summer-winter period. Should they be brought in during the winter, they will usually attempt to breed only after a winter-summer-winter period.

Contrary to other tanager genera, both male and female euphonias share breeding activities, except for incubation and brooding which is carried out by the female only. Therefore both the male and the female need to remain in full breeding condition for a lengthy period if a breeding success is to be realised.

The sharing of breeding activities is best demonstrated by the "mutual" pre-nuptial feeding, observed in euphonias. Although male tanagers of numerous species offer food to their mates, either while they incubate or as they forage together, only in euphonias do the males sometimes accept food from their mates. This occurrence has been observed in the wild with the Tawny-bellied Euphonia *Euphonia imitans* (Skutch, 1954). In captivity, we have seen a female Orange-bellied *Euphonia xanthogaster* feeding a male Bronze-green Euphonia *Euphonia mesochrysa* through the wire of adjacent aviaries. This behaviour was observed by all of us in Maroy-Zoo's aviaries during a visit of Nørgaard-Olesen to Belgium in 1970.

In building their domed nest, the male and female euphonia work together; usually, however, the male is the more industrious. The male of the pair of Purple-throated Euphonias became so stimulated that it completed a second nest without any help from the female.

Once the first nest was completed and the female commenced to incubate, the second nest was used by the male as a dormitory.

As already mentioned incubating and brooding of the young is carried out by the female only; however, even during the incubation period, males are more active than in other tanager pairs. When a female returns to the nest after a break, she is always escorted by the male, who follows her very closely.

Feeding of the young is shared equally by the parent birds. Usually the male feeds first, perched in the nest entrance; the female then enters to feed the young, especially when they are still small and require brooding afterwards.

Euphonias feed their young wholly by regurgitation; in this respect differing from the majority of tanagers. They should therefore prove easier to rear in captivity, yet the opposite is the case. Although fruit and berries are fed to the young soon after hatching, a breeding pair require a plentiful supply of suitable livefood if the young are to be reared. At the Jersey Zoological Park the Thick-billed Euphonias ate only spiders together with grape pulp. The pair of Purple-throated Euphonias, living in an outside aviary, caught large numbers of insects, but readily accepted ant pupae, maggots and mealworm pupae as well as their usual softfood, thus increasing considerably the amount of protein in the regurgitated food.

Nests may contain as many as five nestlings resulting in a pronounced need for protein, compared to other tanagers with only two young in a nest. When the amount of protein offered by the parent birds is insufficient, the smaller nestlings may starve (Roles, 1971; Drake, 1937).

After the young fledge, both parents continue to feed them, but within a week or so the female may be incubating again, leaving the male to complete the rearing of the young.

Usually a pair of euphonias require from 50 to 65 days to build a nest, lay and incubate eggs and rear young to independence. Other tanagers, *e.g.* *Tangara* species, only require from 40 to 50 days.

For the reasons mentioned, to breed euphonias successfully, an aviculturist needs to have a well established pair in full breeding condition, readily accepting a suitable livefood or a softfood with a high protein content.

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THE 1975 BREEDING SEASON

By ROSEMARY LOW (Barnet, Herts)

As one who keeps no Australian parrots, with the exception of cockatoos, I find it is as well not to expect even a reasonably successful breeding season. Chicks of species which have seldom or never previously been bred may not be reared—but much can be learned. It was very encouraging that all known true pairs produced eggs, with the exception of the two pairs of cockatoos and a pair of Red-capped Parrots *Pionopsitta pileata*; the latter were put outdoors too late in the season. Birds which made no attempt to breed and whose sexes are in doubt, were Orange-winged, Salvin's, Yellow-shouldered and Double-Yellow-headed Amazon Parrots *Amazona amazonica*, *autumnalis salvini*, *barbadensis* and *ochrocephala oratrix*, Black and Duivenbode's Lories *Chalcopsitta atra* and *duivenbodei* and Yellow-thighed Caiques *Pionites leucogaster xanthomeria*.

The 1975 season could be said to start at Christmas 1974 when a pair of Meyer's Lorikeets *Psitteuteles flavoviridis meyeri* in a small colony of this species was found to have two eggs. The birds were imported in 1973; most were in immature plumage and none made any attempt to nest during the summer of 1974.

The Meyer's provided one of the major disappointments of the season; removing dead chicks from their nests turned into a habit. There are six birds in the aviary and I believe that these are four males and two females; distinguishing individuals is very difficult and the only sexual distinction is a very slight one in the size of the beak, which is larger in the males. A brief description of this species may be useful, as before 1973 only isolated examples had been imported. It is 17 cm ($6\frac{3}{4}$ in.) in length and most attractively marked in green and yellow. The upperparts are a rich dark green and the yellowish-green feathers of the underparts are edged with the same colour. The ear-coverts are yellow and the head is brownish-olive. The beak and the irides are orange.

The first clutch of eggs resulted in a chick which was heard for the first time on 28th January: it lived for three weeks.

On 1st March the hen laid again; on the 29th part of an eggshell on the aviary floor indicated that a chick had hatched, perhaps a

couple of days previously and the chick lived until 27th April. Meanwhile a second pair had been incubating and chicks were heard on 23rd May; both died on 31st May. Examinations carried out on these three chicks revealed no discernible cause of death in two, but one from the second nest was suffering from fatty degeneration of the liver. Both the latter had food in their crops at the time of death.

As over-rich nectar food was a possible cause of death, I diluted it with an additional quantity of water and cut down the ingredients; they then received nectar consisting of one to two heaped tablespoonfuls of glucose and one of malt in about 25 fluid ozs. of water. A small amount of condensed milk and a tablespoonful of Farex baby cereal were added. In addition, the Meyer's received soaked millet sprays, apple and sunflower seed. Only small amounts of the latter are eaten; also a little lettuce on occasions. Many other seeds and foods have been offered and ignored.

The next two chicks had hatched by 10th June. Unlike the others, they were seldom heard calling for food. One died on 21st June; examination again revealed fatty degeneration. There was food in its crop, but the second which died on 23rd June had no food in its crop and died from no discernible cause. It is possible that the parents deserted and both these chicks seemed scrawny in comparison with those from previous nests.

Next year, I hope to persuade my husband, who is employed locally, to hand-rear any chicks which are hatched. I should like to try this myself, but as I have over three hours travelling daily to and from my place of employment, this is out of the question. We also intend to divide the aviary into sections, to prevent the inevitable squabbling which takes place throughout the year. With the possible exception of Cockatiels, I do not believe that there is such a thing as successful colony breeding with parrots, except, perhaps, in an extremely large aviary. Had the Meyer's chicks lived, it is quite possible that they would have been murdered as they fledged.

The next disappointment was caused by the Iris Lorikeets *Psitteuteles iris* of which we have four, obtained in 1972. They are extremely pretty little birds, the same size as the Meyer's which, of course, belong to the same genus. One believed pair were not in good health on arrival and spent much time, including last winter, in an indoor birdroom. They were placed in an outdoor aviary at the end of May, but made no attempt to breed.

The other two are delightfully tame and never fail to endear themselves to visitors. The hen laid several clutches without success in 1973 and 1974. On one occasion I picked up from the aviary floor a fertile egg which had been incubated for nearly three weeks. It is not possible to inspect the nest box because the birds are so tame that they look on the opening of the aviary door as an invitation to

come out to play; even opening the feeding hatch is fraught with danger because of the incredible speed with which they move about the aviary.

On 20th May I made a note in my diary that the hen had probably laid. She is heard calling loudly for food throughout the incubation period and is fed in the nest by the male; I have never seen the male feed the hen outside the box. The two birds are very playful and aggressive towards each other and if attention is given to one bird, the other invariably attacks its mate out of sheer jealousy and they roll over together, fighting furiously.

On 11th June something about their behaviour made me suspect that a chick had hatched; this was not confirmed until 14th June when I heard the chick. Assuming that the chick had hatched on 11th June, this would give the already proved incubation period of 23 days (see "Breeding the Iris Lorikeet", Ray Kyme, AVICULTURAL MAGAZINE, January–March 1975). I was fairly confident that the chick would be reared because, as is common with very tame birds, the Iris Lorikeets will sample all foods offered and habitually take a wide variety of items. I was particularly interested to note that there was a steep *decline* in nectar consumption from the time the chick hatched. It is possible that a similar phenomenon occurred with the Meyer's Lorikeets, but in a colony observation of this kind is not possible.

The Iris Lorikeets consumed mainly seed while the chick was in the nest; also fruit and soft foods. *Psitteuteles* species must have seed at all times; I believe nectar is a less important item of their diet in the wild than in the larger lories. The "brushes" on their tongues are difficult to observe and for some time I was in doubt as to whether they were actually brush-tongued! It seems that the "brushes" are less well developed than in the larger lories; also, in proportion to their size, the skull is stronger, suggesting a greater crushing power of the beak; both these factors suggest that seed is of greater importance in their diet.

The seeds taken by the Iris Lorikeets were sunflower, canary, white millet, niger and spray millet: no other seeds were offered. The spray millet was soaked for at least 48 hours, until it had begun to sprout, then washed. This was discontinued when the chick was four weeks old and when the male unfortunately became ill, so in case insufficiently washed millet sprays were the cause, no more were offered.

On 8th July I removed the male from the aviary as he was obviously unwell. He ate nothing at all that day despite attempts to tempt him with favourite tit-bits. At 11 p.m. I force-fed him with nectar and Horlick's milk; as he is so tame this caused no stress. The following day he was very ill indeed and started to vomit, a fact I

noted with a heavy heart because all too often in lories it means that there is no hope of recovery. I force-fed him with nectar and chloramphenicol, an antibiotic which has saved the lives of several of my birds in the past. The force-feeding, including the antibiotic, was continued for two more days and by 12th July he was too strong to allow me to do this, so the antibiotic was added to the nectar. On that day I knew without a doubt that he would recover.

On 15th July, I failed to hear the usual loud cries of the chick and, fearing the worst, entered the aviary. The chick was dead and examination showed that there had been haemorrhage of the head. I can only conclude that the hen, tending it on her own, had caused the injury—perhaps in protest at its incessant cries for food. At the time of death its crop was full and the chick weighed as much as an adult. Its beak was black. The green feathers on the back and wings had been chewed by the hen (I had examined the chick for the first time when the male was removed from the aviary; it then had more feathers than when it died); greenish-yellow feathers were appearing on the underparts and orange feathers on the crown.

The male, completely recovered, was returned immediately the dead chick was removed, but the pair made no further attempt to nest. Two more Iris Lorikeets, obtained from separate sources during June, were put into an outdoor aviary on 31st August and mating was observed four weeks later. A chick was heard on 13th November: that night there was freezing fog and the temperature fell to 29 deg. F. (-2 deg. C.). Next day two chicks could be heard, but they died on about 23rd November.

We have had several Fairy Lorikeets *Charmosyna pulchella rothschildi* since the autumn of 1973 and in 1975 the first nesting attempt took place. I do not believe these tiny lorikeets should be wintered outdoors unless provided with a heated shelter; ours therefore are taken indoors from November to May each year.

Although we were not successful in rearing young, we did discover a most interesting fact and one which appears to have been hitherto unrecorded. E. J. Brook bred one Fairy Lorikeet in 1913—and I believe that this is the only occasion on which this species has been bred. He had his birds five years before they were successful and had rather lost interest in them. Because of this he could record almost no information concerning the breeding.

Our Fairy Lorikeets spend considerable periods inside the nest box during the day, but at the beginning of August we noticed that only one bird was out at a time—and it was usually the hen. Meanwhile, the male's tail could be seen through the nest box entrance. From its position, there was little doubt that he was actually incubating! We were soon able to establish that this was so. It would therefore seem that the *Charmosyna* lorikeets share with the *Vini* species the

distinction of being the only members of the Loriinae in which incubation is shared by male and female, a fact that would tend to prove the close relationship of these two genera.

On 14th August, there were several hours of torrential rain of tropical intensity. When it subsided enough for me to venture into the garden, I found the Fairy Lorikeets sitting outside their nest box. Fearing that it was flooded I entered the aviary and saw the two eggs for the first time. They were reposing in a puddle of water! I added a handful of peat to the bare concave bottom of their Budgerigar nest box and plugged in the incubator, in case they should decide not to return. This is a good insurance that it will not be needed and they returned almost immediately to continue incubation!

On 29th August I was surprised to hear very faint squeaks coming from the Fairy Lorikeets' aviary; these were heard again the following day. On 4th September I suspected that the chick or chicks had died. Inspection the next day revealed one egg and a dead chick which I judged to be about six days old. It had a few wisps of white down but was very discoloured, and by the time examination was carried out it was not possible to discover the cause of death.

Success at the first attempt was more than I could hope for, but the failure was, to me, one of considerable interest.

Finally, among the unsuccessful lories, a pair of Edwards's Lorikeets which had bred in the past, had several clutches without result.

The various disappointments with the lories were, to a degree, offset by the rearing of a Dusky Lory *Pseudeos fuscata*. The pair, imported in 1973, are of the bright orange phase and very beautiful. They nested twice in 1974; in each case one chick hatched but lived for a very short time, probably not more than two days.

In 1975 the hen laid her first clutch near the beginning of April; the nest was not inspected because the hen is rather nervous while incubating. Even for lories they are a most devoted pair and the male spends long periods inside the nest box while the hen is incubating. A chick was heard on 10th May but lived for only two days.

The hen laid again at the beginning of June and a chick was heard on 28th June. On 2nd July it was still alive so I added Horlick's and wheat germ breakfast cereal to the nectar (otherwise the diet was as described for the Meyer's Lorikeets). A few days later I gave bread and milk; the bread was ignored but the milk was lapped up. Milk was then given daily during the time the chick was in the nest and was taken eagerly on most days. While the chick was very young, pears were in season and every day soft ripe pear was offered. The Dusky Lories seemed anxious to get at the millet sprays provided for the Meyer's in the next aviary and, to my surprise, when I offered them some they ate it instead of destroying it as they had done in the past. No other foods were taken during the rearing period.

From the time the chick was two weeks old the parents spent very little time in the nest box. The weather was warm and continued very warm until about a week before the chick fledged on 3rd September.

I could make only the scantiest notes on its development, as it was not possible to see the whole floor area of the nest box and often only part of the chick would be in view. On 20th July, when the chick was three weeks old, I saw it preening itself. A week later I noted in my diary that it had "some colour on the head with a halo of fluff". Its body resembled a "white-grey ball of fluff". On 2nd August, the orange feathers on its breast were apparent and four days later I noticed that it was almost fully feathered on the head and back, with down remaining on the breast and rump. On 14th August, it seemed to have been plucked slightly on the wing butts and there was little down apparent. By 23rd August it was fully and perfectly feathered.

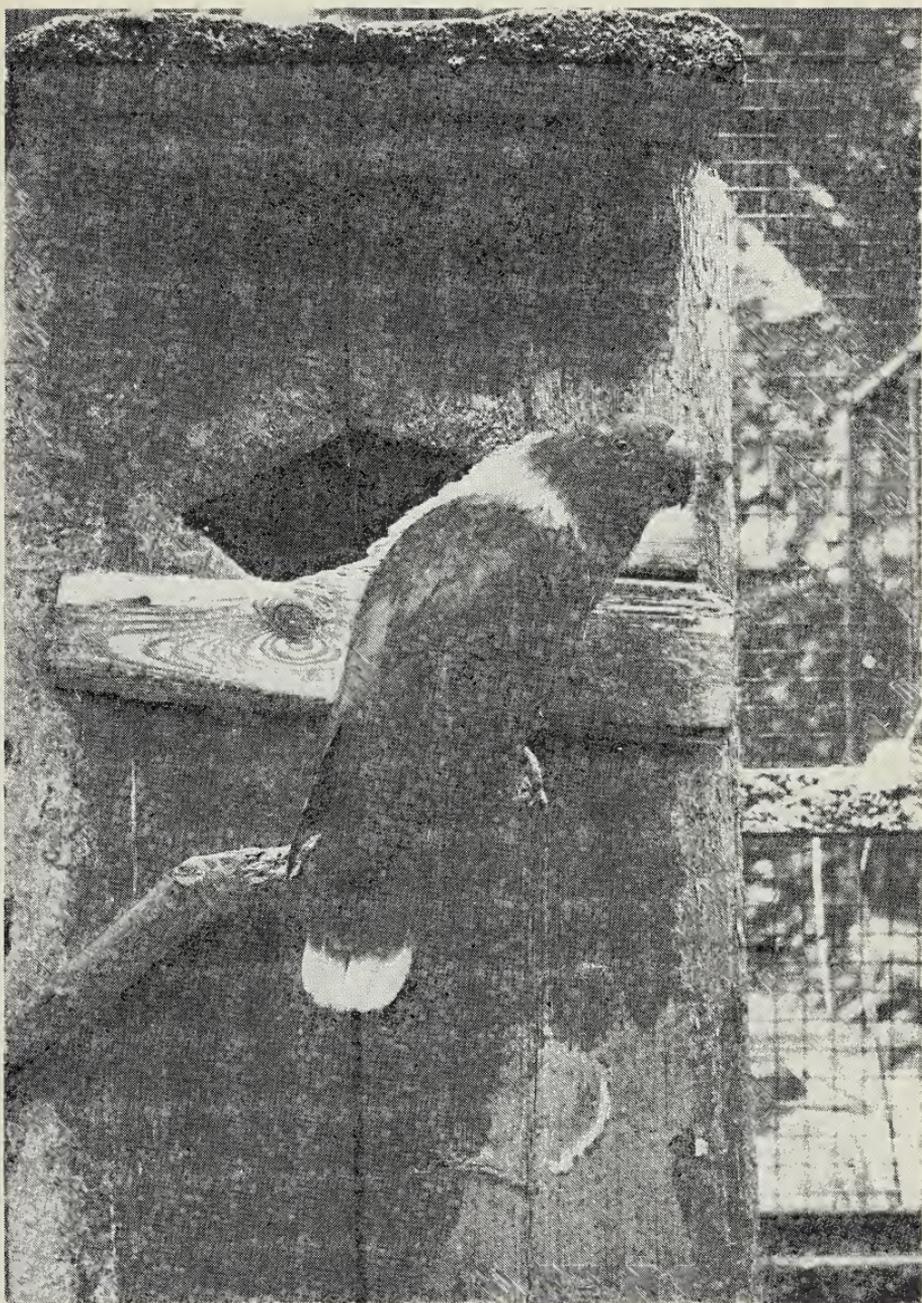
On fledging, its colours differed markedly from those of the adults. In place of the clear bands of colour on the breast it had almost the entire breast bright orange with a smudge of dark brown across the upper breast where the adult has a clear band. Each feather on the wings had a bronzy, almost iridescent centre, and the orange patch on the outer web of each tail feather was far brighter than that of the adults. The rump was almost golden in colour, brighter than that of the male; the female's rump is nearer white.

Of course the most striking feature of the young lory's appearance was the dark brown eye and beak, instead of the ruby-red eye and the deep orange beak of the adult. This gave the young bird a most gentle, appealing look; the bright eye of the adult is of piercing intensity.

On fledging, it was considerably smaller than the hen but within two weeks it had equalled her size, which is markedly less than that of the male.

A pair of *Eclectus* which reared one youngster last year were again successful. The hen is a particularly beautiful bird and belongs, I believe, to the race *vosmaeri*. It is necessary to remove the male when the pair are not breeding, as the hen will not tolerate him and would, I fear, kill him if this precaution was not taken. The pair were reunited on 12th January and the first of two eggs was laid on the 29th. The hen never incubates for longer than 32 days; she seems to be well aware when her eggs do not contain live chicks. After this period she prepares the nest for the next clutch and the eggs disappear. This happened on 1st March; on the 18th she laid again, and again the two eggs failed to hatch. In an attempt to provide the correct humidity, the nest box is always hosed while the hen is sitting.

The first egg of the third clutch was laid on 6th May and a chick was heard on 3rd June. Both birds are very tame and, fortunately,



Elizabeth Butterworth
A female Eclectus Parrot at the entrance she made to a nesting box

do not resent nest inspection. Brief notes made on the development of the chick may be of interest.

12th June: Three times as large as on 7th June; now looks dark (not pink and shiny) due to dark feather tracts covering body. Eyes closed. Crop bulging. 17th June: now has dark blue appearance. Eyes closed. 19th June: eyes open. 21st June: now covered in dark bluish-black down. 24th June: stands upright on haunches. Covered with close dark down like a baby penguin.

On 29th June the presence of green feathers on the mantle indicated its sex: male. On 3rd July I opened the nest box when the male was inside and saw him preening the chick's head; he continued to do this for about three minutes. This is interesting because I have never seen adult birds preen each other. I watched the male preen the chick's head on other occasions; the chick did not enjoy this attention and would move its head away. On 20th July I noticed that it was slightly plucked on the nape.

On 6th July, several lines of green quills, half an inch long, were visible on the wings and mantle, with shorter quills on the tail and head. On the 12th the head and wings were three-quarters covered with green feathers.

On the 26th the young *Eclectus* was becoming quite noisy. It was seen looking out the nest hole on 2nd August and, in fact, spent long periods thereafter looking out until it fledged on 23rd August. Every time my husband or I passed the aviary we would speak to the young bird; consequently, when he fledged he was not at all nervous—unlike last year's youngster. The latter was never seen to look out of the nest and when it left it was so nervous it injured its leg crashing about the aviary. It was therefore removed to a cage indoors as soon as it was independent. For weeks it was quite unapproachable but now, a year later, it is very noisy and tame and will gently nibble at my nose.

Rearing of the chick, from the time it is a few days old, is carried out almost entirely by the male. Principal rearing food is corn on the cob, fresh or frozen—depending on the season. A variety of other vegetables is offered but little interest is shown, although some celery and tomato is taken; also cheese, in addition to some seed when the chick is a few weeks old. Fruit, taken at other times, is ignored.

It was necessary to remove the male shortly after the young bird fledged as the hen had started to chase and bully him. He was returned on 6th September, when the youngster was removed, and nesting again took place, but the single egg was deserted on 14th December. It was found to contain an almost fully developed chick.

A second pair of *Eclectus* also have eggs. Their very first clutch, the first egg of which was laid on 6th August, did not hatch. In 1974, their first year together, they were not compatible and it was

necessary to remove the male for long periods. I am hoping to establish two separate breeding lines of Eclectus Parrots; all the young will be retained for breeding.

Two pairs of true parrots which nested for the first time produced chicks, although in neither case were these reared. The beautiful Purple-bellied Parrot *Triclaria malachitacea* from Brazil is very rare in captivity and has, I believe, never been bred outside its native country. The hen of my pair unfortunately died in 1973 and I had little hope of obtaining a replacement. However, in April, the unexpected happened, when American members Mr. and Mrs. T. Nichols very generously sent me a female.

On being introduced, on 13th April, both birds seemed equally delighted, but nevertheless, the male obviously felt it necessary, right from the start, to show who was in charge. He immediately flew at the hen and gave her a brief pecking but she showed no fear of him at all, in fact, she followed him about the aviary and in a short while mutual preening took place.

Three days later, mating was observed and the following day, 17th April, the hen was seen to enter the nest box. She did not lay until nearly four weeks later, probably on 12th May. When I inspected the nest on the 17th there were two normal eggs (approximately 31 mm. long) and one which measured only 20 mm. The laying of one of these eggs, probably on 15th May, appeared to cause some difficulty; the hen spent much of the day in the aviary looking decidedly ill. At 7 p.m. she was still sitting in the flight so I very reluctantly decided she must be caught up and given the benefit of an infra-red lamp. I went away to get the catching net and, on my return, found to my relief that she had at last entered the nest box. Henceforth she seemed quite well but my worries were not over; the male did not enter the nest and during the early days of incubation the hen frequently came out of the box to beg food from him. He failed to realise what was required of him and the hen was seen feeding herself.

On 14th June a chick hatched; this gave a minimum incubation period of 29 days. The male was seen searching the flight almost frantically for something which we could not provide. We gave all kinds of extras, including a tray of seedlings of canary seed, planted a few days previously. The male showed much interest in this and appeared to be eating the earth.

On 16th June the chick died. Autopsy revealed a septic navel cord, an infection which is very common in chicks of domestic poultry. On removing the chick from the nest I noticed that the tiny upper mandible had been injured, almost certainly by the hen when the chick failed to respond to her attempts to feed it, I imagine.

The pair made no further attempt to nest during 1975.

On 1st June a pair of Bronze-winged Parrots *Pionus chalcopterus* were removed to a very small temporary aviary, as their aviary was required for other birds. The aviary had no shelter and was completely open, the only protection being provided by the wall which formed the lower half of the back, the solid partition dividing it from the adjoining aviary and a piece of asbestos placed above one perch.

The hen had been housed in this aviary with another hen Bronze-winged during the winter, and had shown great interest in the nest box it contained. On being placed in this aviary for an aviary she went to nest almost immediately; the first egg was probably laid on 17th June. Because of the smallness of the aviary and the fact that the hen is very nervous, the nest was not inspected.

On 15th July, the sounds of a chick or chicks were heard—a distinctive quavering noise. All kinds of extras were provided, including sponge cake and nectar, a softfood which I make up, the main ingredients of which are crushed biscuits, a protein baby cereal and honey, and fresh vegetables such as celery, green peas and runner beans, in addition to the usual foods—canary and sunflower seed, pine nuts, peanuts, spray millet and apple. Corn on the cob was ignored.

On 23rd August, the hen Bronze-wing was seen in the aviary for the first time, except for the occasion when she had been alarmed by a downpour of tropical intensity. It was obvious that something had gone wrong. The nest was inspected for the first time and revealed a dead chick, over five weeks old, a very small, decomposed chick and one egg; the latter measured about 34 mm. long and 25 mm. wide—considerably larger than that of the Purple-bellied. The chick's beak and some nails had been torn off and one of its legs was injured. Its crop was full and it was naked except for the greenish-bronze secondaries; its body was reminiscent of that of a macaw chick. It was about one third the size of an adult.

The weather at the time was very hot; when the chick was found it was too late for an autopsy to be carried out. This was regrettable because it might have provided a clue as to whether the chick was mutilated after death, or whether its injuries were responsible for its death. The male Bronze-wing was never seen to enter the nest; he invariably fed the hen at the entrance hole. The hen appeared to be an extremely conscientious parent. Had some outside disturbance, a cat perhaps, caused her to kill the chick? Or did it die from natural causes? Aviculture is full of unsolved mysteries.

Finally, a pair of Grey Parrots *Psittacus erithacus* laid before (mid May) and after (mid July) the moult. In both cases the eggs disappeared after a few days. This was puzzling and disappointing because last year, the pair's first together, fertile eggs had been produced in the single clutch laid which was incubated for the full

period.

Perhaps reading of a member's failures, which far outnumber the successes, will encourage other members to write on this subject. Reports of successful breedings *only* do tend to make it look all too easy!

BREEDING THE SUN CONURE

Aratinga solstitialis

By N. RAMEN (Goxhill, Barrow-on-Humber)

In October, 1974, I bought two Sun Conures, and not until the end of November of the same year did they give any indication of being a pair. I began to think they were two males as both birds seemed identical by form, colour and shape of beak and head. Finally in February, 1975, I saw them attempting to mate. Mating was unusual: unlike Old World parakeets both birds stay on the perch when mating. At this time they were in an indoor aviary 3 ft. x 6 ft. flight with the grandfather clock type nest box, facing north.

In April, 1975, they were placed in an outside flight approximately 11 ft. long, 3 ft. wide and 9 ft. high; enclosed shelter was accessible. Both the east and west sides of the aviary were protected by perspex sheeting, as was half the roof. The nest box from indoor flight was useless, as the birds had almost chewed their way out. I made a similar box 18 ins. x 18 ins. square and $4\frac{1}{2}$ ft. long. At the bottom of the box 6 ins. of peat mixed with dried grass was placed. This time a few small pieces of wood were left on the peat in the hope that the birds would chew them instead of the box, as they had previously done. Both birds slept inside at night. I noticed after a week that the wood placed in the bottom of the nest had all been chewed and a type of nest had been made in one corner of the box. This nest entrance was facing south.

On 4th July, I noticed a large swelling had appeared under the abdomen of the hen bird. I was worried, but kept careful watch over the birds. On the 6th July, 1975, I noticed the lump had disappeared. I realised what could have happened, and correctly, for the first egg was laid. I was so pleased. Three more eggs were laid at two-day intervals, and each time the coming egg was, of course, indicated by the swelling.

The incubation period was 27 days. The first chick was hatched on the 3rd August, looking bare, and the three other eggs hatched at two-day intervals. Only the hen incubated the eggs although the cock did assist in feeding the young. As I have very little knowledge



A brood of Sun Conures

of these birds, a varied diet was their menu. I was much surprised to find that large amounts of bread and milk mixed with dog biscuit in a porridge form, apples and egg and biscuit mixture were taken in the first three weeks. Mixed sunflower seeds and hemp were taken in small quantities. After three weeks the sunflower seed, hemp and apples given were never enough, but the soft food taken was reduced in quantity to that previously taken. Frequent inspections of the nest were made, with the minimum of disturbance to the birds, right from the day the first egg was laid. I found that, as I approached the nest, the cock bird flew to the box, climbed down by the hen, looked vicious and ready to attack and he made a lot of noise. One problem was how to ring the young, for I could never get near them and I had to catch both parents and put them into a cage before I could do the ringing which was done at five-day intervals from hatching.

All four thrived and pictures were taken of them at varying intervals so as to record their progress. On the 22nd September the first young one came out of the nest and within two days all four were out. They were almost identical to their parents, differing only in the colouring of the wings and backs which were mostly green, whereas in the adult these areas are deep orange with only the wing tips green. I noticed how quickly the young ones learned to fly and to recognise their surroundings.

I have found that I have taken twice as long to feed the birds each day and that is because I have spent hours watching the Sun Conures and their family which are beautiful, strong and healthy at present.

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NOTES ON SOME SPECIES OF PARROT IN CAPTIVITY

By GEORGE A. SMITH (Peterborough)

*Continued from Vol. 81, p. 211*THE COCKATIEL *Nymphicus hollandicus*

After the Budgerigar, the Cockatiel must be the most commonly captive-bred parrot and it is now sufficiently domesticated for it to have four established colour mutations. Each of these "New colours" depends for its effect upon some inherent interference in the deposition, or the nature, of melanin: pied, lutino (albino), laced (pearled) and cinnamon (isabelle).

When I acquired my American-imported Cockatiels in March 1969 I could not have given much serious thought to them beforehand because I immediately saw that they were lutino and not, as advertised, albino. Not that they could have been otherwise for it would take a second mutation to produce white by stripping them of their ability to make yellow and orange pigments. Since that time lutino Cockatiels have become commonplace. I kept Cockatiels for six years but somehow never developed any real liking for them and, being always short of accommodation, I no longer have any.

General behaviour

Cockatiels are sociable birds and several breeding pairs may be housed in the same large aviary provided that they have a surplus of identical nestboxes. The crest, which signals alarm or aggressive intent, normally rests fairly close to the head; during squabbles it is always raised. These, the smallest of the cockatoos, never sit in direct physical contact: should even members of a mated pair touch they begin to bicker at each other until a few centimetres lie between them once again.

Irrespective of their sex, all Cockatiels will preen one another, but it is more frequently observed between members of mated pairs. A Cockatiel preening itself on the wings, back or tail does not generally attract the attention of others, for the head is held high. But when grooming the throat, chest or abdomen where the head is held (submissively) low, then an adjacent Cockatiel is very likely to sidle over and attempt to get itself preened by the grooming bird. It does this by adopting the meekest of approaches: the crest is held tight to the scalp, making it almost imperceptible, the eyes are part-closed and the head is held very low. In this attitude it will nudge the preening bird gently with its closed bill. Should this not get immediate attention, then it repeats the nudging again and again until it does. Eventually the preening bird will pause in its grooming and look around to see who interrupts it and is then confronted by this most abjectly postured Cockatiel. To give a vicious peck or take offence at such a contrite-

looking bird as the interruptor is simply not done; and the peck is disarmed into a preen and once it starts to preen the other, it usually continues for some minutes, the bird being preened slowly moving its head to direct the preening bird's bill into fresh areas. If the preening should stop, it will renudge to start it off once again or until the other Cockatiel flies off for peace and quiet. Cockatiels very keen to be preened will solicit from non-preening birds by the same contrite nudging methods.

Males, when they are not partnered, are rather fidgety beings and any movement attracts their attention. It is therefore very likely that they will notice any preening bird and will fly over to try and beg a preen and this is how, I believe, pairs become introduced to one another. If the preening bird is another male or a mated hen, then these unmated males would be signalled off by crest raising and, if necessary, by pecking.

Like cockatoos, Cockatiels seemingly do not bathe in standing water in the usual way of ducking the head under and splashing droplets on to the back with fluttering wings. Instead they stand or sit in the water for some minutes, then when thoroughly soaked on the belly, they fly off dripping wet. This is not usually seen except when they are breeding and I take it that this is a method of increasing the humidity of the nest.

Cockatiels also shower-bathe (Harrison 1961) in falling rain when they become ecstatically excited and fly from one end of the aviary to another calling noisily. When they settle, they spread the wings and tail to catch the raindrops. The bird teeters over to hold itself outwards and downwards from the perch with the outspread wings held forwards. It does seem that the noise of falling rain can set off rain-bathing, for as I was hammering, a caged Cockatiel, hearing this, leant over in a rain-bathing attitude. More usually the stimulation seems to be a sudden change in the light: the darkness accompanying a storm. This rain-bathing reaction to changes in the intensity of light would explain why Cockatiels leaving the nest box spread-eagle themselves upside down from the exit perch; and when leaving the darkness of the aviary shelter or when in a room that is suddenly made bright by turning on the light. This identical stance is taken by Palm Cockatoos *Probosciger aterrimus* at dawn. This was believed by Forshaw (1969) to be a form of courtship: it could, of course, also be a reaction to the sudden increase in light intensity.

The extreme excitement generated by rain-bathing might be important in triggering off breeding in these semi-desert birds. In 1974 we had a 12-week drought. When the rains came in early July both my pairs, which until then had had no interest in breeding, began to investigate the nest boxes and soon laid and this was not an exceptional observation.

Cockatiels noticeably prefer to rest on bare branches; I had to snip the leaves off their fresh perches before they would come out of the shelter.

They ate little fruit; sometimes they chewed at apple and they were very fond of greenfood; otherwise they lived on seed. When breeding they would avidly take bread steeped in milk, and cuttlebone.

Compared with most parrots, Cockatiels are very poor climbers and I have never seen them walking upside down from the aviary roof, nor can they lean right over to pick something up immediately under the perch. Unless an ear of corn or a millet spray were accidentally turned over, the grains on the underside were untouched.

Cockatiels, and especially young Cockatiels, as they walked over the floor, picked up small pieces of vegetation in the bill which they spiralled and twisted by chewing at one end. It was practically impossible to find moulted feathers whose quills had not been splintered by this. One Cockatiel, seeing another twirling something in its bill, would often try to steal this toy.

I had always believed that Cockatiels were unable to use their feet as hands until I saw one youngster trying to take hold with its foot of a piece of grass that it was twirling in its beak. The grasping actions it made were so hopelessly uncoordinated that, although it very often tried, only once was it seen to clasp the grass between its foot and the perch. Once it lost this grip, it was never again seen to repeat this success in the dozens of times, both that day and following, that I saw it try. It was, therefore, a complete surprise when I found that I had an immature pied male which could hold things in its foot and I continually regret disposing of him, for it would have been particularly interesting to see if this unique ability had any genetic basis.

Breeding

In my experience both sexes will breed once they are eight months old and I know of some which raised young when they were five months old. Although Cockatiels come from the deserts of Australia and therefore, like the Budgerigar and Zebra Finch, are presumably adapted to breed at any season of the year, they are not entirely liberated from the influence of day-length. The moult is the invariable late summer one of parrots and during this time they are less inclined to breed. Those pairs which do so frequently become lackadaisical about brooding and feeding, and loss of eggs and young are high, but by mid-September most males, including the current year ones, are in full song and display.

The Cockatiel is an example of those few species of parrot in which the male can produce a mechanical noise by rapping the top of the beak against a "sounding board". The resulting sound is not as loud and far slower than that made by woodpeckers. Objects rapped include the inside and outside of the nest box and the perches in the near

vicinity of the nest. Not every male taps and this is interspersed between singing by very sexually excited individuals. Apart from the Cockatiel I have heard Budgerigar, Many-coloured, Red-rumped and Ring-neck Parrakeets *Psittacula krameri* beak-rapping. The only reference that I can find is for the Noble Macaw *Ara nobilis* (Brown 1950).

Whether they have nesting facilities or not, sexually active males display; they fly up and down whistling a loud, far-carrying *coo-ee*, *coo-ee* . . . and settle with the crest lowered and with open wings; this posture is maintained for a few seconds; they then whistle *coo-ee*, *coo-ee*, *coo-ee*, give a slight shake to the feathers of the head and body and rapidly fly off, again calling. Although the whistle is such a simple disyllabic noise, it was easy for me to identify which of my four males was calling. A calling male usually performs alone, as other males seem indifferent.

When on the ground, males will closely follow their mates, punctuating their walk with little vertical jumps, the whole accompanied by warbling. As the crest is sometimes raised, it appears that they are ill at ease courting on the ground. A perched male courts by approaching with lowered head, the crest tight against the scalp and the wings lifted up so that the back and wings form a flat heart-shaped surface with the tips of the wings touching. Except for the position of the wings, this is the same cringing attitude taken when begging a preen; however, when courting, he chortles a mixture of whistling song and the male *coo-ee*, *coo-ee*. The sexes may look entirely different to us but this might not have much relevance for Cockatiels, as it is noticed that an unpaired male will sexually approach other males apparently just as readily as females and it also seems to make no difference whether they are abnormally coloured, such as pied or lutino. However, if the bird serenaded is male or a disinterested female, then it will raise its crest and if the courting male persists it will be threatened with an open beak and an angry whine. It is usual for females to remain still and it is their mate which drives away the other male. The tolerance towards courting males shown by the females and the preening of the head, which soon follows courtship, contribute to establishing the pair-bond and after only a few days of forming a pair the female usually will be soliciting for copulation. Copulation continues through the incubation and rearing of the brood and is probably also pair-bonding in function.

A female solicits by lowering herself down on the perch with wings slightly away from the body and the back perfectly horizontal. The crest is depressed with head slightly to one side. The pairing male, singing away, slowly steps on to her back with both feet and his song then becomes a silent mouthing. He lowers his tail to one side and copulation takes place. As his head slightly bobs during mating, it

might from a distance, look as though he were feeding the hen. Pairing is a lengthy business and usually takes several minutes. The side of the bird is not changed and the hen keeps up a continual squealing noise which carries for a distance of 20 yards or so. Other males, even if sitting on the same perch, appear totally disinterested.

When a nest box is given to a sexually active pair, they usually begin to examine the entrance hole a few minutes afterwards. The male displays and twitters at the hole as he does when courting a hen. After one or two false starts he soon takes courage to enter and once inside, he continues to sing and beak-tap. It is not too long before the hen enters after him and there is much to-and-froing. They seem to give less attention to the floor of the nest than is customary with parrots; I doubt that either sex scratch the litter with their feet, but some wood is chewed from the walls and around the entrance hole.

Like so many (all?) of the white cockatoos, Cockatiels have no courtship feeding: this may be because the male shares equally in incubation and brooding. Once a pair-bond is established, it is amazing just how soon the first egg can appear after the introduction of a nest box. One record of mine gives three days and I have nine instances where there was only a four-day interval. Likewise when chicks are removed it is possible for the replacement clutch to start after only four days. As it takes an ovum (yolk) two days from the time that it is released from the ovary, before it is laid as a shelled egg, this practically spontaneous ovulation after entering a nesting chamber is physiologically somewhat remarkable. Firstly because Cockatiels are "determinate layers" (that is removing the eggs as they are laid does not increase the overall size of the clutch) and secondly because it indicates that when not laying, mature ova must be continually present in the ovary.

A further feature, better known in game birds, is the longevity of sperm in the female's reproductive tract. I have recorded several examples of this and it is particularly well illustrated by the following. A hen lutino Cockatiel paired to another lutino laid her first egg, of a fertile clutch of five, 20 days after she had been separated from a normally coloured grey male. The resulting five chicks were grey, showing that the lutino male could not have been their father. Indeed, later attempts at breeding from him proved that he was incapable of fertilising eggs because he would face the wrong direction when treading a hen.

The first egg is usually laid the very night that a hen is first seen to roost inside the nest box. When she is laying, a hen spends most of her time brooding: this makes it easy to prejudge the final number of eggs composing a clutch by halving the number of days that the male is seen sitting outside waiting his opportunity to brood. Certain females can become broody without seemingly being able to lay. If these hens are given eggs the pair begin to sit (Marriot 1970) and when the chicks

have fledged, the hen usually lays normally. The average size of a clutch appears to be five; but I have found numbers between one and 10. The average weight for 44 fresh eggs was 6.5 grams (ranging between 6 and 6.9 grams), about a 13th of the weight of the laying hen.

A Cockatiel about to take over the incubation of eggs enters the nest and, without any observable ceremony or noise, sits down next to the already incubating bird. They may brood together for a while, each taking part of the clutch; more typically, as one sits the other gets up and leaves the nest. The only occasion when Cockatiels sit physically touching one another is when sharing incubation and it might well be that it is to avoid this physical contact that one gets up as the other sits down. As with pigeons, the male sits for most of the daylight hours and the female at night; however, occasional females will do all of the incubation. The males always roost outside the nest at night; when emerging from the nest entrance they move with extreme stealth and if they feel that they are being watched "freeze" with the head lowered and if not too far out slink backwards, where they remain until the coast is clear.

The shortest and by far the most frequent incubation period is 19 days (49 clutches of individually marked eggs). This is the same number of days as I have found for the other ground-feeding genera of Australasian parrots: *Platycercus*, *Barnardius*, *Purpureicephalus*, *Cyanoramphus*, *Psephotus*, *Neophema*, *Aprosmictus*, *Alisterus*, *Polytelis*. Budgerigars take 18 days. As the eggs begin to hatch, the parents become loath to leave the nest and then can often be found together. The eggs hatch as they were laid, at roughly two-day intervals. Curiously for parrots some egg-shells are removed from the nest—I do not know how—the rest get broken up by the movements of the birds.

On hatching, the young are moderately clothed with strands of yellow down (Pycroft 1907). The intensity of the yellow is genetically determined and pale yellow chicks make pale yellow adults and *vice-versa*. In a well-reared clutch the eyes start to open at seven or eight days old, but can be delayed for three more days. It does sound, from the gentle cheeping noises they make when being fed, that this takes place very frequently at first; perhaps several times an hour. Examination of *post-mortem* material shows that the parents give the young crop-softened seed, grit and what appears to be saliva but could, from its milky colour, also contain part-digested food from the stomach. Contrary to popular belief, parrots do not, like pigeons, have crop glands which secrete "milk". As the chicks begin to age and feather, the food-soliciting noise that they make takes on a harsher, almost snarling quality.

The most obvious part of a Cockatiel chick's anatomy is the enormous gizzard which fairly bulges under the transparent skin of the abdomen. When the eldest chicks are about 10 days old and their

voice noticeably changes, the parents start to leave them unbrooded for some of the day; however, the hen continues to brood each night until they fledge. Very young chicks when disturbed merely clamour to be fed; however, once they can see, they rock, hissing angrily, from side to side: the hiss is a short sharp exhalation, with the crest raised to its maximum. Hissing is very contagious and even "blind" youngsters of three or four days old will do this when they hear it from the older ones.

The chicks fledge at about 35 days old; however, Mr. D. G. Marriot, who also keeps a daily record of each brood, had one extremely precocious nest which fledged at 28 days. Very frequently, before they leave the nest, the hen has started on her second clutch and it has been my experience that this second clutch is always laid in the same box. When egg-laying starts before the previous round of chicks have left, they frequently get badly chewed by both parents: removing the chicks to the safety of the shelter stops this and the parents still continue to feed them. Unlike small passerines, the chicks in the shelter cluster in one spot and do not fly until their normal time. A fledged chick solicits for food by lowering the crest and bobbing the lowered head and whining. Like other Old World parrots, with which I am experienced, and contrary to New World forms, they do not flap the wings when they are being fed.

Chicks are probably not fully independent of their parents for a fortnight to three weeks. It is noticed that parents which have stopped plucking their young, because they were taken from the nest, will often start to pluck them again once they start perching near to the nest box.

Young males start their singing of *coo-ee, coo-ee*, when they are about 30 days out of the nest.

THE ABYSSINIAN (OR BLACK-WINGED) LOVEBIRD *Agapornis taranta*

I have a small colony of four Abyssinian Lovebirds, each of which is identifiable at a glance. The males are abnormally coloured and were wild-caught. One, which previously belonged to Mr. W. Howarth, is a cinnamon, having pale brown instead of black melanin. The face is orange and the body feathers are light green. The most curious feature is that, although the general body plumage, including the terminal band across the tail, is cinnamon, the "signalling" black of the primary wing-coverts and that of the under wing-coverts are the coal-black usual in male Abyssinian Lovebirds. The production of melanin in these covert feathers must therefore be under a separate genetic control.

The other male, though he has since moulted out normal except for his orange face, was pied. A few of his flight feathers were cinnamon and the piedness involved most of the back, the head, one wing and some of the belly feathers. The largest hen, which is very tame, has

a small group of three or four yellow feathers on the nape and is paired to the cinnamon; the smaller, perfectly normal hen, is mated to the pied male.

The pairs had been kept in separate cages long enough to have formed permanent partnerships when, in late March 1974, they were put into the same small aviary—6 x 4 x 7 feet high—attached to an indoor shelter and four different-sized nest boxes were provided.

General behaviour

Dilger (1960) believed that those species of lovebird in which the sexes are distinctive are not as sociable when breeding as those in which the sexes look alike. My two pairs of Abyssinian Lovebirds continue to breed in this small aviary in boxes less than a yard apart.

Nesting accommodation is very important for lovebird pairs: when they are not breeding, the boxes provide a refuge by day and a warm roost at night. Fortunately, on their release into the aviary, the hens selected different boxes. The males had nothing to do with this choice except for encouraging their mates, with excited twittering, to enter. Just before the final choice of box was properly settled, a slight quarrel took place and ended when the attacking hen was bitten on the face and, as she flew off, accidentally drew the rightful occupier out of the entrance hole. The two parted before they hit the floor and the owner was back inside her box in a second.

A hen defending from an entrance hole is practically invincible; her body is protected and the invading lovebird is very reluctant to enter without having had a careful preliminary survey, something that she cannot very well do whilst the rightful owner remains inside.

Even when they are breeding (in the spring and summer) a large amount of their time is spent bickering with other lovebirds. For although they are reasonably sociable when feeding or foraging about away from the nest boxes, the territory defended by the males is a two foot area around their hen and they readily take offence at what they consider to be trespass in this area. When they are breeding, this territory, for all intents and purposes, is for much of the time the area around the nest box. Dilger has described how, when one male is about to attack another, it will flick its wings from the sides of its body. He calls this "carpal flashing" and it causes the male flicked at to fly off on seeing, as he does, the black undersides of the other's wings. I have not seen carpal flashing, for it appears that mine are not so lily-livered as to merely indicate that they might fly off in pursuit, but actually do so. I have not seen a serious fight, for they obey certain "rules". A male, for example, seldom if ever attacks a female and females usually only war with other hens. The pair-bond is very strong and the females are the larger and stronger sex. When the wives quarrel, the males demonstrate their own anger by flaring their tails, chattering and lunging with the bill and yet noticeably take very good care not to get within

striking distance of the opposing hen. A hen may be practically invincible inside her nest box but outside of it their invincibility to other Abyssinian Lovebird females diminishes the further away they are. One hen chased by another flies to its nest hole and pursuit usually stops even before it needs to enter. And, so much for sexual equality, it is the wives who provide sanctuary to their husbands against attacks by other males. A male bullied by another can divert the attack simply by flying up to the side of his wife, when the other male promptly shies off. Such a husband-protecting hen is so dominant to mere males that she seems barely to notice who has chased her partner back to the protection of her petticoats.

It seems to me that when the pairs groom one another they do not do so with the careful, almost considerate, caressing of conures but often with rather spiteful little pecks that, from the reactions of the birds, must sometimes hurt. The area that they groom is mainly the forehead and throat although they sometimes attempt to preen other parts of the body: when they do so this is always met with anger. In some cases the feathers of the face and lores are stripped bare by the vigour of this preening, whereas in Manycolours and Redrumps it is usually the feathers at the back of the head which suffer.

I have not seen Abyssinian Lovebirds hanging upside down to roost, as reported by Dilger. They bathe fairly frequently and rub themselves on wet foliage, but have neither been seen to rain-bathe nor bask in the sun.

Breeding

The cinnamon pair very soon changed their large box for a smaller, more appropriate one. The hen showed her nervous stress when examining the entrance hole to this fresh box by exaggeratedly flicking her head and flaring the tail as she poked her head inside. After a good many minutes of retreat and advance she finally plucked up courage and entered to examine the inside of the box. While this was going on, the male excitedly hung outside and poked his head into the hole through which his wife had just disappeared, but did not dare to follow. As the hen re-emerged she flicked her head (always a sign of very great excitement) and gave a rather harshly unpleasant *ee, ee, ee. . .* Then she slipped back inside once more flaring her tail at entry. After each emergence she now clung to the wire running over the front of the box, flicking her head and uttering her *ee, ee, ee. . .* however now and again pausing to solicit food from the male, as do fledgling youngsters, by bobbing her head up and down while noisily squeaking. The male, quite as excited as his mate, fed her with such an eager enthusiasm that he seemed positively thankful at being allowed to do something for himself. When she eventually flew off, he entered the box for his first time, stayed for only a second or two and then went off in pursuit of his wife; they returned soon enough

and continued as before.

The incubating hen, rather disturbed by this noisy activity of claiming a nest site, came off her eggs and putting her head well outside her nest hole showed her annoyance by flicking her head and making clicking noises, apparently by gnashing the mandibles together.

Prior to the pair with the cinnamon male establishing themselves in their much smaller box, the male used to be somewhat harassed by the pied male; however, once they had moved in, his dominance rapidly rose over the other: this change happened in only a few days.

Copulation is a long process and is usually preceded by the hen pleading to be fed, as usual, by head-bobbing and squeaking. The male moves his head in a fidgety sort of way and the copulating side is changed several times.

Neither of the two hens took much nesting material into the boxes, but there were masses of feathers, some of which, by their colour, must have been plucked from the males. Each hen laid only three eggs; the largest clutch since has been four, and the incubation period was 25 days.

The chicks are very helpless, and although they are thickly downed, this is not wispy and long as in most parrots but is short and looks not unlike clipped cotton wool. They are all head and neck when hatched, with a minute white-downed body; the ear is represented by a pin-hole opening. They grow very, very slowly and at a week old are still very embryonic-looking. The male goes into the box to feed the hen and one can easily make out her food-soliciting call and the chicks, despite their very small size, have quite surprisingly loud voices even from the first day. The eyes did not open until they were, at the very earliest, 15 days old; however it was usually several days later than this and some youngsters still had one eye sealed shut when three weeks old. Generally one eye opens well before the other and gentle prising in these tardy eyes seems unable to force the lids apart. Once the eyes have started to open, the parents stop brooding the chicks over the day. The earliest that I have had chicks fledge is at 52 days old. As Dilger reports, young males have just an odd tiny red feather somewhere about the head, making it possible to distinguish them from juvenile females.

Considering just what quarrelsome little beasts Abyssinian Lovebirds are, it was amazing how extremely tolerant the parents remain to their offspring, long, long after they are mature. For example, at one point I had father and two nine-month old sons sharing the same box in which the hen incubated a round of eggs. When they hatched, all three males contributed in feeding the chicks. The three males clumped together when the hen was not about—otherwise the father clumped with the hen—and preened and fed each other in perfect amicability. I feel almost certain that had one of these sons been a daughter, then

the pair would have been permitted to nest in very close proximity to their parents' nest site. As I seem completely unable to breed anything but male Abyssinian Lovebirds, I have been unable to work out the genetics of the cinnamon and pied males.

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To be continued.

OBSERVATIONS ON A FEMALE LONG-TAILED HERMIT HUMMINGBIRD

By A. J. MOBBS (Walsall, West Midlands)

The Long-tailed Hermit *Phaethornis superciliosus* has a wide distribution and can be found in Mexico, through the whole of Central America and parts of South America including Colombia, Ecuador, Peru, Bolivia, Venezuela, Brazil, Guyana, Surinam and French Guiana. Peters (1945) lists 14 subspecies, only one of which is somewhat doubtful.

As many of the *Phaethornis* are much alike in appearance, it is difficult to estimate how many Long-tailed Hermits have been brought into Britain over the years. At one time all "hermits" (*Glaucis*, *Phaethornis* and *Threnetes*—the latter often being given the name "hermit", although their common name is barbthroat) were considered extremely difficult to establish in captivity; this plus their so-called drab appearance has not helped their popularity as avicultural subjects and because of this, most importers have always fought shy of such birds.

At one time the difficulties experienced with these birds were attributed to their supposed highly insectivorous nature. However, this theory has been proved incorrect by observations made on birds both in the wild and in confinement; as, in point of fact, there are a number of species far more insectivorous, yet prove fairly easy to establish.

In my opinion, the main reasons hermits prove difficult to establish, is that not only are they poor travellers, but that they also find difficulty accepting a captive diet. Friends of mine who have, under licence, taken *Phaethornis* species in their country of origin, have found that, given a substantial diet from the moment of capture, these birds can

stand up to the rigours of the journey to Europe. Many hummingbirds trapped commercially, are given sugar water only and therefore reach their destination in a weakened state, especially when delayed in transit or when held over by the trappers before being shipped.

The female Long-tailed Hermit on which these notes are based, was purchased on the 9th February, 1972. It was placed into a large flight cage for observation and after four days, was released into my communal hummingbird flight. After being in the flight for one day only, the hermit had to be removed due to the extreme belligerence shown to it by a male Andean Emerald *Amazilia franciae viridiceps*. Two days later, the hermit was again released into the flight and has remained in the enclosure ever since.

*Moult*s

The hermit's first moult in captivity began on the 8th May, 1972, and was completed by the 8th July: 13 weeks. The second moult was from the 18th July, 1973 to 25th October: 14 weeks. The third moult began on the 2nd August, 1974 and was completed by the 11th October: 10 weeks. All moults were completed without complications.

Display activity

As is often the case with newly imported hummingbirds, the hermit showed no inclination to display until it had completed a moult in captivity. However, within a few days of completing the first moult, it was seen to perform and since then has done so regularly except during the annual moulting periods. As with the Reddish Hermit, *P. ruber* (Mobbs 1971), the actual display is somewhat varied and can in fact be divided into certain phases. I shall, therefore, describe each phase separately.

(a) The hermit hovers in front of a perched hummingbird; the neck is arched and the tail is brought under the body slightly. The hermit then opens its beak and utters a loud *churr-tok*, at the same time snapping the head and tail back into the normal position. This action may be carried out three or four times.

Should the bird at which the display is being directed remain passive, the hermit loses interest and flies away. However, should the perched bird take to the wing or show aggression, the hermit will immediately attack. This sudden onslaught is usually enough to rout the bird and the hermit then gives chase, uttering loud *chureks* as it does so. The hermit was seen to perform this display only a matter of days after completing its first moult in captivity.

(b) As in (a) except that when the bird to which the display is being directed remains passive, the hermit attempts to alight on its back.

(c) The hermit hovers directly in front of a perched hummingbird, at the same time raising the crown feathers and extending those of the throat. The beak is held upwards at an angle of approximately 72 degrees; the body is held in an upright position and the tail is held

downwards in line with the body. This attitude may be kept up for 10 to 15 seconds at a time, especially if the perched bird remains passive. However, it is rare for a bird at which the display is being directed to remain passive, as the hermit usually persuades it to leave the perch by hovering closer and closer. If the perched bird does leave, the hermit may (i) chase after it, or (ii) alight on the perch itself and commence to preen.

(d) As in (c) except that should the perched hummingbird remain so, the hermit will fly to the rear of the bird and attempt to alight on its back.

(e) The hermit alights on a perch near to (approximately 4–5 inches) a perched hummingbird. It then turns its head toward the latter and if there is no response, becomes agitated and commences to sidle along the perch toward the perched bird (this sidling action is relatively fast considering how small are the legs and feet). While moving along the perch, the hermit fans the tail to the utmost and wags it up and down in a most exaggerated manner, emphasis always being on the upward movement. The wings are opened slightly and held a little away from the body; they are then moved up and down and vibrated rapidly. This particular action is very much like the wing action made by a bathing bird except that it is more exaggerated.

During the whole of sequence (e), the hermit's body and throat feathers are puffed out and the feathers of the crown are raised.

Although it is rare for a bird at which the display is being directed to remain perched long enough for the hermit to approach nearer than an inch or so, should the former remain perched, the hermit will leave the perch and attempt to alight on the bird's back. Should, as is usually the case, the perched bird take to the wing, the hermit ceases to display immediately.

(f) The hermit sits with the tail held slightly higher than is normal and fans it to the utmost, at the same time uttering loud *chureks*. This can be kept up for as much as two minutes at a time. The hermit then leaves its perch to hover in front of a perched hummingbird, holding its beak open slightly and moving the body from side to side, after which it carries out the *churr-tok* movements (see procedure (a)), and then attempts to alight on the bird's back.

Nesting activity

Approximately two weeks after the hermit completed its first moult in captivity, it was seen to collect nesting material. It appears the hermit will collect almost any form of dead or dying plant life, also hair—especially human!—cotton, wool, etc., as long as it is small enough for the bird to carry to a chosen nest site; *i.e.* (i) the leaf of a *Philodendron* which is growing in the communal flight, or (ii) the leaf of a bromeliad which is growing in the birdroom.

Although the hermit searches most diligently for nesting material,



A. J. Mobbs
A female Long-tailed Hermit: Hummingbird in search of nesting material

only one ritualistic action has been observed, this being when the bird appears to collect (imaginary) cobwebs. The ritual consists of the hermit hovering (usually in front of the wire mesh of the flight) almost stationary, at the same time pecking at imaginary cobwebs. When the hermit considers it has collected enough cobwebs, the head is jerked sharply either to the left or the right; this movement is obviously meant to detach the cobweb from its moorings. The bird then flies directly to a chosen nesting site and goes through the action of winding the cobweb around the leaf. Throughout the ritual, the bird's crown feathers are raised and those of the throat extended. It is possible the hermit obtains some form of pleasure from this ritual, as it appears to enter a light trance at such times.

I have not allowed the hermit to build a nest, due mainly to the fact that it would undoubtedly become extremely aggressive towards other members of the flight in which it is housed. As it is, the bird often shows extreme aggression towards a female Blue-fronted Lancebill *Doryfera johannae*, probably because the latter not only roosts in the *Philodendron* chosen by the hermit as a possible nest site, but also because the lancebill collects nesting material itself.

Because the hermit is not allowed to build a nest, I have only witnessed what must be the commencement of nest building. This consists of the bird clinging to a favoured leaf and winding nesting material (either real or imaginary) around the leaf with its beak. It appears the tongue is also used (could this be to moisten the material with saliva?). Once the hermit considers the material is secure, it releases the leaf and flies around it in a spiral, twining the material as it does so.

Nest defence

At times, the hermit can show extreme aggression to any hummingbird which hovers or attempts to perch near the former's chosen nesting site in the communal flight. The hermit will also show extreme aggression when released from the flight; at such times, however, the aggressive display is directed toward the female *D. johannae* only. The latter display consists of the hermit hovering directly in front of the female lancebill, often moving rapidly either to the left or to the right so as to keep in line with the latter. At such times the hermit's tail is fanned to the utmost, the neck is arched and the beak is opened slightly; sometimes the bird can be heard to utter a low-pitched churring note.

If the door of the communal flight is left ajar, the hermit may cease to display, enter the flight and chase after the female lancebill, uttering a series of loud *chureks* as it does so.

Egg laying

The hermit laid its first egg in captivity on the 21st April, 1974; a second egg was laid on the 23rd. The bird laid again on the 25th October, a matter of days after completing its third moult in cap-

tivity. On the 6th November the bird laid again, and again on the 15th November. It was January the 4th, 1975, before the bird laid another egg; the bird laid again on the 17th and the 19th of March, and yet again on the 28th. All the eggs have been laid from the perch and, other than the first egg which the bird had difficulty in passing, all have been laid without problems. In fact egg number three (the only one which I have actually witnessed being laid) was produced without any signs of strain in a matter of seconds. Egg number four was slightly soft-shelled; the remainder have been perfectly formed.

After egg laying, nesting activity has been fairly low for a time, although the hermit has been seen to collect a small amount of material at such times, probably to renovate the imaginary nest.

Song

At one time I rarely heard the hermit sing; in fact during 1972 the song was heard only once. However, in the latter part of 1973, the hermit became more vocal and by December of that year, could be heard singing for approximately one hour, one morning out of four. During 1974 (except during the moulting period), the bird became even more vocal and was heard to sing on average three out of every five mornings; however, the song was rarely heard after 10 a.m. Why the bird should sing mainly during the morning, I cannot say. A female Reddish Hermit I owned was heard to sing at all hours of the day (Mobbs 1971).

When singing, the hermit fans the tail feathers and extends those of the throat. The tail is wagged up and down more slowly and with greater emphasis than normal. The bird looks about the whole time (as if for a mate (?)); sometimes leaving the perch for a second or so before returning and commencing to sing again. During these short flights, the feathers of the throat are usually extended.

Call-notes

The hermit can be heard calling many times throughout the day. These call-notes are used mostly when the bird is on the wing, or prior to taking to the wing. As already described, certain call-notes are used during display; there is also a weak call used only when the bird is distressed, usually through being chased by another hummingbird.

DISCUSSION

Much has been written with regard to *Phaethornis* species observed in the wild; *superciliosus* having such a vast range, has been studied and written about a number of times, yet to my knowledge, no ornithologist has given a detailed description of the display of this species. Nicholson (1931) wrote more on the song and call-notes than the actual display (see later). Like most authors, Nicholson was unable to sex *superciliosus* in the field and presumed that silent birds were females and those which sang were males. However, he mentions collecting a supposed pair, which when dissected, turned out to be both males.

Davis (1934) described what he considered to be a perched display of a male, but I am in agreement with Snow (1973), that the actions described are more likely to be exaggerated stretching movements usually made by the Trochilidae prior to taking to the wing after a rest period.

From observations made by me and other aviculturists, there is no doubt in my mind that both male and female *Phaethornis* have a song. Having already described the difference in the song of the male and female Reddish Hermit (Mobbs 1971), I have no doubt that should I have the opportunity to study male as well as female Long-tailed Hermits, I would be able to differentiate between the song patterns of the sexes. I should perhaps point out that to determine the difference, both birds would need to be taken from the same area, as there is a possibility that the song differs from one locality to the next. This certainly appears to be the case where *P. ruber* is concerned (Snow 1973).

The song of a supposed male *P. superciliosus* is described by Skutch (1964) as "A single squeaky note, incessantly reiterated, . . ."; by Davis (1958) as a "monotonous insect-like song 'jang, jang, jang . . .'"; and by Nicholson (1931) as a "continuous flow of monosyllabic short-clipped notes, hard and insect-like in quality 'Jang, jang, jang, jang . . .'", or sometimes double "janger, janger, janger". Snow (1973) does not give the vocal renderings the distinction of song, but writes that "the call-notes are a rapidly repeated *chip, chip, chip*, or *chit, chit, chit*, etc.". The main part of the song of my female is an oft repeated note which has a definite trill to it; however, the bird will also utter a few low warbling notes from time to time.

I feel certain the song of my female Long-tailed is an advertising one and because of this, feel that there is a possibility many of the supposed all-male leks described in various papers, could comprise both sexes, especially as certain authors state that it is difficult (or impossible) to sex *Phaethornis* in the wild.

The only references I have been able to find regarding combined display between male and female hummingbirds are, a brief account by Scamell (1966) describing a small part of the display performed by a breeding pair of Sparkling Violet-eared *Colibri coruscans* and the combined "tok" display of male and female Green Hermits *P. guy* (Snow 1974).

I have witnessed combined display in the Black-tailed Trainbearer *Lesbia victoriae* (Mobbs 1970), and also in the Purple-throated Carib *Eulampis jugularis*.

It is interesting to note that the combined display of the violet-eared and the carib are in certain respects similar. It is also interesting to note that not only are the sexes almost identical in these species, but that the female's display is similar to that of the male;

also a female will incite a male by displaying before him. Carib females will often display, even when the male to which the display is being directed is not in breeding condition; however, should the male fail to respond, the female appears to quickly lose interest, even though she may be in breeding condition herself.

The sexes in the Black-tailed Trainbearer are dissimilar and although I have on numerous occasions witnessed a combined display, it has always been the male who has been the instigator.

As the sexes in all *Phaethornis* species are similar and, as there is a good possibility that all females have a song, I feel that the displays described in this paper are those which would usually be performed by a female in breeding condition.

Display (a) is very much like the "tok" display performed by both sexes of the Green Hermit, as described by Snow (*l.c.*). If all the *Phaethornis* perform a combined display, then this would account for the displays described in this paper. As I have mentioned in earlier articles (Mobbs 1973 & 1974), it is possible that certain displays begin as aggression turning to mating display only when a willing partner is found. Although in the past I have associated such behaviour with male hummingbirds only, I see no reason why it should not appertain to females also.

Displays (a, b, c, d & f) could be acts of aggression, but would I feel most certainly turn to mating display if a willing partner were found. Display (e) is surely a form of soliciting.

Although much has been written on *Phaethornis* species, there is still much to be learnt especially with regard to song and display. What an opportunity this would be for some enterprising zoo or bird garden who could give over a small area in which a group of hermits could be kept. Such a group would need to be of the same species, taken from the same area and if possible be in a ratio of one male to every two females.

I would dearly like to carry out such an experiment myself, but living as I do in a first floor flat, space is very limited. Also it would be impossible for a private aviculturist such as I to obtain more than one or two of a species at the same time and if anything is to be learned, all the birds would need to be released into the prepared area simultaneously.

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METHODS OF SEXING EARED PHEASANTS

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The eared pheasants (genus *Crossoptilon*) are unique among pheasants in that they are the only species with no plumage difference between the sexes. Delacour (1951) notes: "The male can only be recognised from the female by the presence of a short spur on the tarsus, slightly larger size, stronger legs and the rounder, more extensive, red wattles on the sides of the face. When the spurs are missing, as happens sometimes in captive specimens . . . or are present in the female, the last three characteristics are the only and not too obvious distinctions between them."

These "not too obvious distinctions" may even be nullified in the case of young birds that must be sexed before sale as well as in borderline adult individuals—the "maley" females and the "femaley" males—to whom these criteria do not apply. I do not mention *Crossoptilon crossoptilon* because I have not yet had an opportunity to study this species, but the borderline individuals in my collection of *Crossoptilon auritum* and *C. mantchuricum* represented a substantial minority, enough to be of concern in avicultural management. There were literally several cases where I could only helplessly wait to see whether the unsexed bird would lay an egg: had I had a non-laying hen, even that would have been futile.

The first step in identifying the sex of an eared pheasant was to collect data on the distinctions noted by Delacour. With the exception of spurs, all involved size (larger size, stronger legs, more extensive face wattles) and this called for tarsal and face wattle measurements. When these measurements revealed overlapping of male-female size characteristics it became necessary to try other methods of distinguishing between the sexes. The most reliable method turned out to be the vent-sexing of chicks. Chromosome analysis of blood samples was not considered because of the prohibitive cost.

The behaviour of adult birds was analysed to see which elements would give clues to the sex of the individual. The role of sex dominance and the significance of breeding season postures and displays were examined.

The study of morphological and behavioural characteristics of 25 adult birds over six years revealed that there was no single visible and conclusive index. A borderline individual acquired as an adult had to be assessed in terms of a combination of factors, physical and behavioural, for successful identification of sex.

Morphological differences

(1) *Measurements*

The data collected on 15 Brown and Blue Eared showed that neither tarsal length nor tarsal diameter is a totally reliable criterion. The tarsal length of three Brown Eared males was 6 to 7.5 mm. longer than those of three Brown Eared hens; the tarsal length of four Blue Eared males was 0 to 7 mm. longer than those of five Blue Eared hens. The tarsal diameter of three brown and blue males was .5 to 4 mm. larger than that of eight brown and blue hens; two brown males had the same tarsal diameter as the thickest legged blue hen (12.5 mm.) and one blue male had a tarsal diameter .5 mm. less than the diameter of the thickest-legged blue hen.

In this sampling, the face wattles of males were consistently larger vertically and horizontally than those of the females, but the differences can be relatively small and hard to distinguish with the eye, particularly outside of the breeding season. Vertical measurements of the face wattles at their widest point showed a difference between the species with the blue males showing more extensive face wattles than the browns: a difference ranging from 4 to 13 mm. The brown males showed a vertical measurement 4 to 11 mm. larger than the hens, and the blue males 6.5 to 15 mm. larger than the females.

Horizontal measurements of the face wattles showed the brown males 2 to 13 mm. longer than the brown hens, and the blue males 3 to 10.5 mm. longer than the blue hens.

In correlating data for individuals, the female with the longest tarsus (Annie) also had the thickest tarsus. However, her face wattle was female-like. The female with the most male-like face wattle (Fannie, Annie's sibling) had an average female tarsal length and diameter coupled with fully developed spurs. The males with tarsal diameter similar to those of the females (James and Billy) had male-like tarsal length and large face wattles. Thus characteristics of the opposite sex in one area do not necessarily correspond with those in another area.

Of the 15 birds measured, two blue hens were siblings, one blue hen was the daughter of an unrelated pair and one brown hen was the daughter of an unrelated pair. In this limited sampling, related birds



Blue Eared Pheasant male

Lee E. Thompson



Blue Eared Pheasant female

Lee E. Thompson

did not show notable similarities.

Weights were taken on the charted birds on an ounce scale too unreliable to warrant giving the data. However, the average male weighed approximately a half pound more than the average female. The difference would only be significant if all birds weighed were in the same optimum condition, *e.g.* a male in poor condition might well be the same weight as a hen in good condition. Weights reported on the blue in the wild (Ekvall 1938) show cocks and hens alike weighed an average of six to eight pounds.

Attempts to sex three-month birds by measurement were unsuccessful. Measurements of tarsi and face wattles showed no pattern susceptible to analysis. The first problem was that of differences in rate of growth; the second that face wattles of young males do not show full development until they are in their first breeding season. With blue males this is usually when they are a year old, while brown males attain their full size, spur formation and breeding ability only in their second year.

(2) *Vent-sexing of chicks*

The most effective method of sexing chicks is by cloacal examination. The rudimentary organ or male process in the male pheasant at hatching is visible as paired thickenings with erectile tissue on the ventral wall quite close to the cloacal opening (Pettingill 1970); the female shows no such thickenings. They are visible to the naked eye but are difficult to spot without considerable practice and good light, preferably daylight. I have not been able to take precise measurements but the papillae seem to measure roughly a millimetre. An application of lidocaine ointment relaxes the sphincter muscle and makes it easier to evert the cloaca. Speed and gentleness are essential to prevent a nervous chick from going into shock.

The method of cloacal identification has, of course, been used by poultry hatcheries for many years to sex newly hatched chicks. It is often referred to as the "Japanese" method because it is so frequently used by chick sexers of Japanese origin (Card & Nesheim 1972).

There is another method occasionally used by poultry hatcheries which is worth mentioning although it is not practicable for the aviculturist. It involves the use of an instrument—a light with a probe attached—which makes it possible to see the testes of the male chicks through the intestinal wall. Its drawbacks, however, are considerable. The cost of the instrument is high (approx. \$450); it takes considerable skill to use and used without the requisite skill can damage the delicate internal tissues of the chick. Since the testes appear only as a shadow it is probably no more accurate than cloacal examination.

Behavioural differences

Behavioural observations of sex distinction are, of course, infinitely more complex than morphological parameters, but some of the more

obvious elements are relatively easy to observe. Changes in sex dominance, keeper-oriented aggression and courtship behaviour can be most useful in conjunction with morphological factors to distinguish sex. Unfortunately, these appear only during the breeding season.

Observations on sex dominance

Outside the breeding season, sex dominance is not a reliable index. Individual differences are so marked that it is impossible to generalise. Beebe (1918-1922), renowned for his description of pheasants in the wild, has a brief note on the behaviour of eared pheasants in captivity: "The sociality and gregariousness of eared pheasants is more pronounced than that in any other species of this family. There is a complete lack of masculine pugnaciousness, chief cause of flock and family dissension among gallinaceous birds. When several birds are kept in captivity in a runway they are almost always close together. No one bird, male or female, seems to take the lead but there is seldom more than a moment when a trio or quartet of birds are more than a few feet apart."

My own observations differ somewhat from Beebe's although I have seen the peaceable world he describes, particularly among young birds before their first breeding season. In general my experience has been with adult birds penned in pairs. Since eared pheasants are basically monogamous, this arrangement strengthens the pair bond and holds less potential for conflict than there may be with birds kept in trios, or indeed in larger groups. I know of only one breeder who attempted flock breeding of eared pheasants and he was forced to give it up because of fighting among the hens.

Either male or female dominance may be seen outside the breeding season or as Beebe remarks, neither of the sexes may take precedence, and it may be more accurate to discuss this factor as rank in the social hierarchy. The most obvious indication of rank in compatible birds where there is no aggression is seen in the inter-individual reactions to the presentation of food treats: the ranking bird stands close to the food as he eats; the lower-ranking bird stands to the rear or to one side, stretches out his neck and grabs what he can. He quickly steps back if the ranking bird makes an aggressive head movement toward him. In some cases the lower-ranking bird is fearful of approaching at all, and rushes over only after the first bird has finished and wanders off. Although in the majority of cases the ranking individual is male, I had two females who considerably outranked the males. When treats were presented, the males were immediately chased away and were not permitted into the vicinity until the food had been consumed. After a short period the males did not even attempt to come forward for the treats. In both cases a change of pen and lengthy separation from the male did not change the rank order. It was only with the approach of the breeding season that there was a

complete turnaround, and the female rank bowed to male sex dominance. Schjelderup Ebbe (1924) generalised that in all animals female dominance has a detrimental effect on procreation. In the case of one of the two pairs described, no fertile eggs were produced and there may indeed have been no copulation. The other hen laid few eggs and less than half of these were fertile. Noble (1939) points out that the dominance drive in all vertebrates is continuous whereas the sex drive with its hormonal basis is cyclic. Thus in the birds mentioned, the hormone-induced aggressiveness of the males during the breeding season outweighed the dominance drive of the hens.

Male birds in general seem to go into season before the females who are less advanced physiologically in their sexual development and who need to receive psychological stimulation from the male to produce a normal sequence of reproductive behaviour (Bremond 1963). All seasonal references are based on the climate in my area of southern New York State and here early March with its lengthening daylight produces personality changes in the males as well as an easily observed morphological change—the face wattles appear enlarged and a brighter scarlet in colouring. Sometimes these changes may be noticeable on a warm bright day as early as January. A marked increase in calling, in restless movement and in aggressiveness towards the keeper are all very obvious at this time of year.

Vocalisation

A comparison of male and female calls is a reliable method of sexing eared pheasants and is worth noting here, although it may not be properly within the scope of this article since it requires equipment not available to most aviculturists. Calls recorded on magnetic tape and analysed from sonagrams show the female call has a frequency some 0.5 kilohertz higher than that of the male. (Thompson, work on vocalisation of *Crossoptilon* in progress.) This small but consistent difference is not obvious to the human ear.

A very obvious phenomenon, however, is the pronounced increase in calling which occurs among the male birds at the onset of the breeding season. This increase was measured by monthly one-hour tape recordings made at one hour after sunrise.

In January calling was heard for 11.5 seconds, in February for 5 seconds, in March it rose dramatically to 79.5 seconds and in April to 83.5 seconds (this timetable dovetails with testosterone development in the males induced by lengthening daylight; taping dates: 6th January, 9 hrs. 27 min. daylight; 19th February, 10 hrs. 51 min.; 10th March, 11 hrs. 40 min.; 21st April, 13 hrs. 29 min.). By May, calling was reduced to nine seconds; in June and July there was no calling at all, but in August calling rose to 73 seconds with both males and females involved.

The pattern is revelatory when seen within the context of the annual

cycle of vocalisation. During the year both males and females call. Calling bouts may be initiated by either male or female and the call of a single bird triggers calling from the others that may last up to a minute or more. The winter, with short days and bad weather, is a relatively quiet time and the increase in calling which takes place in March is almost entirely restricted to the males. The hens appear in a relaxed state and show no change from their normal winter behaviour. The exception may be a hen penned alone or occasionally the ranking bird among two or more females penned together. She is likely to initiate or join in the male calling bouts.

This social phenomenon of the male calling bout would seem at this period to fulfil a sexual stimulatory function, a mutual building up of sexual tensions in the males which will lead at a slightly later stage to more specific courtship displays. In the wild this period would be analogous to the time before the winter flock breaks up into individual pairs. Beebe reports that eared pheasants ramble in flocks of 10 to 30 birds during the winter; in spring they separate into pairs, those which seem to be old mated pairs going off quietly, hinting there is tacit acceptance of the old tie even during winter flocking.

The increase in the volume of calling in March and April and the subsequent drop off in May indicates that frequent calling is associated with the early part of the breeding season when the males begin to go into breeding condition and when, in April, they court the hens with tidbitting and display. When the breeding pairs are established and copulation and egg-laying are in full swing, calling falls off dramatically and does not increase again until August. The breeding-laying cycle in our area starts late April to early May and lasts to mid or late June.

Aggressive behaviour

A typical index of male behaviour which develops or is heightened in the pre-breeding season is aggressiveness toward the keeper expressed in posture and sometimes attack. Since most eared pheasant chicks are hand-raised in small groups, and the species is very sociable and gregarious with humans as well as conspecifics, the chicks become extremely tame. The tamer the male the more fearless and aggressive he becomes at this time of year: this may involve some degree of mal-printing or it may be a territorial defence reaction to confinement in a relatively small area, or both.

The posture shown to the keeper by an aggressive male has elements of the courtship display that will later be directed toward the female. In aggressive display, the contour feathers are raised so that male looks much enlarged, the wing facing the keeper is slightly drooped with occasionally a slight spreading of the last two or three primaries. The opposite wing is slightly raised so that it is visible above the back which is tipped toward the keeper and this adds to the appearance of

greater size. The rump contour feathers are so exaggeratedly raised as to give the appearance of a hump. The face wattles are bright scarlet and much enlarged. The whole appearance presents a beautiful example of what Heinroth (1930) called "Imponierungsgehaben", a posture designed to impress the courted female and to threaten a competing male. As the bird moves around or toward the keeper he utters a repetitive conversation sound which is louder, more insistent and produced at a quicker tempo than when he is in a non-aggressive mood. Both the appearance and the vocalisation seem threatening and the bird seems to be exhibiting agonistic behaviour; he is torn between the incompatible desire to attack and the desire to flee (Morris 1970), he is balanced between aggression and fear. The balance can tip in either direction—if chased by the keeper he may flee or he may respond by direct attack. Or he may without provocation from the keeper move from aggressive display posture to attack. In either case the contour feathers settle down as he runs at the keeper, attacking shoe, leg, or a momentarily lowered head. The eared pheasant does not usually fly up to attack as a Silver Pheasant does. He will occasionally attack from a roost if the keeper approaches but the attack will still be on a horizontal level. The agonistic posture described above is quite different from the posture exhibited by eared pheasants fighting with conspecifics in which the feathers are sleeked down and a protagonist makes himself tall by stretching his neck to the utmost and then fights by beak-jabbing at the head of the opponent.

To complicate sex roles and distinctions further, it must be noted that the aggressive display posture described, *i.e.* raised contour feathers, slightly drooped wing, is not necessarily exclusive to males. I had two yearling hens penned together. The ranking hen took a female sex role toward me, that is she crouched for her keeper, and immediately thereafter proceeded to display toward a male visible in an adjoining pen. These ambivalent sexual demonstrations coupled with her large size and considerable spur development made me unable to sex her definitively until she started laying.

Lorenz (1935) in discussing species of birds, reports that "an isolated female deprived of male company always inclines toward exhibition of male demonstrative behaviour . . . a female can only respond in a feminine way when she is presented with a socially dominant conspecific". Thus my pheasant hen treated her keeper as a socially dominant conspecific and treated her pen mate and the male in the adjoining pen as though they were female and she was male. This hen furthermore was one of the exceptions mentioned above in a discussion of vocalisation, taking full part in the March calling bouts of the males.

In captivity the eared pheasant male may also be dangerously aggressive toward the hen. This type of behaviour seems to be most

common in the early part of the breeding season when the males have come into breeding condition and the hens are not yet receptive to mating. The lateral display presented by eared and most other pheasants is analysed by Schenkel (1958) as demonstrating aggressive-sexual tendencies sublimated by intimacy and sociability into non-aggressive sexual tendencies. However, he notes that the tenuous nature of the artificially induced intimacy of caged birds can lead to such aberrations as the killing of the female by the male.

Courtship and reproductive behaviour

In this section the chronology of male and female behaviour is outlined: (1) male tidbitting, (2) male display to attract and impress the female and to stimulate her desire for mating, (3) female crouching and head-weaving, indicating her readiness to mate, (4) mounting and copulation. The full description, involving a summation of the interactions of a breeding pair, which may take place over a period of weeks, follows.

The earliest ritualised courtship behaviour to be observed in the males is "tidbitting", a term used to describe courtship feeding, *i.e.* the presentation of food by the male to the female during the breeding season. Stokes and Williams (1971) in their article on galliform courtship feeding analyse several types and place *Crossoptilon* in the category of "freezing over the food". "The male approaches the food and dabbles a few times in cursory fashion, the beak held close to the ground. As he does so he begins to call. When the hen comes to within a metre of him he 'freezes' over the food, body taut and the beak held within a few centimetres of the ground. The cock continues to call until the hen has taken the food from the ground in front of him." Another category described is "dabbling and head movements". "The cock dabbles with the food, picking it up and dropping it numerous times. When the hen does not respond immediately, he exaggerates the head movements." From observations of my birds I believe that eared pheasants may be an intermediate type showing elements of both, depending on the intensity of the stimulus.

My birds are accustomed to daily greens, different varieties of fruit, peanuts, raisins, and occasional mealworms, and usually male and female come running as the keeper enters the pen. During most of the year both birds gobble up the treats as fast as they can, uttering a food vocalisation which alerts the remainder of the flock to the news that treats have been presented.

Mealworms, of which the birds never seem to tire, present the strongest stimulus for tidbitting. Starting in March, sometimes earlier, tidbitting behaviour is seen in adult males. When mealworms are presented, the male, head held close to the ground, dabbles with the mealworm, picking it up and dropping it numerous times and giving his food vocalisation. During this performance his face wattles are

much enlarged. Only after the female has eaten a good number of mealworms (anywhere between six and 12) does he start eating as well.

One year no mealworms were fed during the winter. The first time they were presented in April three adult males "froze" as described by Stokes and Williams. One of the three "froze" only until the hen had consumed five or six mealworms, then he started dabbling, and finally he ate. The following day none of the males froze—all dabbled. (Three yearling males neither froze nor dabbled—they just gobbled right along with the hens.) It would seem that under the most powerful stimulus—mealworms to which the birds are not accustomed—freezing over the food takes place, but that in the case of a lesser stimulus, *i.e.* mealworms as a more habitual treat, the dabbling response is invoked.

Tidbitting is associated exclusively with courtship behaviour. Once a pair is well into the breeding season it is no longer seen. On the other hand, when I experimented with injecting testosterone into a brown male who stopped mating with his hen early in the season, he restarted the courtship-breeding cycle with aggressive postures toward me, tidbitting with his hen, display and attempted mounting. Unfortunately, by that time the hen had stopped laying.

Observation of tidbitting is a reliable index of sex distinction. I have never seen a female tidbit, and although it is not inconceivable, it would be most unusual.

When the male goes into full breeding condition, in April, he presents his courtship display to the hen and attempts to mount her. Most males prefer privacy for courtship and I have observed only one full-fledged display. James, an adult blue male, had spent the winter months in a pen adjoining that of Mary, a two-year-old hen who had never been mated. In early April the gate between the pens was opened. Mary entered James's pen and started foraging. James moved in front of her and immediately presented a lateral display. His face wattles were enlarged and glowing scarlet. The primary feathers on the side facing the hen were drooped with the tenth primary touching the ground. The upper tail-coverts and the contour feathers over the rump were stiff and erect; the tail feathers were fanned out. The body and the tail were tipped toward the hen. The primaries and secondaries on the far side of the hen were spread but the wing was not drooped. The head was curved with the beak pulled in toward the chest but was angled away from the hen although the curve of the head made it possible for the eye of the male to be constantly on the hen while showing his vivid face wattle to the best advantage. As Mary moved about James pursued her at a measured pace, constantly attempting to get in front of her to present his display. Early on during the display James tried to leap on the hen but she ducked away and he again started displaying. Occasionally he stopped to beak-wipe or to bang his beak against the feeder. He ignored the peanuts that were strewn

about and did not give Mary a chance to stop and pick at them, for she kept moving away as he approached. The display was unceasing for 30 minutes, then it became less marked, and after 50 minutes it ceased entirely. James foraged for about five minutes, and then started displaying again. At no time did the hen indicate mating readiness. This display was accompanied by only minimal vocalisation and no calling.

Breeding males show much less reluctance to copulate in front of the keeper than they do to display. The copulations observed have involved long-mated pairs and occurred either after a brief chase of the hen by the male, or after an invitation extended to the male by the female in a crouching posture. The hen crouches on her tarsi, raises her wingbows slightly, drops her tail and starts a pronounced head movement, weaving the head back and forth in an arc-like rhythmic movement, beak tucked in toward the chest, until she is mounted. Possibly since *Crossoptilon* lacks sexual dimorphism this is a signal that aids in sex recognition, or perhaps it is a now-ritualised way of drawing attention to her sexual invitation and distinguishing it from the ordinary postures of resting or dust-bathing. Schleidt (1967) notes that among gallinaceous birds the squatting of the hen and the nape-grabbing of the male as he mounts is a method of orientation—if the heads of the two birds are properly aligned the bodies will line up accordingly and successful copulation can take place.

A crouching head-weaving female almost invariably causes a male in breeding condition to mount. He grabs the nape of the hen in his beak and treads her with wings slightly drooped and tail feathers fanned out. The hen's tail moves to the side to facilitate cloacal contact. After copulation both birds ruffle their feathers and shake themselves vigorously.

Summary

A summary of the conclusions on the morphological and behavioural elements analysed shows that :

- (1) measurement of tarsal length is useful but not consistently reliable.
- (2) measurement of tarsal diameter is not a dependable criterion.
- (3) face wattle measurements appear reliable but differences may be small.
- (4) weight difference is a doubtful aid.
- (5) the only definitive method of sex distinction is the vent-sexing of chicks.
- (6) behavioural differences such as changes in sex dominance, increased male calling, keeper-oriented aggression, are all linked to the breeding season.
- (7) male courtship behaviour (tidbitting and courtship display) and female courtship behaviour (crouching and head-weaving) are excellent guides but even here aberrant male-female behaviour

may cause confusion.

- (8) A borderline adult must be assessed in terms of a combination of physical and behavioural factors for successful sex identification.
- (9) analysis of sonagrams of male and female calls show consistently higher frequencies in the call of the female.

Acknowledgements

My very special thanks to Dr. Wolfgang M. Schleidt, Professor of Zoology, University of Maryland, who led me to study pheasants in the first place, for his illuminations on animal behaviour and communication and his unflagging guidance and support.

Dr. C. S. Shaffner, Professor of Poultry Husbandry, University of Maryland, has been most helpful on morphological and physiological problems.

Dr. Alexander Wetmore and Dr. George E. Watson, of the Smithsonian Institution, gave me instructions on tarsal measurements, and Mrs. Roxy Laybourne, of the Smithsonian Institution, instructed me in the vent-sexing of chicks.

MEASUREMENTS OF TARSI AND FACE WATTLES

<i>Individual</i>	<i>Tarsal length</i>	<i>Tarsal diameter</i>	<i>Face wattle, vert.</i>	<i>Face wattle, horiz.</i>
MALES				
Brown : George	105.5 mm	13.0 mm	30.0 mm	48.0 mm
Mac	105.0	12.5	36.0	51.0
Hilles	105.0	12.5	34.5	54.0
Blue : James	100.0	12.0	40.0	50.0
Dr. James	102.0	14.5	43.0	49.0
Billy	103.0	12.0	41.0	54.0
Vaughn	105.0	14.0	41.0	52.0
FEMALES				
Brown : Jane	98.0	12.0	25.0	44.5
J.C.	98.0	11.0	29.0	41.0
'74	99.0	11.5	26.0	46.0
Blue : Cherry Pie	98.0	10.5	31.5	44.0
Annie	100.0	12.5	28.0	44.0
Fannie	99.0	12.0	33.5	46.0
Grantie	99.5	10.0	33.5	43.5
'74	98.0	12.0	29.0	46.0

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NEWS OF CLÈRES, 1975

By J. DELACOUR

Breeding results at Clères in 1975 were among the poorest in many years. This unfortunate record was certainly due to highly erratic weather conditions in Northern France. After a wet, frostless winter, the spring was unusually cold, and there was a sharp frost the last night but one in May. Birds became upset by such freak weather and the consequences were unfertile eggs, or even no laying at all. Such was the case of normally reliable breeders such as certain waterfowl, particularly Red-breasted Geese or Demoiselle Cranes, which simply did not nest. This happened all over France.

Two pairs of Emus produced 24 young, but all the Rheas' eggs proved to be clear. This has become frequent all over Europe in the last few years, the reason for which remains mysterious. Inbreeding may be the answer.

We lost a male cassowary in a rather strange way. He became very ill in June with terrific internal haemorrhage. Dr. Ciarpaglini doctored him and he seemed to be cured; but he started bleeding again in July and died promptly, having lost all the blood. Autopsy revealed a puncture of the intestine due to a bamboo splinter the bird had swallowed.

Cranes did badly; we had only one clutch from the Crowned Cranes and two from the pair of Sarus, but no egg hatched, being clear or addled. Only one Black-necked Swan was reared out of three hatched and we had several infertile clutches, a rare occurrence. Various young geese were reared without difficulty, but few of each species.

Seven Cuban Whistling Ducks, however, produced 29 young, the largest brood from a trio, and we had a dozen Comb Ducks from a group of one drake and six ducks; it is important, with that species, to associate many females with each male. Among the ducks reared, all of fairly common species, I shall mention seven Greater Brazilian Teal.

Pheasants were also only moderately successful; we had a young pair of Bare-faced Curassows.

A number of pigeons and doves nested. Pairs of Common and Victoria Crowned Pigeons had three weeks old squabs in the nest, but they died without apparent reason, no doubt of some disease. Some Ashy and Tambourine Doves were reared.

Small birds were also rather unsuccessful. Broods of Black-faced Scarlet Tanagers, Spreos and Parrotbills did not survive. Two pairs of Orange-headed Thrushes produced 15 young, but only two were saved. They were heavily parasitised by some kind of roundworm, which, in other birds, are fairly easily controlled by vermifuges; but thrushes do vomit the medicine and therefore cannot be cured.

We hand-reared three Kookaburras, but our old breeding pair, which has so far produced 17 young at Clères, behaved in the most unpredictable way. The first clutch of two eggs, in May, was easily hatched in an incubator and raised as usual; a second clutch produced another one. Then, a few days later, we found that the hen had been attacked and slightly damaged by the male. She was removed and she promptly recovered, but the male attacked her as soon as we put them together. We removed him, hoping that such a change would alter his attitude. He, however, attacked her again after he was returned to the aviary two weeks later. Finally, the two birds have been living since in two adjacent outdoor cages, and it is hoped that peace between them will be restored during the winter. It is, however, puzzling behaviour, after four years of perfect pairing. A three years old pair has not yet bred, although frequently visiting the nesting boxes and hammering on the walls during the spring and summer.

* * *

ADDITIONAL NOTES ON DISPLAYS OF QUEEN CAROLA'S BIRD OF PARADISE

By C. B. FRITH (Phuket Island, Thailand) and D. COLES
(Prospect, South Australia)

As a result of a previous publication (Frith 1968) and some correspondence a meeting occurred between the present authors. David Coles was for some time a bird keeper at Chester Zoo, where observations were made for the above mentioned publication. Whilst there he made notes on the behaviour of the pair of Queen Carola's Birds of Paradise *Parotia carolae* observed by Frith in 1967. Due to the frequency of observations made by Coles he was able to obtain an impression of more typical behaviour of this pair. As the previous data were recently published in this magazine, including several descriptive drawings, reference is given to it rather than repeating display descriptions here. The following notes were made by Coles during the summer of 1968. All reference to previous publication refers to Frith (1968) unless otherwise stated.

No additional pre-high intensity displays were observed. Those already described were witnessed often and showed little or no variation. A significant and considerably different pattern of behaviour was noted regularly, however, during the high intensity displays. This display was seen four times by Frith, being executed each time on a perch and it was then considered possible that this may be the case in the wild. Observations by Coles, however, do not agree with this, for out of approximately thirty-six high intensity displays seen by him, only one was performed on a perch, the rest being performed on the ground. The area of ground used for these displays was kept clean and bare by the male. The bird postured itself in exactly the same way as previously described but hopped continuously during the display and in addition moved the head conspicuously from side to side.

A noteworthy sequence of behaviour recorded by Coles is an aspect of which Frith made brief mention as it was observed only once. Frith saw the female "fly down beside the male, hang upside down, look at him and flutter to the ground" just after the male had displayed. This peculiar female behaviour was witnessed by Coles very often, not only after the male had displayed but also during male displays. During the male's performance the female would "somersault backward from the top branch above the display area to another below, missing a central perch on the way down". Occasionally she would flutter completely to the ground and watch the male displaying there. Although this was seen often by Coles he did not note the female hang down prior to falling, the bird simply falling backward and somersaulting. This peculiar action by the female is unlike anything previously recorded for birds of paradise and may be the aberrant behaviour of a captive

bird. This point, however, requires the observation of wild birds for confirmation.

From the above it would seem safe to assume that Queen Carola's Bird of Paradise does display on the ground in the wild and that this may be the more normal situation, particularly in view of evidence presented by Gilliard (1955, 1969). Captive *Parotia wahnesi* display on the ground and on perches (Crandall 1940). Wild and captive male *P. sefilata* are recorded displaying on the ground by Bergman (1957) and ground displaying by captive male *P. lawesi* is described by Crandall (1931). It is also noteworthy that with the recent discovery of the bower system of *P. wahnesi* (Schodde & Mason 1974) all species of *Parotia* are now known to clear and maintain remarkably clean display areas on the forest floor. These facts also support the probability of *P. carolae* being mostly a ground displaying bird, whilst some display almost certainly regularly occurs on well used perches above the cleared area. For example the "sideways facing" display previously described would appear to be exclusively a perch display.

Another important point confirmed by the additional observations of Coles is that during high intensity display *P. carolae* does move the head from side to side as is described for *P. wahnesi* (Crandall 1940), *P. sefilata* (Bergman 1957) and *P. lawesi* (Crandall 1931). This head movement has been noted to cause the 'flag wires' to "bob" (Bergman 1957, Crandall 1931) or "rotate" (Crandall 1940). Notes on *Parotia lawesi* in the wild (Southern Highlands, Papua New Guinea) with a photograph of the display area appeared in the Magazine (Smyth 1970), but there were no details of the actual display.

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1975 AT LONDON ZOO, WITH BRIEF NOTES ON 1974

By P. J. S. OLNEY (Curator of Birds)

Many of the aviaries have had changes in plants, decor and occupants. We are continuing to set up breeding groups and to find mates for our single birds—unfortunately this task was made more necessary by an outbreak of botulism in the Bird House during December 1974 when thirty-seven birds were lost (VET. REC. (1975) 97 : 204-205). Some of the birds for whom we have found mates include Laminated Hill Toucan, Crested Cariama, Spectacled Owl and Nduk Eagle Owl.

Species new to the Collection, or not seen here for many years, include Crimson Seedcracker *Pyrenestes sanguineus* and Yellow-ridged Toucan *Ramphastos culminatus*. A pair of Brown Eared Pheasants was a very welcome gift.

Hatchings of perhaps the most interest are—in 1974, a Blue-backed Manakin, Oystercatcher, Knysna Turacos and the Imperial Pheasant. In 1975, a Laughing Kingfisher (first since 1969), two Sarus Cranes, Scarlet x Purple-capped Lory, Grey-headed Gull, Sacred Ibis, Jerdon's Imperial Pigeon, Oystercatcher, Abyssinian Spotted Eagle Owl and four Snowy Owls.

We were particularly pleased to receive from Perth Zoo, Australia, in the summer of 1974, a welcome gift of Splendid Fairy Wrens, Crested Terns, Banded Rails, Banded Plovers, Stone Curlew and Yellow-winged Honeyeaters.

Autumn 1974 saw the demolition of the popular Waders' Aviary as the site is being developed to house carnivores, but fortunately a new aviary will take its place. Some of the occupants of the old aviary were re-housed in the Eastern Aviary and the others in the Southern Aviary : both these aviaries have been landscaped with some replanting. The Southern Aviary now contains an interesting collection of sea birds, perhaps the most notable being a colony of Gentoo and Rockhopper Penguins.

The Bird House was repainted during 1975 and new indoor aviaries have been completed, Splendid Fairy Wrens, Laminated Hill Toucans and Red-headed Barbets occupying some of them.

The most notable breeding success is that of the Jackson's Hornbills, the parents having reared four young in two years, in three separate broods. A captive-bred pair of Black and White Casqued Hornbills were received in exchange at the beginning of the year. Great favourites and delightfully tame are 'Pansy' and 'Gillespie' a Wreathed and a Southern Pied Hornbill, hand-reared in Thailand and presented to the Zoo. More recent arrivals include three very young Tarctic Hornbills *Penelopides panini* from the Philippine Islands. A sad loss in March was the death of a Rose-crested Cockatoo,

having been here for 45 years (it was presented in 1930). Also, sadly, the male of our pair of Congo Peafowl (on loan from Antwerp Zoo) died recently, and it was decided to send the single female to join the breeding group at Jersey Zoo.

NOTES FROM THE ST. LOUIS ZOO

By STEPHEN R. WYLIE (Curator of Birds)

Creation of the St. Louis Zoological Park was initially activated by the 1904 World's Fair. This event, which commemorated the Louisiana Purchase, took place in the city's Forest Park and for the occasion the Smithsonian Institution financed the construction of what is still one of the world's largest flight cages. Following the fair, the exhibit, which measures 69.5 metres long, 25.6 m. wide and 15.2 m. high, stimulated public interest enough to establish what is now one of the most popular and famous zoological parks in America. Besides an outstanding assortment of mammals and reptiles, the zoo traditionally has exhibited a bird collection that has made significant contributions to avicultural and ornithological knowledge.

For the past two years, the bird collection with its exhibits and support facilities have undergone numerous alterations and improvements. The Bird House exhibits, for example, were repainted and decorated with various zoogeographic and ecological themes in mind. The department's incubation, breeding and rearing facilities all received attention, with emphasis placed on the construction of waterfowl, game-bird and crane breeding areas. Two hospital-holding rooms were painted, air-conditioned, and new cages for sick and injured specimens were installed. The Stupp Memorial Pheasantry, constructed in 1954, was renovated.

Diets utilised within the department were evaluated and readjusted in order to fulfil the nutritional requirements of each specimen. One of the most important tasks undertaken involved reviewing the size and composition of the bird collection itself. Considerations were given to the availability of exhibit space, propagation potentials, scientific and educational value, staffing and other managerial factors. As a result, several avian species were either eliminated or procured in an effort to comply with these guidelines.

Since the previously mentioned projects, as well as others, required the full participation of bird department personnel, an active propagation programme received low priority. Yet, in spite of this, there were some interesting results. A total of 57 Emus and 27 Greater Rheas were reared during this period. Several species of waterfowl and game-

birds were hatched and reared, including Nene and Lesser White-fronted Geese, Germain's Peacock Pheasants, Satyr Tragopans, Crested Wood Partridges and Vieillot's Crested Fireback Pheasants, to name a few. Probably the most notable successes occurred with cranes. In 1974 two Eastern Crowned Cranes and two Stanley Cranes were hatched and reared. In 1975 two Indian Sarus, two Stanley and five Eastern Crowned Cranes were hatched and reared, all from artificially incubated eggs. A Demoiselle Crane was hatched by its parents, but they failed to rear it. Various smaller species such as the Red and White Crake, Spur-winged Plover, Red-rumped Parrot, Orange-fronted Conure, Diamond Dove and the Saffron Finch also produced progeny. Certainly the most significant event was the hatching and rearing of a Mottled Owl *Ciccaba virgata* which is believed to be an avicultural "first" and which forms the subject of a paper in preparation.

With the majority of rehabilitation projects now completed, our attention can be focussed on an accelerated breeding programme. Nesting facilities have been constructed and implemented where possible, and a continuous search is being made to pair up unmated specimens.

* * *

NEWS AND VIEWS

Among the notable breeding successes at the Cologne Zoo during 1975 are two White-browed Coucals *Centropus superciliosus*, eight Rothschild's Grackles, two White-checked and one Pink-crested Touraco.

* * *

Mr. Cliff Wright sends a report of the nesting and hand-rearing of the Moluccan Cockatoo *C. moluccensis*, also known as the Rose-crested or Salmon-crested Cockatoo. In 1972 he obtained a female to make up a pair, her sex being distinguished by the iris colour—brown in the female and black in the male. In March 1974 one egg was laid but this became buried in the mixture of sawdust and peat moss that had been put into the wooden barrel nest; two more eggs were laid in August, but failed to hatch. They had been incubated, apparently by both the pair for 36 days, the male sitting by day and the female by night. In June 1975 two more eggs were laid and after 38-39 days young were heard. The chicks were covered with yellow down and the beaks were light in colour.

The diet provided included peanuts, raisins, apple, spray millet, Budgerigar seed mixture, sunflower, paddy rice, bread, cheese, Farex mixed with Ostermilk, honey and water, maggots and chickweed, both these latter foods being eaten in large quantities, dandelion leaves being also eaten, but no fruit was taken after the hatching until late August when some pear was eaten. Meat was offered, but was not eaten. On September 6th one chick died (at 43 days of age) and on the 11th when it appeared that the parents were no longer feeding the survivor, it was taken and hand-reared on Heinz strained baby food, given hot by means of a syringe and by November the chick was being weaned on to seed. It flew for the first time at 104 days of age.

* * *

The 1975 International Symposium on Zoo Design and Construction held at Paignton was such a success that it is proposed to hold another this year, from May 11th until May 13th, also, of course, at Paignton. As before, the symposium will include aviary design and accommodation for a wide range of birds and, also as before, speakers from many parts of the world are expected to attend. Particulars are obtainable from Mr. A. P. G. Michelmore, Managing Trustee, The Herbert Whitley Trust, Primley Estate Office, 190 Totnes Road, Paignton, Devon.

* * *

Mr. Joseph Bell, Curator and Chairman of the Department of Ornithology at the New York Zoological Society's park writes to say that in addition to the Green Wood Hoopoes, breeding successes in *The World of Birds* include Tawny Frogmouths (three breeding pairs), Sun Bitterns (two breeding pairs, themselves hatched there), Double-toothed Barbets and a White-breasted Touraco *Corythaixoides leucogaster*.

* * *

The American Federation of Aviculturists' journal WATCHBIRD contains an account by John Tobin and Richard S. Rundel of the first captive breeding of the Plate-billed Mountain Toucan or Laminated Hill Toucan *Andigena laminirostris*. The birds had been in the Los Angeles Zoo collection since 1967 and had been kept with other species of mountain toucan and some small parrots, all agreeing well together until nesting boxes were put into the aviary, when the toucans became rather aggressive, particularly towards the parrots and they were then separated into pairs, each pair with its own aviary. The first egg was laid in July 1974, the nest being in a hollowed palm tree some two feet in diameter and about eight feet tall. The first egg and the second disappeared, but in September 1974 one egg hatched after 16 days incubation, but the chick died after 21 days. Two eggs laid in December hatched early in January and the chicks were fed by the parents on "pinkies" (baby mice?) and pieces of fruit, cut up mice being added later. Throughout the incubation and rearing periods the adults enlarged and deepened the nesting cavity to about six feet deep. The first chick left the nest at seven weeks of age and the second two days later. Both were independent at 10 weeks.

* * *

The Royal Zoological Society of South Australia's 97th Annual Report records the breeding in the Adelaide Zoo during 1974-75 of 58 bird forms, notable among them being the Little Lorikeet, Hooded Parrakeet, Red-tailed Black and Gang Gang Cockatoo, the Tawny Frogmouth and the Regent Bowerbird.

* * *

Among the 1974 records of rare breeding birds in the United Kingdom, published in BRITISH BIRDS are two of Golden Oriole, three of Fieldfare, 19 probable breedings of Redwing, five of Cetti's Warbler, one of Savi's Warbler and about 560 pairs of Dartford Warbler probably bred in southern England, compared with 11 after the severe winter of 1962-63; also 7-11 of Snow Bunting in Scotland. A Red-tailed Wheatear *Oenanthe xanthopyrmyna* on the Isle of May, Fifeshire, on August 31st would be, if accepted, the first record of this species for the British Isles.

* * *

There may be some confusion over what constitutes a generation in the breeding of birds. The young of a pair breeding in each of three years would be their "children" whereas the third generation would be the "great grand-children" of that original pair.

* * *

As an economy measure the correspondence will in future be set in 10/11 point type in place of the smaller 8-point.

M.H.H.

REVIEW

PINE CROSSBILLS: A Scottish contribution. By Desmond Nether-sole-Thompson. Berkhamsted. T. & A. D. Poyser. (1975). pp. 256. One col. pl.; 24 photos, drawings, 5 appendices, 12 tables, bibliogr. £5.00.

For many people it is the difficult or elusive species which really excite them and encourage their interest, as a result of which we may find that we know far more about some rare and distant species than we do of those that come to our own gardens. Among the European finches the crossbill has always been the exceptional species, erratic and eruptive in its movements and often furtive and unseasonable in its nesting; and this is one of the species that attracted the author. His field studies were mainly devoted to the Scottish bird but he had also watched the Common Crossbill in breckland, and in the present volume he combines his own extensive studies with other information, published and unpublished, to produce a monograph of the European forms, with additional data from Siberia, Asia and North America to an extent which rather invalidates his subtitle.

He uses the name "pine crossbill" for what we would call the Parrot Crossbill, and refers to the Scottish bird as the "Scottish pine crossbill" (with lower case initial letters for proper names, I regret to say). The link between bill-size and the type of conifer seed most extensively eaten is obvious and perhaps justifies the name; the Common Crossbill being apparently a Spruce specialist. The name does however suggest stronger affinities between the Scottish Crossbill and Parrot Crossbill than is usually recognised. The book discusses the relationship and origin of the various forms in both the earlier chapters and in an appendix by Alan Knox, but the suggested solution of treating the European birds as three species is not wholly convincing.

The author is particularly interested in the nesting of the birds, and much of the text is devoted to various aspects of nesting behaviour. Most of the statistical data are relegated to tables at the end of the book and the author's great virtue is his ability to communi-

cate some of his enthusiasm and to bring the text alive, describing the birds in the context of their habitat and the species with which they share it. This may lengthen the text at times, however, and the blow-by-blow account of days of observation at a nest, in an appendix, seems a little self-indulgent; but in the main text the frequent recourse to personal experience and observation enlivens the flow of facts.

In addition to the information on the various aspects of the breeding period there are also good chapters on voice and food. Discussion of distribution and irruptions deals largely with the British Isles but gives interesting correlations between breeding, irruptive behaviour and the state of the conifer seed crops. There is also an excellent series of photographs of the birds, but I do not share the author's enthusiasm for the single colour plate by the late George Lodge. There is much valuable summarised information as well as statistics in the appendices and tables, and a useful selective bibliography. In summary, I think this is a useful and informative book with enough personal touches to make one conscious of the author in the background, and to share his pleasure in these birds.

C.J.O.H.

* * *

CORRESPONDENCE

HATCHING WATERFOWL EGGS BY INCUBATOR

I was interested in Mr. Smith's letter in the last number of the Magazine and am grateful to him for the trouble he has taken in consulting commercial hatcheries. I want to make it clear, however, that I was not asking whether cooling eggs was necessary, for I am quite sure that it is, in spite of what commercial hatcheries say, especially in the case of still air incubators, but it should be controlled.

A point I was trying to make is that, just as in natural incubation there is a difference between the Phasianidae and the Anatidae in that the latter cover the eggs with body down while the former leave them uncovered, so in artificial incubation different methods of cooling should be employed.

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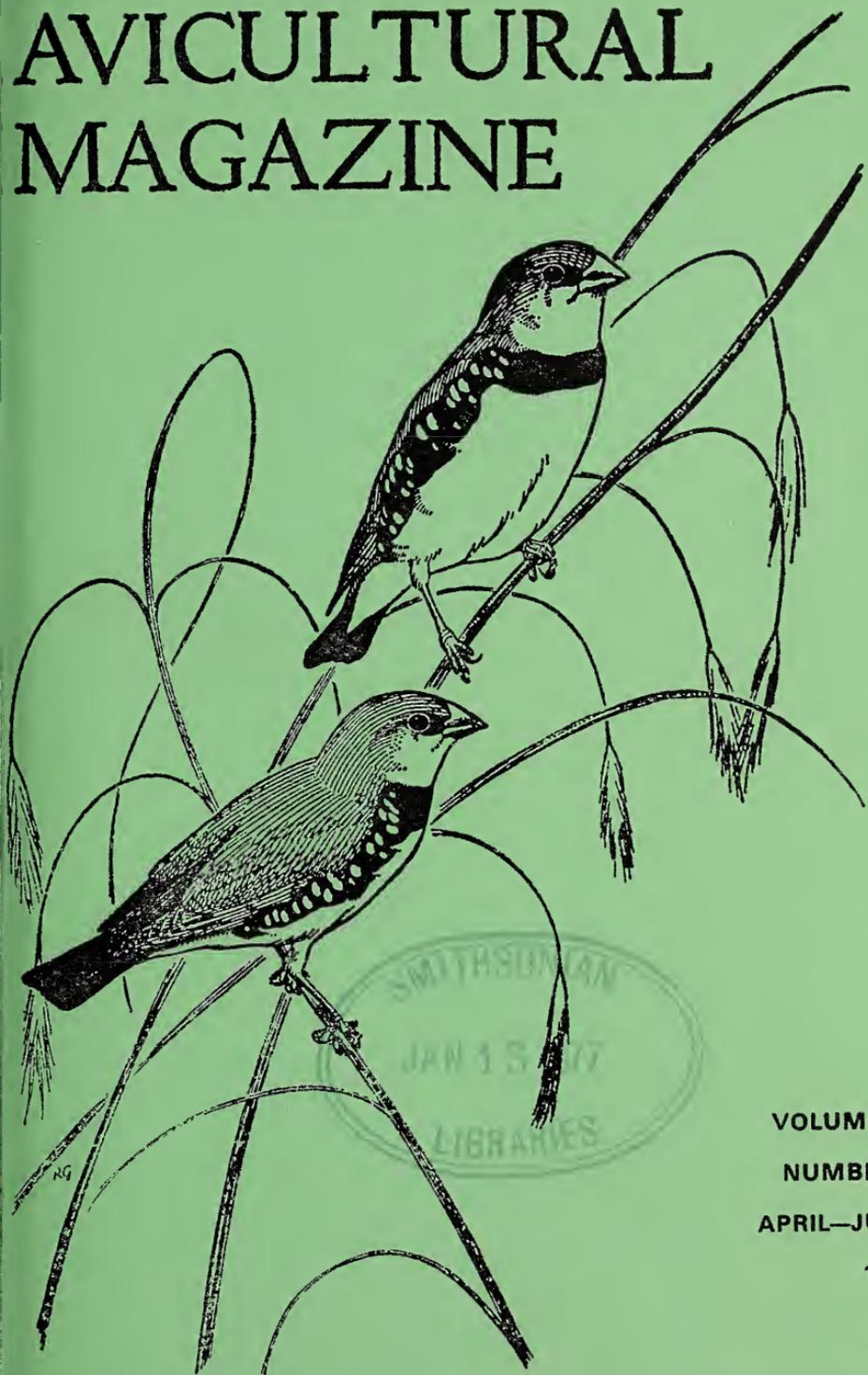
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THE AVICULTURAL SOCIETY

Founded 1894

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R. DAVID DISEY

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APRIL - JUNE 1976

BLAKISTON'S FISH OWL

Ketupa blakistoni

By BERNARD SAYERS (Chelmsford, Essex)

The fish owls are a group of large owls entirely confined to the Old World. Physical dissimilarities permit them to be easily divided into two genera; the three African species belonging to the genus *Scotopelia* lack ear tufts and have quite well developed facial discs, whereas their four Asian counterparts of the genus *Ketupa* have pronounced ear tufts, but have less prominent facial discs. The Asian species, with their ear tufts, mainly rufous coloration and large size closely resemble eagle owls; indeed for many years they were included in the genus *Bubo*. However, the Asian fish owls do differ from eagle owls in three respects. Their legs, like those of most other species that snatch fish from the water, are coarsely scaled and devoid of feathers, the only exception being Blakiston's Fish Owl that does have feathered tarsi. They also have less pronounced facial discs and the feathering lacks the fimbriated edges and is much coarser than that of eagle owls. Presumably, as much of their prey is aquatic, a silent approach is not so important as it is to a species that preys on mammals and birds.

The species depicted in R. David Digby's excellent plate is the very rare Blakiston's Fish Owl. The coloured plate portrays the single bird exhibited in the Weston Underwood collection of our member Christopher Marler. This specimen was received from a Japanese Zoo in exchange, and it is possibly the only example in a western zoo at the moment.

Text books give Blakiston's Fish Owl's length as 510-610 mm., but I would estimate that Mr. Marler's bird is larger than this, 700 mm. probably being more accurate. Certainly its large size, the pronounced taper of the body towards the long neck, its small head and huge bushy ear tufts give it a spectacular if rather bizarre appearance.

Four races of this owl are recognised; the nominate form *Ketupa b. blakistoni* was described by Seebohm in the PROCEEDINGS OF THE ZOOLOGICAL SOCIETY OF LONDON in 1883 and it is said to be resident on the islands of Kunashiri and Hokkaido. The subspecies *karafutonis* was first recognised by Kuroda in TORI in 1931. This race is found on the Island of

Blakiston's Fish Owl

Ketupa blakistoni

Drawn by R. David Digby

Plate donated by Palaquin Fine Arts, London

Sakhalin, south of the Tym River. Seebohm also described the subspecies *doerriesi* in the BULLETIN OF THE BRITISH ORNITHOLOGISTS' CLUB in 1895. This race is apparently confined to the Ussuri River south of Vladivostock. Lastly the subspecies *piscivorus* is known only from the type locality in western Manchuria and was first described by Meise in ORNITH. MONATSHER, in 1933.

Unfortunately, little is known of Blakiston's Fish Owl in the wild: it is thought to be resident in its range in spite of the very severe winters that affect much of the area. One can assume that if the diet consists mainly of aquatic prey, then the vicinity of fast flowing rivers that remain free of ice, would provide the only suitable territory for winter occupation; however, since fish owls readily accept mammals and birds as food in captivity and in some instances even seem reluctant to take fish, it is quite possible that the diet in the wild is not confined entirely to aquatic life. As well as taking fish in flight in the manner of an Osprey or a sea eagle, Blakiston's Fish Owl is said to wade into shallow water to hunt for crabs and crayfish.

In common with many other large owls, Blakiston's Fish Owl reportedly nests on the ground. I have been unable to trace further details of the nidification of this species, but the better known Brown Fish Owl *Ketupa zeylonensis* lays from one to three eggs and the Javan Fish Owl *Ketupa ketupu* both at London Zoo and in my aviaries never laid more than one egg in a clutch. The pair of Javan Fish Owls that I owned, which were both bred from the same pair at London Zoo, showed a pronounced size difference, but unlike most owls, the female was the smaller of the two. I am not sure if the size difference of my pair was an individual peculiarity or if this is a characteristic of the fish owls.

BREEDING THE WHITE-EYED CONURE

Aratinga leucophthalmus

By C. ALLAWAY (North Walsham, Norfolk)

I purchased a "pair" of White-eyed Conures in August 1974, but it was not until April 1975 that I realised that they could be a true pair, for it was then that I saw one feeding the other. They were housed in an outdoor aviary measuring 7 feet x 4 and 6 feet high with an enclosed shelter at the back and on either side were a pair of Ring-necked Parrakeets and a pair of Nanday Conures, for I always keep my birds at one pair per aviary.

The diet consisted of sunflower and hemp seed added to Budgerigar seed mixture and such fruit as apple, pear and occasionally orange or banana. Grit and cuttle bone are always available to the birds. In April 1975 a nest box measuring 18 inches x 12 x 12 was hung on the aviary side with its top some 18 inches from the aviary roof; inside was a layer of peat moss to which the birds added some wood that they had bitten off from the aviary framework, and during May four eggs were laid, being incubated by the female only. After 26 days she left the clutch and took no more interest

in the nest, whereupon inspection showed that all four eggs contained dead chicks, but in spite of that my hopes were raised, for obviously I had a true pair.

Later that summer the birds were again seen taking chips of wood into the nest and on August 12th the first egg was laid. After that I left the birds as undisturbed as possible and, as before, the hen did all the incubating, being fed at the nest entrance by her mate. I calculated that the eggs should hatch on about September 9th and on the 11th I found one chick dead on the aviary floor, so, although the parents made a lot of noise and threatened to attack me, I went into the aviary to inspect the nest and found one chick and two eggs. The chick was covered with white down and all appeared to go well until the 24th when the mother began to spend more time outside, so I again inspected the nest and found that the chick appeared to be thin and was having difficulty in keeping its balance. I thought at this time that perhaps the parents were losing interest in the chick, but on October 13th, when the nest was again inspected, the young one appeared well and strong; the parents very much resented any approach to the nest. On October 18th when I went to clean out the accumulation of seed husks so as to lessen attraction for mice, I looked into the nest and found that the flight and tail feathers of the chick were nearly two inches long, but the body was still covered with down. On the 29th most of the feathers had grown except for those at the back of the head and on the back. The chick left the nest on November 15th, a day that was cold and wet, and at first it stayed on the ground, but climbed up the wire netting to the top of the nest box and that night, when I put it back into the nest, I noticed that the beak seemed to be deformed with a scab on it, but after a day or two this scab dropped off to reveal a perfect beak, so I wondered if this was usual with this species, though, having bred Nanday Conures, I cannot recall this happening with them. The young bird is now much like the parents except that it has no red specks on the neck feathers; it is a strong flyer, feeds on the diet given to the parents, but has more liking for apple and pear. No special food was given during the rearing periods; bread and milk was offered daily for a week, but was never eaten.

When I realised that the chance of a successful breeding was probable, I asked Miss Rosemary Low and others about the possibility of this being the first in this country. According to the *ENCYCLOPAEDIA OF AVICULTURE*, London Zoo hatched young of this conure in 1871, but there seems some doubt as to whether the young were reared. There are confirmed breedings in the U.S.A. in 1936 and in Adelaide, Australia in 1936-37.

* * *

BREEDING THE MOTTLED OWL AT THE ST. LOUIS ZOO

By STEPHEN R. WYLIE (Curator of Birds)

The Mottled Owl *Ciccaba virgata* inhabits the tropical and subtropical forests of Trinidad and Mexico, south through Central and South America to north-eastern Argentina. It is a rather variable species of which seven subspecies are currently recognised. These subspecies vary in colour and in size, from about 280 to 355 mm. in length, depending upon type-locality. Those individuals found in the northern part of the range tend to have the breast and underparts somewhat lighter in colour than those from farther south. In those prevalent from Central America to Argentina, the breast and underparts become tawny to fulvous. This species differs primarily from its Old World relative, the Woodford's or Wood Owl *Ciccaba woodfordi*, by having non-feathered toes. It is essentially a nocturnal species which feeds upon small invertebrates and vertebrates. Nesting generally occurs in April or May, with the average clutch consisting of one to three whitish eggs that are usually deposited in a tree hollow.

The pair of Mottled Owls currently on exhibit at the St. Louis Zoological Park appear to be of different subspecies. The localities from which they were collected are not known, and while the arrival date of one is known to be April of 1965, the other is recorded only as having been in the Zoo's collection prior to 1969. For the past three years they have been displayed in a glass-fronted exhibit, measuring 183 cm. in depth, 165 cm. in width and 277 cm. in height. The enclosure also contains a nest box, natural perching material and tropical plants (*Diffenbachia picta*).

The nest box is located in a corner of the exhibit, approximately 236 cm. above the floor. Constructed of 1.77 cm. plywood, its dimensions are 39 cm. high, 34 cm. wide and 40.6 cm. deep. The entrance is 14.6 by 17.8 cm., and directly below the opening is a 22.9 by 3.8 cm. wooden dowel rod for perching. Peat moss was provided as nesting material.

Several infertile eggs had been produced prior to 1974, and since no nest box was available during that time, the eggs were incubated on the sand-covered floor. It was not until 1974 that the nest box was constructed, and two eggs, which proved to be infertile, were laid in the nest that year. On 20th or 22nd March 1975 the pair re-nested and produced the first of three eggs. It was decided that the pair should have as much privacy as possible so that the chances of nest desertion would be minimal; consequently it is not known when the other two eggs were laid. Incubation duties were shared by both the male and female, with the latter playing the major part.

On 11th May a single chick, approximately seven to ten days old, was observed in the nest. The adults, who had been maintained on mice and commercial bird of prey diet, were offering the same to the youngster. Again, both parents shared in the brooding and rearing responsibilities, and on 1st June the young owl left the nest. At that time its body was



Young Mottled Owl at St. Louis Zoo

Al. Hillman

covered with down, but its primaries and secondaries were developed well enough for flight. At eight months of age it was removed from the exhibit because the adults indicated renewed interest in the nest box.

It is believed that this hatching constitutes a first breeding of the Mottled Owl. We hope that the pair will re-nest. If this occurs, less caution will be exercised in an effort to obtain more exact data.

BREEDING OF THE LITTLE LORIKEET

Glossopsitta pusilla

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

It gives me pleasure to chronicle what must rank as one of the most meritorious breedings ever achieved in South Africa and one which will certainly be awarded the Rare Breeding medal of the South African National Cage Bird Association. That two Little Lorikeets should have been bred in South Africa in 1975 is indeed surprising, firstly in view of Australia's restrictive laws concerning her avifauna and secondly in view of the discouraging reports on this species even in Australian avicultural literature. These reports range from "Another species difficult to keep in captivity; there is no authentic record of it ever having been bred while caged" (Cayley 1938) to "Although seldom kept or bred in captivity, the Little Lorikeet does well if housed in a spacious, well planted aviary and cared for in the same way as the Rainbow Lorikeet" (Forshaw 1969). In 1973 Alan Lendon said "This bird is very uncommon in captivity, even in the eastern states", but he goes on to give the data of one successful breeding that had occurred in Sydney in 1948. As late as 1972 the Avicultural Society of South Australia awarded its medal to R. Rowlands for the first breeding in that state.

When Mr. Peter Odekerken, a member of the Avicultural Society, emigrated from Australia to South Africa in 1970, he was entitled to take with him his pets and among these was a delightful pair of Little Lorikeets. On arrival here he found that he was not immediately in a position to house the birds in the type of aviary he considered necessary for their wellbeing, so in order to give them some chance of propagating, he disposed of them to the owner of a collection of parrot-like birds in Rustenburg where they remained in good condition for four years, but showed no inclination to breed. In March 1975 they were acquired by Dr. David Russell, a veterinary doctor who has a collection of lorries and lorikeets at Bryanston, just north of Johannesburg. In the garden of over an acre in extent he has a noteworthy collection of birds, parrot-like being his speciality, and his collection of lorikeets is the best in South Africa. When I visited him he showed me the young Little Lorikeets; also two young Moluccan Lorries or Lorikeets *Eos bornea* and there were young Dusky Lorries in the nest. The Little Lorikeets have an aviary to themselves: it measures three feet

wide, six high and 12 feet in length. The back half forms the shelter with asbestos sheeting on the roof and sides with a brick wall back, but there is no front to the shelter. This aviary is one of a range all of the same pattern and each containing a single pair of lorikeets; they face west and are partially shaded by some large nearby trees and from the afternoon sun by a larger aviary just in front of the one occupied by the Little Lorikeets. Dr. Russell has a theory that these partially shaded aviaries particularly suit the forest-dwelling lorikeets and the cooler conditions prevailing in these aviaries perhaps account for the breeding of the Little Lorikeets after four unfruitful years at Rustenburg which is a very hot place. The aviaries have a deep layer of river sand on the floor of the shelter portion and the flight is of grass left to grow naturally with a small apricot tree growing there. Normally the lorikeets leave the grass untouched, but when the Moluccan had young in the nest they ate a large amount of the tender grass shoots. The sand flooring of the shelters has proved ideal, for the liquid droppings of the lorikeets quickly dry on the sand, forming crust which is easily removed when the aviaries are cleaned. The Little Lorikeets were given a choice of a small natural hollow log and a nesting box of the type used extensively here for breeding Gouldian Finches. These were hung on opposite sides of the shelter and the birds chose the box fastened on the southern wall facing north. The only nesting material was a three-inch layer of wood shavings and the birds merely made a slight hollow in this in one corner. When the young had left the nest it was found to be remarkably clean: it has sometimes been suggested that charcoal should be put into the nests of lorikeets to help to absorb the liquid droppings or that holes should be drilled in the base of the box, but Dr. Russell's experience with both this species and the Moluccan Lorikeet is that they are exceptionally clean nesters. He has found that lorikeets are sensitive to disturbance at nesting time, so his birds are fed from a small door at the aviary front, water being supplied by means of a pipe leading to each separate water dish and controlled by a tap outside. Incubation started on completion of the clutch of four eggs on 19th August and the first chick was judged to have hatched on 10th September when an egg shell was seen on the ground, so the incubation period was estimated at 22 days. The lorikeets are fed on a mixture of three teaspoons of Complian (a high protein food used for infants and invalids) one teaspoon each of honey and condensed milk with a vitamin additive, this mixture being added to $\frac{1}{2}$ litre of warm water. This is given early in the morning and because such mixtures go sour rather quickly in hot weather, only enough is given to last until lunch time when the second mixture of Pro Nutro (a proprietary breakfast food something like Farex) mixed with honey and a little water to form a paste is given. Apple is also given then and usually this suffices for the day, but when there are young a third meal consisting of the Complian, etc. is given. The young birds were in the nest for exactly six weeks: for the first two weeks the parents fed mostly on the nectar mixture and apple; during the third and fourth the Pro Nutro was most favoured and during the fifth and sixth weeks the Complian nectar

food was preferred. The young left the nest on 22nd October: one of the four eggs was infertile and the fourth egg hatched but the chick died at about two days old. Throughout the breeding season the parents remained very tame and the young on leaving the nest were also tame. For the first ten days they were poor fliers and they were put back into the nest each night.

The young are like the parents in plumage; one appears brighter in colour than the other so it seems they are a pair. The adult male has a deeper red on the face, a brighter green body and a more conspicuous and extensive bronze shading on the nape than his mate: the hen's facial area of red is also somewhat smaller. Naturally Dr. Russell is anxious to build up a stock of these birds and so, if any member outside Australia happens to have Little Lorikeets, he would be glad to know so as to be able to exchange experiences and perhaps some birds. At the time of writing the Little Lorikeets appear to be about to nest again.

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BREEDING THE BLUE AND YELLOW MACAW

By DAPHNE HEDDON GRUNEBAUM (Hampnett, Northleach, Glos.)

I have Blue and Yellow Macaws *Ara ararauna* and a pair of Green-winged (Red and Blue) *A. chloroptera* living in a state of controlled liberty. The former are let out from their aviary at around 9.0 a.m. (so as not to disturb late risers in the village) and they return a couple of hours later, sometimes much earlier, and they then retire into the aviary for a siesta, during which time they are shut in. This allows me to let out the very aggressive pair of Green-winged who will attack the Blue and Yellow, so must be let out alone. When they return at about tea-time, they in their turn are shut in and the Blue and Yellow go out for an evening flight if the weather is fine.

The Blue and Yellow Macaws successfully reared two young in 1971. Three eggs were laid in 1973, but after a short while they had completely disappeared. Again in 1974, eggs were laid but the 1971 young, for whom I had been unable to find "free-flying" homes, got in and destroyed them. In 1975, the unhappy parents again were ready to go to the box, and many fights took place with the young who eventually threw the box to the ground. I renewed my efforts to find the right home for them and was eventually successful.

Within two weeks of being on their own, the parents changed their pattern of behaviour; the hen no longer wanted to go out, the cock became very fierce and they spent a lot of time in their box. They both smelled very

strongly, the sweet, sickly macaw smell. On the first occasion I was able to look into the box – on June 28th – I found one egg. The peat we had put in for nesting material had been pushed out, so we put in dry powdered wood, together with a lump for them to whittle away themselves. On July 1st the second egg appeared, and on the 5th or 6th the third was laid. At about this time we noticed that they started to make a new call, a gentle call of two notes, the lower note sliding up to the higher. This call was eventually taken up by *all* the family and only ceased when the babies were nearly feathered.

The weather was very hot and dry at this time, so we soaked the aviary floor with buckets of water. On July 9th it rained and the cock “swam” with delight over the leaves of the trees, thoroughly soaking the underside of his wings; his hen never left the box, except to stretch occasionally. On July 24th, loud unforgettable “honks” were heard coming from the box and we immediately gave brown bread soaked in milk, with glucose, and some banana, which was taken at once, and from then on it was a never ending stream of food in the form of sweetmeal biscuits, fruit, nuts, chop bones, cheese, and lots and lots of sweet corn, which was undoubtedly the favourite food, and which we grow ourselves specially for the birds.

On August 1st, while the parents took a short flight, I was able to get in and to see two large pink babies who were quite noisy, and one unhatched egg, and a walnut for good measure! The behaviour of the cock now changed completely. He became very friendly and was obviously bored stiff with being on his own; he would come around on my back and as he had given us some nasty bites in the past, I was not too keen on it, but did not like to push him off. He would also come into the house and help himself to anything he could find to eat, and if I did not give him enough, he would go up the garden and take carrots and peapods for himself. I noticed that the birds no longer smelled as strongly as before.

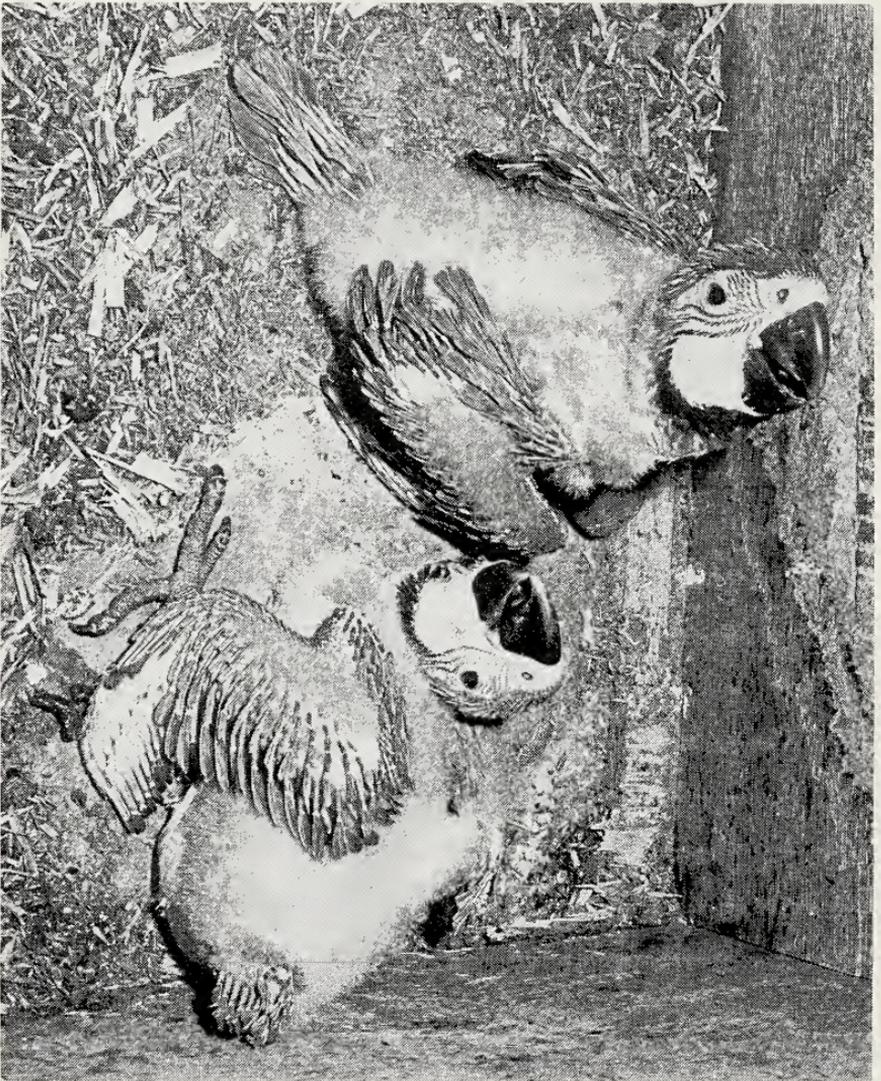
By August 6th, the babies were crawling in their box: they had black beaks and a few quills, tipped with blue, on wings and tail. They did not appear to notice me when I looked at them. By August 28th, yellow colour was to be seen on the neck of one; the other seemed less advanced and weaker. They looked at me and registered fear, with open beaks and backing away.

On September 3rd there was nearly a tragedy. For several days we had heard a scraping noise coming from the box, which sounded as though they were whittling away at the wood. Whilst inspecting them we had seen that they had scraped away a certain amount of wood from the floor, but we were not prepared for the sight which met us on this day. They had succeeded in removing the entire thick floor, and were resting on a flimsy piece of half-eaten formica which had been left on the underside. In this was a jagged slit, through which protruded the leg of the weaker of the two young, who was firmly trapped. I eased it out, while the other struck aggressive postures; they were both very frightened, and shaking violently. With difficulty we propped a false floor up underneath and left them to



P. D. Turner

Nesting Blue and Yellow Macaws



Nesting Blue and Yellow Macaws

P. D. Turner

recover, resolving next time to make a floor three or four inches thick and lined underneath with tin. They were by now fairly well feathered, giving a true blue appearance, but their legs still would not support them. We remarked that by this time the parents' special call which we had heard at the beginning of incubation seemed to have ceased.

The young were fully feathered by the end of September, but they will not be allowed out to fly with their parents until the spring. They are clumsy uncontrolled fliers at first, and very frightened at their first taste of freedom. The weather at this time is, of course, often wet and very windy, and added to this, *all* my macaws are chivvied during the first winter months by flocks of Rooks, who try to drive them out of the sky and divide them up – sometimes succeeding only too well, and rescue operations in neighbouring villages have to be carried out. This unwelcome activity stops at the beginning of spring, so as the first training flights are always rather a strain on us, physically and mentally, it seems wisest to wait!

JACKSON'S HORNBILL

Tockus jacksoni

By MALCOLM ELLIS (Holloway, London)

It was during 1969, when I was staying with Mrs. Betty Roberts and her family at their home close to Kampi ya Samaki on the west side of Lake Baringo, Kenya, that I first became acquainted with Jackson's Hornbill. It is not uncommon there and lives, usually in pairs, among the scattered bushes and trees of the surrounding country, which is desperately dry for most of the year. Among many species sharing the habitat with Jackson's Hornbill is the very common Red-billed *T. erythrorhynchus* and, in places, the Yellow-billed Hornbill *T. flavirostris*; also the rare Hemprich's Hornbill *T. hemprichii*. Williams (1972) states that Von der Decken's Hornbill *T. deckeni* occurs in the Lake Baringo area: I have not seen it on the west side, but suspect that it may replace Jackson's to the east of the lake.

At the time of the visit in 1969, Betty Roberts was at the final stages of hand-rearing what was then a well-grown young Jackson's Hornbill. It was perfectly tame and would accept food from anyone prepared to offer something it liked. I had the opportunity to take a number of photographs of this bird and one was later reproduced on the front of CAGE AND AVIARY BIRDS (18 June, 1970). When I was there on another occasion, a few years ago, Betty Roberts obtained two Jackson's Hornbill nestlings: one came around Easter, while I was away from Baringo, and by the time I returned was quite well-grown, but I was present when the second bird, a small nestling, arrived. The latter is shown in my photograph, taken about five days after the nestling came, when it was small enough to fit easily into a hand, and was, I estimate, 25 – 35 days old. The first of the two birds,

which was housed with several young Red-billed Hornbills all about the same age as itself, was soon feeding on its own, but the other needed to be hand-fed for some while, a task I undertook during the early stages.

While I was living with Tim and Jane Barnley, near Kitale, Kenya, I took a part in the hand-rearing of another small nestling; this one had belonged to the pair of Jackson's Hornbills that have since bred so successfully at London Zoo and it was taken from a nest they had near Kongelai, West Pokot. Jackson's Hornbill is found there along with the Red-billed again and also the African Grey Hornbill *T. nasutus*.

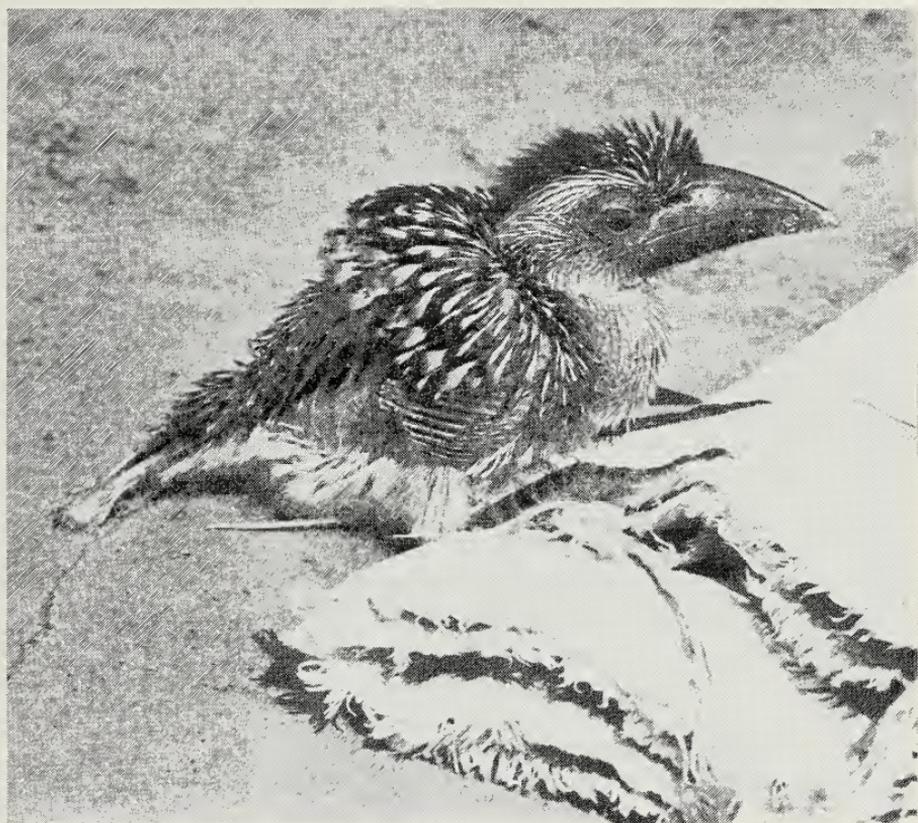
These young hornbills were taken from nests to be hand-reared under the provision of capture permits issued by the Kenya Game Department whose regulations allow birds to be caught for zoos, bird gardens and scientific institutions, but not dealers.

They proved relatively easy to rear: all were mainly fed with raw minced lean beef, or occasionally goat, mixed with chopped hardboiled egg and chicken/duck mash; sometimes finely chopped lettuce was added and sometimes the mash was replaced by a home-made softbill food. The minced meat constituted 80-90 per cent of the mixture which was moulded between the fingers into small egg-shaped pellets that the birds could comfortably swallow. It was supplemented by mealworms and grasshoppers and, though not specially relished, diced banana and paw-paw. If the food was held between the fingers and offered to the hornbills, sometimes they would take it and, grasping the food in the tip of the bill, would juggle it about into a good position, then toss it back and swallow it; otherwise the bill was carefully prised open and the food pushed well down the throat. While small, the nestlings were fed throughout the day at intervals of around one hour: these were gradually extended as the nestlings grew bigger and a dish of food was left with them to encourage them to feed themselves, which they did by the time they were able to fly.

In view of the lack of information about the juvenile plumage of Jackson's Hornbill and doubts about the exact relationship between Jackson's and Von der Decken's Hornbill, it was interesting to find the four Jackson's grew blackish-brown and white plumage, just like that of an adult Jackson's Hornbill, including, as can be seen in the photograph, a lot of white spotting on the upper wing-coverts. The last feathers to fully develop were the long slim tail feathers.

It was some while after the plumage was complete before the bill reached its full length; the four birds each possessed a black bill and were therefore all females. The small nestling shown in the photograph, obviously had a very dark coloured eye like an adult, whereas a colour transparency I have of one of the others, taken just after it had started to fly, shows that it possessed a light, silvery-grey eye. The bare skin around the eye of all four birds was blackish: the adults I have seen also had blackish skin, not blue, as plates in some books indicate.

Until the young hornbills began to perch, each was housed in a box that had hay lining on the floor, where they squatted in a similar posture to



Jackson's Hornbill nestling

Malcolm Ellis

the one shown in the photograph, only normally, the tail – what there was of it – was held up against the back—presumably an adaptation to cramped conditions in the nest hole!

It is evident from the photograph that, compared to the nestling's scanty feathering, its black legs were fairly well developed at an early age. Brown (1975) suggests their "strong legs" not only enable *Tockus* nestlings to clamber up the inside of the nest chamber to escape possible enemies, but back up to the opening so they can forcibly defaecate out of it. When the female (who had thrown out the droppings) on renewing her plumage, breaks out and helps the male to collect the increased amounts of food, especially small animal life, needed to feed the young, they, although only partly fledged, re-plaster the nest entrance using their dropping and items of food, etc – a remarkable piece of behaviour on the part of the young hornbills.

* The female Jackson's Hornbill had already broken out of the nest when the single, partly fledged, nestling was taken. About the size of the one in the photograph, it was at first housed in a box which at the front, had a strip of wire along the top. From the first day the bird fed very well, yet 3–4 days later no droppings had been found, and this caused some concern; however, an explanation was soon discovered – the droppings were plastered around the edge of the wire-covered opening. During the following days a close watch was maintained and the nestling seen plastering its droppings around the opening. It applied them with the tip of the bill, which invariably had some white excreta caked around it. Later still, when the bird was older and a dish of food was placed in the box, some food was stuck around the opening. The latter, which measured about 9 x 2 inches (229 x 51 mm.), was doubtless regarded by the hornbill as the open nest entrance and so it manifested the plastering behaviour. However, it proved too enormous a task for one bird; it had managed to plaster less than 10 per cent by the time it had outgrown the box and needed to be transferred to a cage. Eventually it went to Birdland, Malindi, Kenya, and during 1974 I saw it there. It had developed into a fine adult female and was sharing an aviary with a male Von der Decken's Hornbill.

Some time after the hornbills were reared, I obtained through the East Africa Natural History Society a copy of a paper from IBIS, 1940, entitled *Hornbill Studies*, by the late R. E. Moreau and Winifred M. Moreau; it is an extremely informative account of their experiences hand-rearing four young hornbills during the 1930's, in Tanzania (then Tanganyika) East Africa. The account relates to three Crowned *T. alboterminatus* (then *Lophoceros melanoleucos*) and a Silvery-cheeked Hornbill *Bycanistes brevis* (then *B. cristatus*).

The three Crowned Hornbill nestlings, which were taken from one nest and placed together in a box, soon began to plaster their droppings along the edge of a gap left by the lid. They were transferred to a box with a hole $2\frac{1}{2}$ inches (63.5 mm.) square cut in the side and, though they could have escaped through it without difficulty, never made the slightest attempt

to do so. Instead, after one spent some time picking grass from the floor and pushing it out, another started to plaster the hole with mud which had been provided in a dish, although, the authors say that in the wild there is no reason to suppose parents bring any material specially for plastering. At first the nestlings used just mud, but after some early reluctance, incorporated more and more of their droppings and also food. The three, that each showed quite a difference in their plastering impulse and ability, eventually succeeded in reducing the hole to a width of less than half an inch (12.7 mm.) from top to bottom. It was thought the female had only recently emerged from the nest when the three were taken, and the oldest was about 25 days old. They showed a remarkable disparity in size, which the authors say is the rule in the hornbills as a consequence of irregular egg-laying, and the two smallest died after just over three weeks. The survivor's growth was retarded, and it was about 54 days old before it was able to fly; 10 days longer than in the wild. The authors seem undecided whether young *Tockus* hornbills learn the plasting technique from the female before she breaks out of the nest, or whether the faculty is innate and manifests itself at a certain stage of the young bird's development. I would think the latter, most likely. By contrast, the Silvery-cheeked Hornbill nestling took no interest whatever in a hole cut in the side of the box it was in; it passed nothing through the opening and showed no desire to plaster it.

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NOTES ON SOME SPECIES OF PARROT IN CAPTIVITY

By GEORGE A. SMITH (Peterborough)

*Continued from p. 32*THE RING-NECKED PARRAKEET *Psittacula krameri*

I have bred the Indian Ringneck for four years now and am trying to build up a collection of the several known colour mutations: I have blue, lutino, fallow (red-eyed cinnamon), cinnamon, khaki and pale green forms. I have no piers, but pied-coloured Ringnecks are extremely common. Occasionally an odd *Psittacula* parrot becomes unable to synthesise the black pigment (melanin) which causes it to grow yellow instead of green feathers. Usually this affects only a few areas of the body and gives the bird a pied appearance. This acquired piedness is very unstable from year to year, each moult producing a different pattern and some birds even go to the extremes of becoming completely yellow (*e.g.* Tavistock 1926) or reverting to a normal green (*e.g.* Ezra 1917). This acquired piedness ought not to be confused with a congenital piedness where the pied areas remain stable throughout the life of the bird. Theoretically the difference between the two forms should be readily made out by examining the yellow feathers at the edge of their pied areas. In acquired piedness, some feathers have a mottled appearance, but in the congenital form the yellowing is uniform. I must have seen about 40 examples of an acquired piedness: most have been male and concern not only the Ring-necked, but the Plum-headed *P. cyanocephala*, the Moustached *P. alexandri*, the Alexandrine *P. eupatria* and I had a single example of what may well have been the same disorder in a male Abyssinian Lovebird *Agapornis taranta*.

It is a common observation that parrots living on a poor diet not uncommonly grow some yellow feathers which are later replaced by normal ones once the diet is broadened (*e.g.* Knobel 1922). Parrots managing to live almost entirely on sunflower seed, which is very low in lysine, frequently produce yellow feathers because the formation of melanin stops if the diet lacks this amino acid (Klain *et al.* 1957). Yet acquired piedness frequently occurs in *Psittacula* species fed on a seemingly satisfactory diet. As this pied state often increases or makes its first appearance with sexual maturity, it might be that there is some connection with male hormone levels. My limited experimental breedings with such a male pied Plumhead, at present, makes me believe that this tendency towards acquiring a piedness is not inherited.

In 1972 I had an article in the Magazine on Ringnecks and, to avoid repeating myself, this section only reports information not available then and notes my differences of opinion with Lamba (1966). Confining birds to an aviary must distort many of their activities, yet it may not always greatly alter their breeding behaviour, for MacDonald (1961) who, like

Lamba, watched wild Ringnecks in India, saw very much the same as myself with my aviary birds.

General behaviour

Ringnecks are very gregarious: whatever they do is very infectious to others, so that, although most of my pairs are spaced out in separate flights, should one pair descend to the ground then all within view follow and likewise with bathing and feeding. This group behaviour has an unfortunate side-effect and that is if one bird is nervous and gives the alarm call, then the others, even if they are themselves indifferent to the upsetting object, similarly shout, which makes them amongst the most noisy of my parrots. At evening time when, were they wild, they would be swirling in flocks around their roosts (Ali and Ripley 1969) mine have a regular ten minutes or so of noise; and when they are breeding, some pairs at about this time of the day, squabble at each other through the wire. It is noticeable that most of the din they create comes from the adult hens.

Like the Cockatiel, they are savannah birds designed to fly away from danger at great speeds and they cannot fly almost upwards and are so poor at turning in a limited space that it is simple to catch them in an aviary. A minute with a net and, precisely as with Cockatiels, they are either caught or lie ready to pick up, spread-eagled on the ground.

The age of sexual maturity

I have seen young males, 150 days from hatching, making half-hearted courtship-preening movements. They will not get the male neck ring until their third autumn when they are approximately $2\frac{1}{2}$ years old. There are exceptions: David Castle bought two 1974 lutinos from Mrs. Betty Partridge which, in 1975, grew their pink rings; Baker (1968), in Canada, had a male which also grew his when only 14 months old and West (1953) said, of Californian-bred Ringnecks, that they sometimes have theirs when but 16–18 months old.

I wish that I knew whether the males that acquire their neck ring a year early were hatched from very early laid eggs, because although I have now bred more than fifty, it was not until 1975 that I had any moult in the same year that they hatched. These particular chicks came from quite the earliest hatch that I have had – they fledged in mid-May. Two of these are male and I shall eagerly wait to see whether their neck ring comes with their second moult when they are only 14 or 15 months old(?). They are quite the most sexually precocious youngsters I have encountered and, not having any suitable partners to demonstrate to, they display to the feeding tray or some other inanimate objects. They have tried courting their mother, in the same flight, but their father gives them short shrift.

Peter Paris, in Cornwall, assures me that his young invariably moult a few months after they fledge and that his still take the usual time to get their adult plumage, but I would be far more surprised if my precocious chicks did not become adults by their second moult than if they delayed it for a further year.

Ringnecks moult early: the first feathers are shed about mid-June, so by late August or early September the entire feather system has been replaced and only the very longest tail feathers still require a little more growth. The precocious clutch of chicks mentioned above also moulted all their feathers; however they started about a month later than the older birds.

Breeding

Until the winter weather of this year's January and February made me fear egg-binding, I had stopped taking down the Ringneck nest boxes once breeding had taken place, as the hens, sometimes their partners and several youngsters – which I suspect are predominantly female – always use them as roosts, not as nests, for they foul them at night and do very little chewing of the interior. Roosting in a box stops them getting frost-bitten feet. Once they begin to finish the moult, signs of sexual behaviour again begin and all the current year's youngsters form pairs. The displays of the young males are usually very half-hearted and could be missed, nor are their pair bonds particularly strong. I have one hand-tame, talking adult blue male who treated his hen as if she were a mere sparrow. But I am certain that he does this because of his ignorance of hen Ringnecks rather than bravado. Usually males are far less certain of themselves and unless they have a protracted period of introduction, dare not start to court. In February and March I have often seen hens, from couples paired off two or three months beforehand, sexually soliciting and the very interested males are too cowardly to respond and the eggs were not fertilised.

The posture taken by a sexually soliciting female is of complete submission. The back is flattened, the tail and wings slightly drooped and the head pulled close up to the body. They periodically move the lowered head backwards and forwards, exactly like *Polytelis* parrots. I do not know if a noise accompanies this, as my observations are made through a closed window. The spiralling movements of the head, which are said by Lamba to be part of a female's "courtship", have yet to be seen in my birds, although I have often seen soliciting hens loll the head from side to side.

It is the hen that selects and excavates the nest-box and defends it with such ferocity against other hens that, in the case (admittedly reported at second-hand by Lamba) where two hens were alleged to occupy the same nest, it does seem more probable that it was actually a pair in which the male was still in immature plumage.

The African race *P. k. krameri* nests from October to March (Macworth-Praed and Grant 1970) and the Indian *P. k. manillensis*, again depending on latitude, from January to April, although odd pairs have been reported breeding until July (Ali and Ripley 1969). They are so sociable that mine even lay as a flock. For example in 1974, whereas the first pair were exceptional and laid on the 40th day of the year, the others laid on the 72nd, 73rd, 75th and 77th day, and in 1975 the five pairs each laid the first egg on the 39th, 43rd, 44th, 51st and 53rd day of the year. This year, at the time of writing (late February) they have not yet started.

The number of eggs laid increases with age. My young ones in their first laying year have three and rarely four. The older birds usually lay five; one has even laid six. Contrary to Lamba's observations, and typical for all the avicultural reports, the male never incubates or broods; however the majority of mine sleep overnight in the box with the hen. The eggs get laid at roughly two-day intervals; yet one aged "split" blue's second egg invariably comes six days after her first.

The incubation period has twice taken only 23 days, but I would accept 24 days as being the more common interval. Resulting from my experiments with nest-fillers and different sorts of boxes I now feel reasonably certain that "dead-in-shell" in parrots is often the result of the eggs being subject to frequent or severe cooling. Cold weather will add as much as four days to the hatching time and whereas fertile summer-laid eggs usually hatch, I find that the majority of winter-laid and cold-spring-laid eggs fail with dead-in-shell. From weighing of hatched and unhatched eggs I cannot attribute these deaths to desiccation.

Even if the incubation may seem to begin with the first egg, because the laying hens often stay inside the box, the eggs usually hatch within a day or two of each other. Growth is very variable: some chicks take longer to "start". In my previous article I wondered whether this might have something to do with their sex. It doesn't.

The naked chicks open their eyes when about ten days old and it takes a few more days before they open wide. It is impossible for me to accept the remarkable forwardness of Lamba's chicks which were said to open their eyes at three days and look out of the nest at three weeks. Those reared by my birds take as long as Lamba's to leave the nest and cannot eat for themselves until several days after they fledge, so that it is also difficult to believe that parent wild Ringnecks, when the chicks are three weeks old, carry large food items in the bill back to the nest for the chicks to eat. Unlike New World parrots, if a chick should die no attempt is made to remove it from the nest and they lie where they died.

With my birds, the briefest time from hatching until the youngsters first leave the nest has been 46 days. The longest interval 61 days and the total average has been 51 days. The parents take extremely good care of their fledged young, even pushing them from behind to steer them back to the nest or away from the nest territory of other Ringnecks.

My own birds came from India and they are usually single brooded. Mr. Hipolite told me in mid-September last that he had a pair of blues that were treading and gave every impression of going to nest. My own do not usually start to copulate until late December/early January: however, following a general article by Boosey in *THE FOREIGNER*, in which he said they were single-brooded birds, Kewley (1936) wrote that by October 15th the second round of youngsters had not fledged and Hall (1936) said that his bred twice every year and that particular year his pair had four young in February which were immediately followed by another reared four after which the hen began to prepare for a third round which he stopped by

taking down the box. Rudkin (1936) also said that his pair occasionally had a second round. Were any of these birds African Ringnecks or were they all Indian? My own example of a second round was in 1974 when a pair raising a single chick recommenced mating. The eggs were laid in the same box as the 32-day old chick. To stop the eggs getting broken and filthy I put the chick into the shelter, but on looking into the box an hour afterwards I found it back inside. This certainly surprised me, as the chick must have had a very difficult journey; it could not fly and the bolt-hole into the shelter usually takes strange adult birds some hours to find, for it is half-way up a solid wooden front. I did remove the chick twice more just to see how very skilful the parents were in guiding it back crawling along the wire; the nest cannot be seen from the shelter. I finally let it be and it then fledged a fortnight later and meanwhile the hen incubated her eggs sitting alongside her chick which she never feather-pecked. The small clutch of three eggs never hatched, being addled.

I usually foster single chicks and sometimes clutches of eggs; therefore certain hens have the opportunity to lay twice. I have found that when the eggs are removed shortly after being laid, the first egg of the next clutch comes along 11 or 12 days later. However, as copulation stops about half-way through the incubation, if very young chicks or full-term incubated eggs are taken from the nest, it always takes two or three days for treading to recommence and now the first egg comes about 16 days after clearing the nest. I have also found, when the well-grown chicks are taken, that although the hen always seems to re-solicit for mating, the male in most cases cannot restart his courtship and so there is no second clutch.

THE LONG-TAILED PARRAKEET *P. longicauda*

I have kept Longtails for six years and the first year they nested; unfortunately a November firework that, I believe, killed the cock from fright when it exploded on the roof during the night also caused the hen to leave the nest, killing the three-day old chicks with cold. I exchanged that hen in November 1975 for an immature cock. The other hen I have was received in 1971.

Longtails have been an enigma: general opinion is that they cannot bear the cold which would be strange, for the ten or so other *Psittacula* species can. Because of this belief, I housed mine in their first winter in a cold room; however since they have always lived in an outside aviary. Their toes are certainly more liable to frost-bite than in other parrots known to myself. The last few winters have been mild and they kept their toes until this year when they have lost several, although it has not been excessively cold. Should there be a "secret" to keeping these birds through several winters, it may perhaps be that I do provide each hen with a nest box that she may use as a roost and refuge. A nest box also gives them employment and they eventually chew the inside of each substantially-built box to splinters. In captivity they are rather sluggish and soon become tame. In the 1950's the London Zoo had a caged male in

perfect condition for several years. Even well-established Longtails can be found dead the day, or sometimes the day after a period of abnormal excitement, such as capturing them in a net, perhaps a cat on the aviary roof or the introduction of a strange bird having to make them re-establish the peck order. Although these birds are usually picked up in the very pink of condition, I believe that they have died from an acute hypertension: a far too abrupt rise in an already high blood pressure system from excitement. I have autopsied five, two of which were mine. Both of mine had an atherosclerosis of the major arteries and all five were in seeming perfect feather and very good, indeed a fat, condition. Two had filarial worms in the air sacs and one had been dispatched live by rail and was dead on arrival.

I try to give mine something to do by providing plenty of twiggy branches. The seed vessels are in a neutral position in the shelter away from the territory of the nest boxes and I do my best to get them to eat seeds other than sunflower: a diet rich in which is said to predispose to atherosclerosis (Ratcliffe and Snyder 1965). Mine are now very partial to pine seeds, peanuts and the male takes bread and milk; they are very keen on fruit of all kinds.

Description

Longtails are slightly smaller than the Ring-necked Parrakeet and their sexual dimorphism is more pronounced. The large bill is somewhat narrower than that of a Ringneck. A male has a red bill, a black moustachial stripe and a pea-green cap and the sides of the head is broadly covered with a lovely Victoria plum pinkish-purple. The centre two tail feathers, from which it gets its name, are thin ribbons of blue with no white tip. Hens and immature males have brown bills, green moustaches, a marigold-coloured blotch on the side of the face, and the tail is shorter: otherwise both sexes are green, yellower on the belly and bluish on the back. A good illustration of both sexes can be found in Robinson (1927). If one has sufficient time, and sufficient birds to compare, young males can be distinguished from hens by their marigold cheek feathers extending slightly farther along the sides of the face and merging slightly into the green. It is a very subtle difference to make out.

General behaviour

Although very gregarious, they are especially quarrelsome over any near approach by a neighbour so they usually sit about a foot from each other and any closer approach makes them show the whites of their eyes as they pin-point the pupil and glower back with lowered head and threatening open beak. They will, if necessary, lunge or charge at one another. No sexual equality here; the females are very definitely the superior sex: the courtship period is therefore extremely protracted and has been seen on almost every day of the year.

Longtails are extremely arboreal in captivity and are most reluctant to come to the ground whether to drink or pick up grit. They invariably

descend by climbing down rather than flying. Except in the early morning and evening when they fly and move about a great deal, they are very inactive unless courting.

Courtship

The courtship display has been previously described (Smith 1970) and may be roughly summarized by saying that the females stand obeisant, crouched with part-closed eyes; otherwise the males stand well off. Males probably first start by giving little stiff-legged jumps in which the body is sometimes twisted slightly in the air so that first they face the hen with part of one side of the body and then the other. Jumping appears to be common to most kinds of parrot except, it seems, Australian broadtails and, from its context on other occasions, it seems to be an intimidatory gesture—almost a war-dance. The courting male Long-tailed Parrakeet stands quite tall and slightly bows his head so that his pea-green cap points towards the hen and then he sways his head in a very regular rhythm to show the hen first one of his plum-coloured cheeks and then the other. This head swaying is often followed by regurgitatory feeding when, like so many other red-billed parrots, his head seems to be swirled round for two or three turns just preceding feeding the hen. This swirling seems to be a combination of the usual parrot head-bobbing regurgitation and the head-swaying of courtship. During courtship the considerable nervous strain on the male is seen to be consistently relieved by scratching the head with a foot or, equally out of context, by wiping or half-heartedly rubbing the sides of the beak on the perch. During copulation the male, as has been described with Ringnecks (Smith 1972) alternately, and very rhythmically, lifts his head high in the air to drop the beak first on one side of the hen's neck and then to her other shoulder. And, again as with Ringnecks, during the first few seconds of copulation the tail may be first lowered to one side of the hen's tail and then the other; after this copulation takes place from one side only.

Only the female incubates and each of the five clutches of eggs that I have had has been three and they lay towards the end of the year. The incubation period is 24 days and the chicks, very surprisingly, instead of having a naked skin, like Ringnecks and Plumheads have a few long, white streaks of down (sketch in Smith 1972).

With the quarantine period for parrot imports, I suppose that the Long-tailed Parrakeet will soon become completely unknown in aviculture for, although somewhere around 30 or 40 must have been imported annually for the past five years or so, I doubt that more than 20 are alive at the present.

THE PLUM-HEADED PARRAKEET *P. cyanocephala*

I have two pairs of Plumhead *P. c. cyanocephala* and a pair of Blossomhead *P. c. rosa*. Both male Plumheads are abnormally coloured: one is practically yellow, including its head, and has the pink feet of a lutino; the other is of a cinnamon shade, although the black moustachial stripe is not brown but a powdery black. I have strong doubts as to whether either

colour is genetically determined for they are, as Tavistock (1937) reported, "unstable". During the three years that I have had the first bird, he has been colour photographed annually and it is noticed that the pattern has varied slightly each year. For example, last year the entire body and head were pale yellow and now he sports a few very pale green feathers. It certainly is not as pretty as the undoubted genetically-determined yellow originally owned by the Keston Foreign Bird Farm and then by Alfredo Marques and which is, I am told, still alive in the U.S.A. This bird had a red head and flash on the wing and a yellow body.

Biswas (1951) has argued for identifying the Plumhead and the Blossomhead as separate species, but his case is a perfect example of someone so keen to notice microscopical differences that they omit to see the many huge similarities. They look so much alike that I invariably have to explain the differences to people when they look at my birds; they sound alike and the distribution of one ends with the start of the other. Moreover, in a genus where species vary considerably in voice and display, they seem to have an identical courtship pattern.

General behaviour

Plumheads are quite as active as lovebirds and seem to be more skilful flyers than the rest of the genus; they certainly are far less harsh in their voice. Indeed in voice, beauty and easy management, they would have all the virtues as aviary birds were they not so prone to "dead-in-shell" and so cheap, for no-one, it seems, wants to use up an aviary on a pair of birds unless they will produce the young that could pay the seed bill. They are completely innocuous with other birds and seem to have no vices.

As they fly, they have a *weep weep* call and this is also given when they are settled; it is noticed that the white tips to the tail twinkle with the effort of making this noise, so attracting attention to its source. They sometimes feed off the ground; however this is exceptional and it is my impression that they are adapted to feed from the outermost, and therefore thinnest, twigs of bushes and trees. However, I cannot find any information as to their wild behaviour other than that they are restricted to wooded country.

Breeding behaviour

Like Ringnecks, the males do not get their adult colour until they enter their third year, but after the first moult males noticeably have a trace of "plum" over the grey of the head. This distinction can only be made in the hand, for the difference is slight.

Males court in their juvenile plumage, starting half-way through their first moult *i.e.* mid to early-September. Males walk away from the hen (hens are the more dominant) and every so often they give a little jump into the air. The beak is often pushed along the perch during this jump-walk. The next stage is head swirling which usually is preceded by a bout of jump-walking which this time has led to the male standing next to the hen. His head is held low and slightly to one side, and it is swayed slightly so

that the back of the head faces the female. Sometimes males fly from one end of the flight to the other and drop next to the hen by rising just before landing, and the wings are held open just for a fraction to show the blue underside. During courtship the males trill a rather musical song which is later wildly chanted whenever the hen appears or disappears into her nest box. At about this time, a month or so before the hen lays, the courting male stands with his legs rather straight so that the body is well clear of the perch and the head is swung with such a vigour, in the two or three turns before feeding the hen, that the whole body noticeably sways with the whirling.

In all essentials the nesting is as for Ringnecks. The female selects the nest site and the male may sometimes defend the site, but more usually this is done by the female. It is she alone who excavates the nest, which is used as a dormitory by the cock. Mine lay in early February each year and the clutch is four eggs which take 24 days to hatch. The hen does all of the incubation and brooding: the chicks are quite naked at hatching and take six weeks to fledge.

THE PRINCESS OF WALES' PARRAKEET *Polytelis alexandrae*

Princess of Wales' Parrakeets are extremely well established in European aviaries and there may well be 3-400 pairs in the U.K. alone. Because so very little selection to get brighter colours had taken place and partly because of poor husbandry and feeding, there are a large number of very undersized, dull specimens. In Holland several examples of the blue mutation exist: I know of no-one in the U.K. who has any.

Three years ago I had a pair in one of my aviaries from which I made several notes, but somehow these seem to have become lost and the birds were sold (to make room for my egg-eating male Port Lincoln) before I could breed them. However, as the Princess of Wales is so interesting a parrot from its courtship, I have gathered a few notes from recent, hurried glances at pairs of these birds in other peoples' aviaries.

General behaviour

Princess of Wales' Parrakeets feed largely from the ground which makes them especially prone to infestation with *Capillaria* and *Ascaridia* worms, which pests are most likely the reason why the numbers rise so slowly despite the species being so easy to breed. Anyone acquiring a pair would do well to "worm" them several times before putting them into a clean aviary, under which conditions they should remain free from these pests. Like other equally terrestrial parrots, they cannot hold food in the foot (some people may have exceptional birds which can). Like the two other members of their genus (Barraband's *P. swainsoni* and the Rock Pebbler *P. anthopeplus*) they are very easy to tame and seem naturally confiding.

Breeding

Very probably Princess Parrakeets are able to breed in any month of the

year. Males are quite the most sexually active parrots known to myself except for, possibly, the Budgerigar. At any time they can be seen courting either their hen or sometimes an object such as a nest hole or a twig or even nothing at all. Being a desert bird, most activity is shown in the cooler parts of the day, during the very early morning or late evening. One can often hear males calling when the light is so very nearly gone that the birds cannot be made out except as vague shapes. Males will fly from one end of the aviary to the other calling their particularly ringing, and far-carrying, (*p*)ing, (*p*)ing, (*p*)ing. This "inging" is most sounded in flight, but they also do it when perched with head stretched straight up high in the air. After a few calls on alighting, they may take off again. They can repeat this for hours on end. This sound appears to be restricted to the male sex: the sexual display proper consists of the male flying up and down with the tail slightly flared and after one or two perched (*p*)ing, (*p*)ing he will wipe his head rapidly on the perch (rapid beak-wiping is part of the display of all the *Polytelis* parrots) and may jump up and down once or twice. He then will walk towards the female with the head held very high and pointing upwards. Then comes the most curious feature which can only be described as a rapid "running-on-the-spot" which produces a soft drumming noise. (I have once seen a male Rock Pebbler similarly "run-on-the-spot"). This is followed by several bowings and stretching upwards and perhaps more running-on-the-spot; then the head is swivelled rather rapidly with the same mechanical, metronome-like, swing of the Long-tailed Parrakeet. The sides of the head are shown alternately to the hen, for the movement is slowest as the cheeks come into view and most rapid when the beak faces the hen. The pupils of the eyes are so contracted during head swaying that they are barely observable in the rich ruby of the iris. As he swings, he may produce a rather duck-like *qua, qua, qua*. . . Putting his head next to the female he can make a curious ticking noise in the throat: usually this ticking noise is made while he chatters his bill rapidly as if he were cold or stammering. Both sexes can make the rapid chewing of the jaws and the rattling noise and I have seen hens sway the head. Females are very obstreperous to males and the males consequently are very circumspect about their wives. On the floor of the aviary males also court, but here most of the display is jumping. Someone who kept two pairs in the same aviary found that he had success, whereas when they were separate they never bred. I saw these birds and the males seemed most quarrelsome one to another. They would fly directly at one another and hover face to face for a second or two and then return to their mates. What was most evident was that the females were totally unconcerned; but when a female sat next to her mate, then the attacking male kept well away. These assaults were entirely silent.

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To be continued

NOTES ON THE STRIPE-BREASTED STARThROAT HUMMINGBIRD

Helimaster squamosus

By R. J. ELGAR (Manchester)

The description of the male Stripe-breasted Starthroat Hummingbird in its breeding plumage is: Crown glittering green; post-ocular spot and moustachial streak white; throat metallic violet-red, the outer feathers being lengthened; the upperparts bronze-green with an irregular line of grey feathers on the rump. The underparts are dark greenish-black with a white stripe down the centre; there are white downy feathers around the legs and vent and the under tail-coverts are blackish edged with pale grey. The tail is somewhat forked and the central feathers are bronze-green, the outer ones a dull bluish-green.

A male in this plumage came to me in late September 1974, but was imported from Brazil I would think in November 1972, as this was the last time that this species was imported into England. The bird was in excellent health when I received it and had just finished its moult. I kept it with nine other medium-sized and larger hummingbirds in an indoor flight 14 feet long and 4½ feet wide where it soon settled and within two weeks began to sing and display. In the first week of July 1975 I noticed several new

feathers in its gorget: the feathers were blackish edged with white and within a fortnight the whole of the violet-red gorget was replaced by these scale-like feathers as shown in the accompanying photograph. The iridescent green feathers of the crown were replaced by dull grey ones and at the same time the bird had a full moult, but did not lose any flight feathers until the gorget was completely out of colour. By early September the bird had nearly completed the moult; the grey feathers of the crown and the scale-like throat feathers were replaced by the metallic green and violet-red ones to bring the bird back into full colour.

Ruschi (1973) mentions the Blue-tufted Starthroat *H. furcifer* as having a non-breeding dress and says that *Heliomaster* is the only genus in which this occurs, but that is not so, as pointed out by Mobbs (1975) who quotes Johnson as recording it in *Thaumastura cora* and who describes it in the case of *Calliphlox amethystina*, the Amethyst Woodstar, a specimen of which in my collection had three eclipses in almost four years, A Long-billed Starthroat *H. longirostris* in my collection also had an eclipse plumage, but whether this in *H. squamosus* has already been described I do not know. Mr. Mobbs thinks this is the first instance observed in captive Stripe-breasted Starthroats.

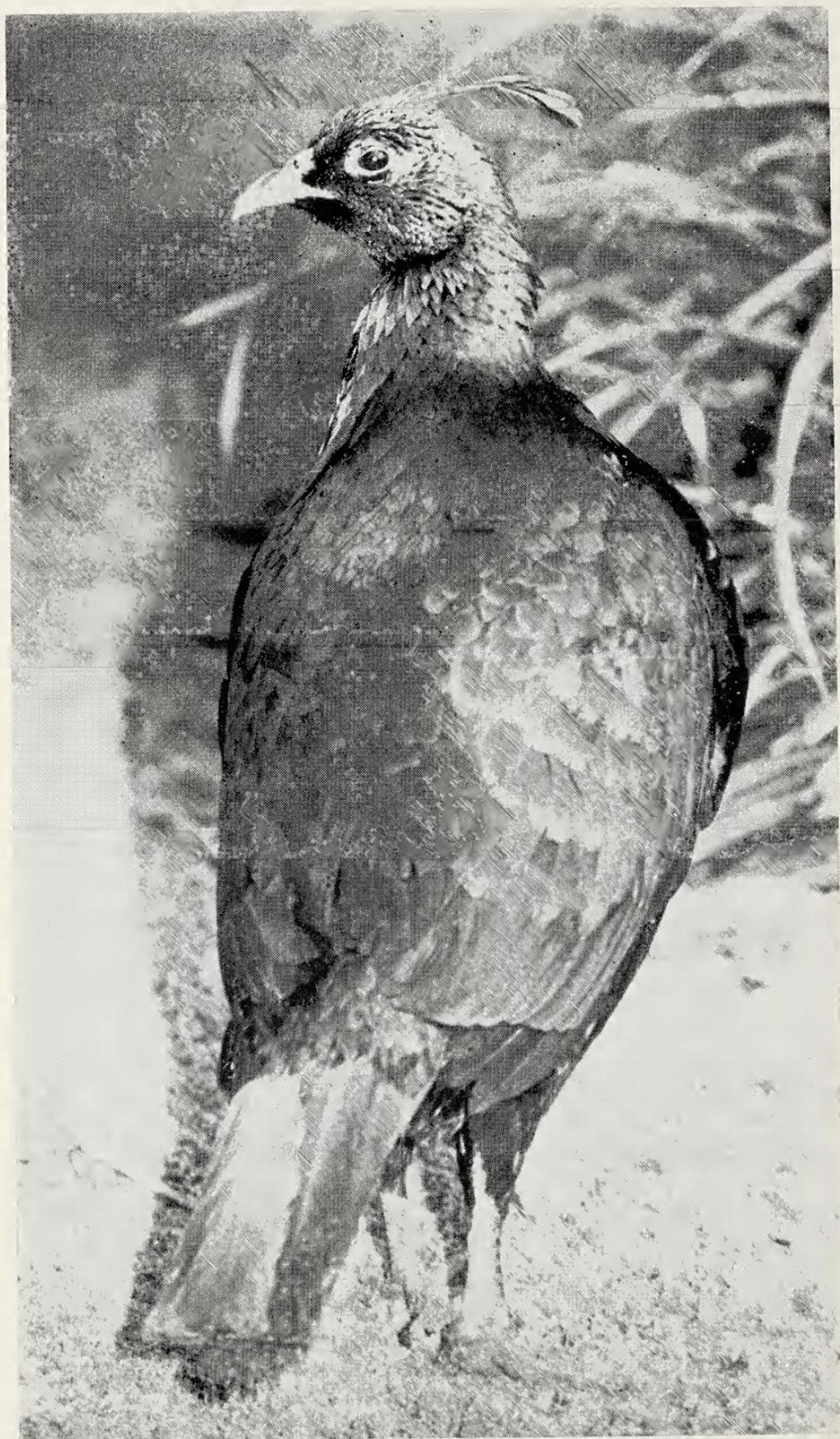
The song of this species is a monotonous *chr chr chr tss* and some days my bird will sing almost continually. The display will start with this song and the bird will then leave its perch and fly up and down the flight very quickly, snapping its wings until it finds a perched bird to which to display. It will then hover in front of and slightly below the other hummingbird showing its enlarged gorget and green crown, all the time moving up and down with extremely jerky movements and making a buzzing noise. It will eventually take hold of the other bird's throat or breast feathers with its bill and will hang there, still singing, until the other bird takes flight. The starthroat will then chase it until it settles again and the display will start over again. I have found this bird to be extremely aggressive towards some of my other hummingbirds, especially the female Green-fronted Lancebill *Doryfera ludovicianae* and the Bronzy Hermit *Glaucis aenea* and I had to remove the Long-billed Starthroat whose song and display is very similar to that of the Stripe-breasted.

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R. J. Elgar
Male Stripe-breasted Starthroat Hummingbird
in eclipse plumage



Male Impeyan Monal at the Jersey Zoological Park

P. Coffey

THE MONALS

By J. DELACOUR (Clères, Seine Maritime)

The three species of *Lophophorus* constitute a very special genus of pheasants not closely related to any others. They are heavy in shape and sturdily built with short square tails and strong bills and legs. The males are graced with magnificently iridescent plumage: females and young are brown.

Monals live high in the mountain forests and they are found all along the Himalayas and in western China. There are three species of *Lophophorus*: the two easternmost, *L. P'huysi* and *L. sclateri* have very seldom been kept in captivity, but *L. impeyanus* has long been established, particularly in England and France since the middle of the 19th century. It is widespread today in European, American and other countries' zoos and aviaries. The Impeyan Monal is found in the Himalayas east to Bhutan and Tibet at between 8,000 and 15,000 feet. Sclater's Monal almost comes into contact with it in the easternmost part of the range, but it is not yet known how close. The Chinese Monal (*P'huysi*) occurs quite far from the other two and to the northward in Yunnan and beyond. Both the latter species have become, it seems, very rare. They would be wonderful additions to live collections of game birds and their establishment under controlled conditions could be most important in order to constitute reserves and to safeguard the existence of probably threatened species.

I have never seen Sclater's Monal and the only specimen kept in captivity lived in the London Zoo in 1870, but I have watched a pair of Chinese Monals in the late Leland Smith's collection at Fair Oaks, near Sacramento, California, in 1936 and later. I had two females at Clères from 1938 until 1940. They are almost twice the size of the Impeyan, but the male's metallic colours are not quite so bright and the female is greyer and darker; all the same they are marvellous birds. None, so far as I know, have been reared in captivity.

Impeyan Monals live and breed well in pheasantries. They dig a great deal with their rather long bills, but never scratch the ground with their feet. They walk jerkily and they are rather brisk in their actions, flying strongly if heavily. The voice is high pitched and whistling. The bright iridescent upper plumage of the males is contrasted with the dull black of the underparts and the light chestnut tail. Females and young Impeyan Monals are very different from the adult males (who assume their full plumage in the second year) for they are finely streaked and marked light and dark brown with a pure white throat. Young males can usually be identified early as they are larger, show some dark spots and lines on the throat; their stronger legs often have developing spurs, always absent in females, and a few metallic feathers appear on their upper plumage in the first year.

Being mountain birds, they are rather susceptible to infections and they

must be kept on clean, well-drained and dry soil. They are extremely hardy and easy to feed, requiring a good deal of green food. Very destructive to grass and continually digging, they need roomy pens with good open shelter. Monals stay well at liberty in a park, but we could never keep more than one mated male even in a very large space, for they chase and kill one another when associated with females, although unmated males will agree fairly well together. Two or three females with one male will breed satisfactorily if space is sufficient.

It is idle to discuss the relative beauty of pheasants, for everyone can have his own choice, but there is no doubt that monals are among the most brilliant birds of the world.

BREEDING ATTEMPTS BY WHITE-BELLIED CAIQUES

Pionites leucogaster

By R. E. H. MANN (Denton, nr. Peterborough)

Ever since my wife and I first saw Mr. George Smith's Black-headed Caiques *P. melanocephala*, we have unsuccessfully tried to obtain a pair of these very tame and oddly-coloured parrots. In early April 1975 Mr. Smith was kind enough to lend what he hoped might be true pairs of both Black-headed and White-bellied Caiques. The pairs were put into adjacent aviaries and each given both an outside and an inside nest box. We are here only concerned with the White-bellied, but both pairs, although they examined the outside boxes, roosted and the White-bellied eventually nested in the inside ones. Nailed to the inside of each box were as many broad battens of wood as I could fit in. The caiques would probably have chewed themselves out of their boxes a dozen times over if it were not for diverting their attention to these strips of wood.

The male is the nominate form *P. l. leucogaster* that, until February 1975, belonged to Mr. and Mrs. Frank Waite. His previous mate, now dead, once reared a hybrid with a Black-headed Caique for the Waites. This male is extraordinarily tame, even for a caique, and always contrives to get as close as he possibly can to human beings when he hangs in front of them suspended only by his bill from the wire. Hanging thus he gabbles away in a soft whisper which is supposed to be Spanish: to me it sounds plain "double-Dutch". This male seems so tame and confiding that he practically obliges one to stroke and fondle him, to which caressing he will not show the slightest objection: alas he is treacherously spiteful and cannot be trusted. A former owner has a long scar on his left fore-arm where this bird bit and refused to let go, for if he can get a chance to grab hold with his foot or bill then he bites hard. White-bellied Caiques are rather uncommon in captivity and it is therefore particularly easy to trace his previous history through six different owners, from which I estimate that he must be at least fifteen years old.

The hen is a five year-old Yellow-thighed Caique *P. l. xanthomeria*. Originally she had been on loan, from Mr. Smith, to Mr. and Mrs. R. Grantham and was later exchanged for another White-bellied Caique in an attempt to provide a true pair. This hen, as is so often the case with parrots, is not as tame as the male; she will take fruit from the fingers and does not fly off if approached slowly by people that she knows.

The caiques, White-bellied and Black-headed, are so often illustrated (e.g. Prestwich 1955, Bates and Busenbarh 1969, Low 1972, Forshaw 1973); it might therefore suffice to say that they are of about Starling *Sturnus vulgaris* size, with short tail and of a stocky appearance. The back, wings and tail are a deep holly green while the belly and chest are white. The white is soiled-looking, even in caged individuals, as it is only the margin of the feather that is white, the greater part being pale yellow (the same "middle" part of the white feathers of Black-headed Caiques is grey). The top half of the head and the nape of the neck are apricot. Except for having yellow "trousers", most members of the yellow-thighed race differ from the white-bellied race by having the naked, flesh-coloured skin surrounding the eye very heavily and irregularly smeared with black; exactly as if they were wearing mascara and then had cried - smearing it patchily over the pink skin. The feet are also black and an odd toe-nail is white. The White-bellied have the bare skin around the eye and the legs and feet flesh-coloured with white toe-nails, while the thighs are green. The very marked differences in the pigmentation of the bare parts of these two subspecies does seem not to have been previously reported. It might also be noted that the outer iris of both the geographical races of the White-bellied is a very much more 'anaemic' red than the bright ruby one of Black-headed Caique: likewise the innermost portion of the iris is pale grey and not black as in the last mentioned bird. This difference is not shown by Cooper in Forshaw (1973).

Caiques are extremely poor flyers: they whirr through the air just like a Starling after it has had a too generous bathe in water. They give the impression that for them to fly a hundred yards would be an impossible feat. If this is so, then it is not surprising that caiques have split up into five geographical races (most say two species have divided off into five further subspecies); however, like Smith (1971) and Low (1972), I regard the Black-headed and the White-bellied Caiques as being but geographical races of the same species, differing only in the amount of black deposited in the skin, iris, bill, toe-nails and feathers.

The white-bellied "species" is found in the (higher?) Amazonian rain forest south of the river Amazon; the nominate White-bellied ranges from the east coast inland and the Yellow-thighed eastward from the eastern slopes of the Andes. Sandwiched between these two is a third, *P. l. xanthurus*, which has yet to be imported and sounds most attractive with its yellow rump and tail. Descriptions of this last subspecies do not mention the colour of the feet or facial skin.

General behaviour

This has been described by Smith (1971). Both sexes threaten by screaming and whirring of the wings but the males also have a self-important, swaggering walk. They also take little jumps and fly upwards in an arc with whirring wings to drop vertically onto a perch; or they bow very low and with blazing eyes accompany this movement with a low growling; or they walk along a perch with the head lowered and the body and head feathers fluffed, the wings not drooped and the tail only slightly flared. Sometimes they whistle a piping toot as they upstretch their wings over their backs revealing their orange "arm-pits". The wings may also be upstretched silently. The above patterns of behaviour are very probably diagnostic of the male sex. In plumage, brightness of colour and body size, allowing for individual variation, the sexes are identical. Caiques always roost in pairs in a box and when resting during the day sit close next to one another and appear to preen almost any part of another's body. The tame male is often noticed on the aviary floor turning over the litter and perhaps searching for grit.

Breeding

From the first night that we had our two they slept together in the nest box, although previous to our having them they were complete strangers to each other. The very next day they were preening one another and the male was feeding the hen; a week further on and they were mating in the invariable one-footed way of American parrots.

The hen soon began spending much of her daytime in the nest; perhaps the male did as well, but that would be difficult to tell, for the moment that he hears anyone approach he comes straight over to them. My wife could not resist looking into the nest box whenever she caught the female off and discovered the first egg, laid in the early afternoon, on May 30th. The clutch was three and the interval between the eggs about three days. This, the first time she laid, the male was not a bit possessive towards the nest and the hen sat well, remaining on the eggs even when the front of the box was removed for examination. Halfway through the incubation she was caught off and my wife then had the opportunity to water the nest with warm water and to notice that all three eggs were fertile. A tray of water was put in the shelter to raise the humidity: the eggs were watered once more before hatching with the hen still sitting, for she absolutely refused to budge. Mr. Smith tells me that he can tell from the first day of laying when his Black-headed Caiques have eggs, as throughout the incubation, the hen constantly whines to be fed by the male. I did not often hear this wheedling noise from the White-bellied hen.

The disappointment of not finding a chick, on the 27th day from the first egg being laid, increased with each day: then on July 1st we found that one had hatched, 26 days after the last egg was laid. Our greatest disappointment still had to come, for two days later the chick had gone without a trace. The two remaining eggs measured 32.5 x 24.7 mm. and 33.7 x 23.6

mm. and each had a full-term dead embryo: the eggs were sent to the British Museum (Natural History) at Tring.

The hen did not forsake her nest and continued to brood and to chew about the interior. I managed to catch her out once or twice which allowed me to reline the inside of the box with fresh pieces of chewing wood. She laid again on July 30th, exactly two months from the beginning of her first clutch and on what must have been one of the warmest days of the year: again the clutch was three. The male, with this clutch, became more defensive and one had to be very careful in changing the food pots.

The weather was exceptionally warm throughout August which shortened the incubation and on the 23rd calling was heard and a chick found. The second hatched on the 26th and the last egg on the morning of the 29th: as the eggs were laid at approximately two day intervals, this gave a 24-day incubation.

Feeding of the chicks was easy: the parents sampled everything that we offered including bread dipped in milk, cheddar cheese, lory nectar food,



Nestling White-bellied Caique

apples, orange, hemp seed, peanuts and the usual parrot mixture of seeds. The fat, white-downed chicks grew slowly at first. Having lost the single chick of the first clutch so mysteriously, we had intended removing the cock just before the anticipated time of hatching (returning him once the chicks were well grown) as we assumed, knowing his taste for human flesh, that he had eaten it. However, the precocity of the hatching took us by surprise and we completely forgot. The morning inspection on the 4th of September revealed that the two smallest chicks had gone.

According to Mr. Smith, American parrots differ in several ways from the Old World parrots and amongst their peculiarities may be that they are more likely to eat their dead babies. If the dead chicks are small, they completely eat them; the larger chicks get chewed about the head, less often

the body, which might make the owner assume that the parents had killed them. He also tells me that it may be unwise to put closed-rings on the legs of the chicks for, again quite unlike most parrots, the American ones will remove strange objects from the nest and, in his experience, they have torn legs off chicks trying to free them from a ring.

The same evening that the two disappeared, the remaining chick, because it had no food in its crop, was taken away for hand-rearing. It took its meal very readily and was put in a metal hospital cage heated by electric light bulbs under its floor. In the night it crawled out of the nest onto the hot floor and died. The chick weighed exactly 20 grams and is shown in the drawing. It may be noted that, like other American parrot chicks, it has no visible ear openings. If there is a next time, we shall very probably try to hand-rear the chicks from the time of hatching.

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BIRDS SEEN DURING A SHORT STAY ON GRAND CAYMAN ISLAND

By ROSEMARY LOW (New Barnet, Herts)

Grand Cayman is situated in the British West Indies, 180 miles west-north-west of Jamaica and about mid-way between that island and Yucatan in Mexico. It is the largest of the islands which comprise the Cayman group, approximately 23 miles long and averaging about five miles wide.

A few words on the background of the islands may be of interest. England acquired them by treaty in 1670: the population, coloured and white, originated from wrecked sailors, freed slaves and American and European immigrants, especially Scots. Today, nearly half the expatriate population of 3,000 consists of Jamaicans, yet 15 years ago expatriates numbered only 100.

My interest in Grand Cayman stems from the fact that it is the home of the Cayman Parrot *Amazona leucocephala caymanensis* and that very few parrots have such a small range. Possibly the only one with a smaller range (excluding the Cayman Brac Parrot *A. l. hesterna*) is the nearly extinct Puerto Rican Parrot *Amazona vittata*. However, the latter is found nowhere else, while the Cayman is a subspecies with the Cuban Amazon *A. l. leucocephala*. It greatly resembles the latter and there are few people

who can differentiate between the two races: one who can is the Rev. Ramon Noegel of Seffner, Florida.

A chance remark made to my husband and I while visiting San Diego Zoo in 1974 led to us meeting this dedicated aviculturist. We heard of his unique achievement in breeding the Cayman Parrot and were fortunate in having the opportunity to visit him and see the four young Caymans which were hand-reared.

The fact that the Cayman greatly resembles the Cuban Amazon will mean little to most people, as the latter is not well known in aviculture: a brief description will, therefore, be appropriate. The Cayman's plumage varies quite considerably in individuals and I believe that this also applies to the Cuban. Both birds are very beautiful with an extensive area of deep pink on the cheeks and throat and a white forehead. Cayman Parrots have a turquoise wash to the underparts and rump which, I am told by Ramon Noegel, is invariably lacking in the Cuban. The former are usually lighter green with less pronounced black edges to the green feathers of the head and neck; the white on the forehead is often suffused with pink or has a yellowish tinge. There is a maroon-coloured patch on the abdomen, and the underside of the flight feathers are a rich shade of sky blue. The tail is one of its most attractive features, with red and light blue markings.

Ramon Noegel's enthusiasm for the Cayman Parrot was so infectious that it led to my husband and I visiting Grand Cayman at the end of April last year. On arrival, we immediately hired a small car; bird-watching without it would have been very difficult, for the birds in which we were principally interested are not to be found in the most populated part of the island. The parrots are confined to the eastern end and keep principally to the mangroves, of which there are over 18,000 acres.

At the end of April 1975, after four years' work by a small team, a Proposed Development Plan for the Cayman Islands was published. This was summarised in the magazine of the islands, *THE NORTHWESTER*, in the May 1975 issue, and is reproduced here with permission of that journal.

Protection of the mangroves was proposed for the following reasons:

“. . . the mangroves protect the shoreline and the shoreline is there because it is protected by the mangroves . . .

“On the mangroves it (the Plan) says that the general attitude was that they were a nuisance, breeding mosquitoes and increasing humidity; however, careful study showed that there were three types of mangrove, each serving a purpose. There were red mangroves, which were permanently covered by tidal water; black mangroves, which were only affected by high tides or heavy rain and which were the breeding-ground for mosquitoes; and white mangroves which grew above normal water level but had access to the salt water table.

“Although there might be reservations about the black mangrove, other areas of mangrove, especially red mangrove, were wholly beneficial. Much of the nutrient material for the North Sound originated in the swamps. The swamps were nursery areas for many species of fish and other marine life.

They dissipated the energy of the waves and gave a high degree of protection during storms or hurricanes. They attracted rainfall. They moderated the runoff into the sea thereby preserving the clarity of the surrounding waters.

“The Plan states that the mangrove swamps play an important part in the ecology and natural environment, and indiscriminate removal could have repercussions as serious as efforts to continue dredging the North Sound.

“The conclusion of the Plan was that ‘Mangrove and forest areas should therefore be preserved; belts of woodland and open space should be consciously retained between developments; more care should be taken to preserving valuable trees in existing projects and to replacing those destroyed by careless operation of heavy equipment.’”

On the face of it, this would appear to be promising where the survival of the Cayman Parrot is concerned, but the black mangroves are its main breeding area and the Plan suggests that “there might be reservations about the black mangrove . . .”

No tourist development and very little residential development is proposed for the area in which the parrots are found. Tourist development is confined to the coast, especially at the west end of the island.

During the all-too-brief week we spent on Grand Cayman, we devoted every morning and late afternoon to watching birds, especially parrots. On our first morning, as we approached the area in which they are found, a pair flew across the road some way in front of us. Even at a distance, there is no mistaking this bird in flight; the rapid wing beat, always below the horizontal, and the rather blunt appearance of the head are diagnostic.

We spent about an hour watching a pair feeding on mangoes in a garden. Presumably because they were used to seeing people there, they allowed a closer approach than the parrots we saw later in the mangroves. The mango is, of course, a sweet, fleshy fruit with a large stone in the centre and a hard skin. The parrots feed on the ripe fruits, those in which the outer skin has turned from green to yellow: they leave many fruits half eaten and are thus doing a service to small birds such as the Bananaquit which are not capable of piercing the outer skin. On several occasions we watched these little nectar-feeders eating ripe mango.

The mango is a native of India and was introduced to the West Indies, especially Jamaica, many years ago. It grows wild all over Grand Cayman and is one of the principal foods of the parrot. The fruit from the trees growing by the roadside is apparently judged anybody's property; thus the parrots do not have to raid cultivated trees to obtain food.

There are many almond trees, another favourite food source of this species. On one occasion we came across a party of eight birds feeding on the seeds or leaves of a tree which we could not identify. I broke off a small twig and a friend on the island identified it as logwood.

The main road follows the coast, bisecting the island at only one point in the area inhabited by the parrots. Late one afternoon we parked the car on

this road to explore an area whose appearance had promise. After walking for about five minutes into land which was obviously swampy during times of high rainfall, I could hear parrots calling not too far distant. As I made my way towards the sound of their voices, a pair flew over in the direction from which I had come. I retraced my steps towards the car in order to fetch a pair of shoes more suitable for the rough ground. As I did so, a pair of parrots flew very low above me; one must have been as low as 10 ft above my head and it was a tremendous thrill to see it so close. It seemed that the birds were as curious about us as we were about them, for they could easily have avoided us and would, in fact, have been easy prey for anyone with a gun.

So noisy were the parrots perched some way off that, although I could not see them, their cries led me to the tree in which they were hidden. The camouflage was so effective that it was not until one flew that I discovered its whereabouts; its mate eluded me completely. As I returned to the car my husband beckoned me urgently from the other side of the road. He had been watching a group of eight birds feeding in the logwood, already mentioned. Six had flown off but the remaining two were unbelievably tame. These two did nothing more than display at us as we stood immediately below the tree in which they were feeding, about 8 ft above us. It was the wrong time of year for young birds, so I can only conclude that they were particularly incautious young adults.

My husband tried many times to photograph feeding parrots but they usually flew off shrieking their tinny, atypical Amazon call, when approached too closely. As a matter of fact, it is a rather pleasant noise to my ears, almost musical in comparison with the sounds produced by some Amazon parrots.

We never failed to find parrots in the area mentioned above: it was impossible to estimate how many there were, but often their voices seemed to come from every direction. However, we never saw more than eight together at once and all those we saw were in pairs or small groups so we knew that nesting had not commenced. We were told that they normally start to breed at the beginning of May. Usually two young are reared, sometimes three, rarely four. Their chief enemies are domestic cats and snakes; thus they breed deep in the black mangroves. On more than one occasion we saw a black snake which slithered off at great speed on sensing our presence. The main source of annoyance to the bird-watcher is the mosquito. We invariably went about armed with an aerosol called "Off!", but it did not deter these vicious biters.

During our week on the island we identified 25 bird species and saw none which we could not name – with the help of James Bond's *BIRDS OF THE WEST INDIES*.

Our favourites, next to the parrots, were the Greater Antillean Grackles *Quiscalus niger* as noisy and ubiquitous as our Starling, but far more attractive. About 11 inches in length, this species is black, with a violet or blue sheen; the pale yellow, almost white, eye provides a striking contrast to

the black plumage. The tail of this bird is distinctive, yet difficult to describe – V shaped and wedge shaped not being quite accurate. Wherever one went on the island, the tinny, plaintive notes of this grackle were not far away.

In *THE BIRDS OF JAMAICA*, published in 1847 and now a rare collector's item, Gosse stated that he could compare its voice "to nothing but the sounds produced by repeatedly striking with force a piece of sonorous metal, relieved occasionally by the creaking of a schoolboy's pencil upon a slate." As the notes are uttered, it puffs itself out, throws back its head and opens its beak wide. These birds were invariably seen in small groups; they breed and roost in colonies.

We never tired of watching the antics of the Smooth-billed Ani *Crotophaga ani*, another extremely common all-black bird. The Ani, a very distinct member of the cuckoo family, is immediately recognised by its beak, which reminds me of a cartoonist's representation of a parrot's beak. Not only is it very large, but it has a very high, thin, ridge to the culmen. The long tail accounts for almost half of the Ani's total length of 14 in.

Anis, too, are found in small flocks, usually of about ten birds and it is amusing to see them flapping weakly along in single file. They spend much of their time on the ground searching for food; we often saw them in the longish grass at the side of the road, where they would also perch on the fences. Their food consists of insects, lizards and even frogs. The nesting habits of this species are of particular interest: a nest is shared by several females and may contain as many as 20 eggs. It is an open structure of twigs, lined with leaves, often situated in mangrove trees.

The only other black bird on the island is the Cuban Bullfinch *Melopyrrha nigra*. The male is entirely shiny black except for a conspicuous white patch on the wing. I watched a male collecting nesting material and he soon led me to the nest. It was situated in a small stand (15 ft. x 3 ft.) of almond trees about 7 ft. high in the centre of a patch of ground which had been burnt. The nest was at a height of about 6 ft.; we also saw the female at the nest site, less conspicuously garbed in greyish-olive.

Much in evidence on Grand Cayman are pigeons and doves. A most delightful little bird is the Common Ground Dove *Columbigallina passerina*, hardly bigger than a Chinese Painted Quail *Excalfactoria chinensis*. It would, I am sure, be an instant success with aviculturists were it available again: not only is it very common, but it is the most widespread of West Indian birds.

Its coloration is drab except for the chestnut on the wings which is seen only when it flies. It allows a very close approach, often running to avoid a pedestrian, rather than taking to wing; its flight is low and whirring. Every day we saw these dainty little birds running about on the beach in front of our hotel and they were much in evidence in other parts of the island.

Of the larger pigeons the White-winged Dove *Zenaida asiatica* appeared to be the most common. About 12 in. long, it is immediately recognised by

the conspicuous white wing bar, the rest of the plumage being brownish. Far more handsome was the White-crowned Pigeon *Columba leucocephala*, which is dark grey with striking white crown and forehead. The head is greyish-white in the female, pale grey in immature birds. Seen less often was the Red-necked Pigeon *Columba squamosa*. We saw it in the mangroves, whereas the other large doves were usually perched on the telephone wires at the sides of the road. The Red-necked is a large bird, about 15 in. long, mainly dark slate-grey with the head and neck dull vinaceous and the hindneck chestnut and metallic purple.

An extremely common and conspicuous species is the Northern Mockingbird *Mimus polyglottos*, usually seen running along the ground or singing from a conspicuous perch. About 10 in. in length with a long tail, it is mainly grey with white patches on the wings and white outer tail feathers. It has a habit of running a short distance, stopping abruptly every three or four seconds and opening the wings wide, like a giant butterfly, to reveal the white wing bars. What significance this behaviour has I do not know. Is this a way of shading the ground to assist in the search for insects?

The Mockingbird is known as the Nightingale; it sings at night as well as throughout the day. The song is loud and melodious, usually delivered from a high perch. It is a talented mimic as its scientific name (which means "mimic of many tongues") suggests. We found a Mockingbird's nest at the end of a branch situated at a height of about 8 ft. Two to four pale greenish-blue eggs are laid but we did not disturb the incubating hen to see what the nest contained.

Two tyrant-flycatchers which appeared to be plentiful were the Loggerhead Kingbird *Tyrannus caudifasciatus* and the Stolid Flycatcher *Myiarchus stolidus*. Both are rather drably coloured but the Loggerhead is considerably larger — 9 in. compared with 7½ in. The former is brownish above and whitish below and can be identified by the fact that most of the head, including the lores, is dark; it has yellowish under tail-coverts. The Stolid Flycatcher has only the crown dark, light-coloured lores and partly rufous tail.

The cheerful, not unmelodious song of both species was frequently heard, often when the singer was perched conspicuously at the end of a leafless branch, from where it would make short flights after insects. Both species apparently also take small lizards, which are abundant on the island. While on the subject of lizards, I cannot resist mentioning the iguana *Cyclura macleayi caymanensis* on Grand Cayman. Iguanas have always held a particular fascination for me; unlike some people, who find them ugly, I think them extraordinarily beautiful. The species on Cayman is probably extinct in Jamaica, where it was widely eaten by the Ararwak Indians and even sold in Kingston market for the table until the early 19th century. I had read that a small population survived on Cayman, but this fact had somehow got relegated to the recesses of my mind.

The day before we left, we drove to the northern shore of the eastern part of the island, and parked in the shade with a cooling sea breeze. Even

at 10 a.m. the temperature was well into the 90s F. The road ended abruptly; it was covered with sand, with low scrub on one side and the sea on the other. I imagine that there are few visitors to this part; there are no sandy beaches, thus no hotels.

We drove off very slowly, in order to look for birds. A few yards along the road, my husband stopped the car suddenly. We could hardly believe our eyes: there on the roadside was a 4 ft. iguana, an imposing beauty. I do believe he would have ignored us, had my husband not got out of the car, which had stopped about 3 ft. from the iguana, in order to photograph it. It turned and moved off quickly into the low scrub, where we could not follow, but not before it had threatened my husband with nodding head.

Elated at this sighting, we returned to the spot we had left and parked in the hope that the iguana might re-appear. It failed to do so but another, smaller iguana came out to sunbathe on the road; however, it did not allow a close approach. Once again we returned to park under a tree and waited – but two iguanas was to be our total.

We did not realise how fortunate we had been until we mentioned the incident to a friend: his reaction was one of incredulity. "I have spent 30 years on the island and have never seen an iguana – and you are here a week and see two!" He told us that even scientific expeditions had failed to find the iguana.

We also enquired about the Grand Cayman Thrush *Mimocichla ravidia*, found only on Grand Cayman. Attracted by the illustration in BIRDS OF THE WEST INDIES, we kept a lookout for it whenever we visited the eastern part of the island, and we showed our friend the illustration and asked whether he knew the bird. He told us that he believed that it had not been seen for about 30 years; it must therefore be feared extinct. Not unlike our Black-bird in size and stance, it is depicted as being entirely grey with white abdomen and under tail-coverts and bill, feet and bare eye ring of coral red.

One morning, on our way to the turtle farm, which lay at the opposite end of the island to that we visited most often, we added two new species to our list – the Mangrove Cuckoo *Coccyzus minor* and the American "Redstart" *Setophaga ruticilla*. The former, known locally as the "Rain Bird", is a handsome species about 12 in. long. It is grey above with black ear-coverts; the underparts vary from whitish to pale brownish-yellow. The single bird we saw was in low bushes a few feet from the sea. The American Redstart is an extremely striking little bird. We saw but a single male of this ill-named warbler, darting about and flirting its handsome tail. The male is mainly black with bright orange patches on the sides, wings and tail, with some white on the underparts. Apparently, the female is olive-brown above, whitish below, with yellow instead of orange patches.

We often parked in lonely places to watch birds which inevitably led to any Caymanian who passed enquiring whether our car had broken down. The islanders are very friendly, helpful people but it seems that few have any interest in the native birds, and we usually hesitated to explain our true purpose!

There was one bird on the island which vociferously objected to our presence – a Black-winged Stilt *Himantopus himantopus* which inhabited an area of shallow brackish water, where we often saw Great White Herons *Ardea occidentalis*. The latter would flee as soon as they saw us but we were able to observe a Tricoloured Heron *Hydranassa tricolor* from a distance although it, too, was very cautious. The stilt was one of a pair which was probably nesting nearby and circled above us screaming, almost resorting to “dive-bombing” my husband when he approached the water to photograph the scene.

Late one afternoon, following the calls of the parrots in the mangroves which, when I found them, did not allow a very close approach, I came across a beautiful Stripe-headed Tanager *Spindalis zena* which was not at all shy. About 7 in. in length, the male has the head and wings boldly marked in black and white, in contrast to the bright yellow of the underparts, with a touch of red on the upper breast. The female has the head grey and the wings grey and white, with yellow underparts. This species has a wide distribution in the West Indies and has been imported on a few occasions.

The same afternoon I was foolish enough to leave my cine-camera in the car, thus missing the opportunity to film a West Indian Red-bellied Woodpecker *Centurus supercilialis* which flew towards me, perched in a tree about 8 ft. away and unconcernedly carried out his drumming. Woodpeckers' voices were a familiar sound, but we seldom saw the birds.

A small, brightly coloured bird which appears on one of Cayman's stamps is the Yellow Warbler *Dendroica petechia*. On several occasions we saw this species in trees or bushes a few feet from our moving car: it did not seem at all shy. The male is golden yellow, streaked with chestnut on the underparts. Finally on a single occasion we saw a Belted Kingfisher *Ceryle (Megaceryle) alcyon* perched on a telegraph wire. Grey-blue above, including the crest, and white below, it has a broad bluish-grey band across the chest.

Grand Cayman is an island which I will always recall with affection and to which I hope one day to be able to return.

OBSERVATIONS ON SOME HUMMINGBIRDS
OF MARTINIQUE

By JOHAN INGELS (Destelbergen, Belgium)

During a visit (22nd and 23rd August 1974) to the island of Martinique (West Indies), I had the opportunity to observe the hummingbirds living around the Hilton hotel. This hotel is situated on top of a steep cliff, approximately 20 m. above the Caribbean sea, at the entrance of the Fort-de-France bay and near the Route Nationale N.2, connecting Fort-de-France and St. Pierre.

In the hotel's well kept gardens and grounds which descend to sea-level, three hummingbird species occur, all of which are endemic to the West Indian archipelago. In these gardens flowering shrubs and trees are abundant, e.g. *Bougainvillea*, *Delonix*, *Heliconia*, *Poinciana* and *Hibiscus* species.

The hummingbird species observed in this drier part of the leeward side of the island were: Antillean Crested Hummingbird and Green-throated and Purple-throated Caribs. The Purple-throated Carib comes only occasionally to man-modified habitats at sea-level (Diamond 1973). The other species regularly occur in the lowlands of all Lesser Antillean islands; also in the dry forest areas (Wolf and Wolf 1971; Lack 1973; Pinchon 1963).

Antillean Crested Hummingbird *Orthorhyncus cristatus*.

The subspecies observed was *Orthorhyncus cristatus exilis*, with a glittering all-green crest. It was especially abundant in the tops of flowering trees belonging to the Leguminosae, which grew alongside a small brook left of the hotel. It was seen feeding on the flowers of dwarf poincianas (*Poinciana pulcherrima*) and shower trees (*Cassia* species). Several were seen chasing each other among the nearby fruiting almond trees (*Terminalia catappa*). Bare twigs in the shady crowns of these trees appeared to be the preferred resting perches.

After a two hour period (09:00-11:00) of observation with binoculars, I estimated between five to seven birds were present, at least two of which had no crest, being either females or immature. Although there was continual bickering amongst these birds, none appeared to have actual feeding territories.

Next to the main entrance of the hotel, in the tangled vegetation around rubber and mango trees (respectively *Ficus benjamina* and *Mangifera indica*) lived a number of these hummingbirds. At least one of them was a female or an immature one, having no crest as I stated when it was feeding on ixora flowers (*Ixora macrothyrsa*), 2 m. in front of me. Shaded, bare twigs low in the mango trees were the preferred resting perches.

A single male of this species, which resided next to the path leading to the hotel's private landing-stage, was fairly tame: its behaviour was studied in some detail for a period of three hours (14:00-17:00), together with that

of a male Purple-throated Carib *Eulampis jugularis*. Its normal resting perch was a bare twig of a golden trumpet bush (*Allamanda cathartica*), approximately 1½ m. high and overshadowed by a tall flowering cannonball tree (*Couroupita guianensis*). This particular male was seen feeding on the nearby flowers of *Hibiscus*, *Bougainvillea*, a golden trumpet bush and the cannonball tree and on the very small flowers of a climbing herb. The nectar in the deep calyces of *Hibiscus* and *Allamanda* flowers are inaccessible to such a short-billed hummingbird; however, I observed the male taking nectar through a narrow hole in the base of the corollas of these flowers. This particular feeding behaviour had already been observed for all three hummingbird species mentioned in this paper, at the "closed" flowers of the pepper hibiscus (*Malvaviscus arboreus*) (Pinchon 1963). Although I did not observe this Antillean Crested Hummingbird actually piercing corollas, I believe the perforations were made by the hummingbird itself. Bananaquits *Coereba flaveola*, which were abundant in the hotel grounds and are known to pierce flower corollas in search of nectar, would have made larger, less defined perforations.

I agree with Lack who remarks that Antillean Crested Hummingbirds normally feed from near the ground up to the canopy of tall trees, although I too observed they seemed to prefer the former (Diamond 1973).

As to resting perches they seem to prefer bare twigs, well overshadowed when chosen low, or in shady crowns of higher trees.

Green-throated Carib *Sericotes holosericeus*.

A Green-throated Carib was seen feeding several times between 07:00 and 08:00 on the flowers of *Hibiscus*, red ginger (*Alpinia purpurata*) and *Heliconia caribea*, planted in flower beds around the swimming pool and along the rear side of the hotel. Between two feeding visits, it disappeared for approximately ¼ hour, each time flying off in the direction of the front of the hotel. At 08:30 when the place became crowded with people, it no longer appeared. Shortly afterwards, another one was seen probing the flowers of an orchid tree (*Bauhinia variegata*) in front of the hotel and both birds were seen to feed on flowers from near the ground up to the tops of low shrubs.

Purple-throated Carib *Eulampis jugularis*.

To the right of the hotel was a small forest, consisting mainly of flowering flamboyants (*Delonix regia*), among which grew a thicket of tall cactus, a few clumps of bamboo and several cultivated mangos and rubber trees (*Ficus elastica*).

The Purple-throated Caribs observed fed almost exclusively on the abundant flamboyant flowers.

A female Purple-throated Carib, which furiously defended its own feeding territory consisting of three flamboyants, was observed for a period of three hours. It always fed from flowers of these trees, after which it returned to the same perch to rest; a tiny bare twig just below the crown of a non-flowering flamboyant nearby. On several occasions it chased a female Purple-throated Carib occupying a nearby feeding territory. The

intruder's territory was much larger, consisting of approximately a dozen poorly flowering flamboyants, which may have been the reason for it trying to feed on the more abundant flowers in its neighbour's territory.

The Purple-throated Caribs were always seen feeding high up, never descending to nearby low flowering *Hibiscus*. Sallies to take airborne insects were observed, mostly followed by some nectar sipping, prior to returning to the favourite perch.

The mentioned male Antillean Crested Hummingbird residing nearby, entered several times the feeding territory of the first mentioned female Purple-throated Carib to feed on low hanging flamboyant flowers, but it was not seen to be chased.

List of food plants on which the hummingbirds were seen to feed:—

Apocynaceae

Allamanda cathartica : *O. cristatus*

Cesalpiniaceae (Leguminosae)

Bauhinia variegata : *S. holosericeus*

Cassia species : *O. cristatus*

Delonix (= *Poinciana*) *regia* : *O. cristatus*, *E. jugularis*

Poinciana pulcherrima : *O. cristatus*

Lecythidaceae

Couroupita guianensis : *O. cristatus*

Musaceae

Heliconia caribea : *S. holosericeus*

Nyctaginaceae

Bougainvillea species : *O. cristatus*

Rubiaceae

Ixora macrothyrsa : *O. cristatus*

Tiliaceae

Hibiscus species : *O. cristatus*, *S. holosericeus*

Zingiberaceae

Alpinia purpurata : *S. holosericeus*

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THE LESSER ANTILLEAN PARROT PROGRAMME AT THE JERSEY ZOOLOGICAL PARK

By DAVID JEGGO (Deputy Curator of Birds)

The Lesser Antilles were once the home of six species of Amazon parrot: today two are already extinct and the other four are in danger of extinction, the St. Lucia Parrot *Amazona versicolor* most gravely. For a long time these beautiful parrots have been much sought after as cage birds. Mr Sydney Porter wrote about them in glowing terms in this journal (1929), making particular reference to the Imperial Parrot *A. imperialis* of Dominica.

Always extremely rare in aviculture, they are far too scarce to justify their inclusion in the aviaries of the over zealous collector. Today, their only place in captivity is in a properly controlled propagation programme. Concerned for their survival, Dr and Mrs Nichols of Texas, U.S.A., started just such a programme for all four species of Lesser Antillean parrot. Due to the vital role this could play in their conservation, the Jersey Wildlife Preservation Trust and S.A.F.E. (Save Animals From Extinction) International, its sister organisation, gave the programme their backing and have worked closely with the Nichols so that captive populations can be established both in Texas and Jersey. Initially the J.W.P.T. are concentrating on the St. Lucia and St. Vincent species and thus representing the J.W.P.T. the author spent from April to July 1975 in the Antilles, principally on St. Lucia, assisting with field studies and securing specimens for the captive phase of the programme.

The St. Lucia, one of the largest Amazon parrots, measures about 43 cm. in length and is approximately the same size as the St. Vincent *A. guildingii* although rather slimmer in build. As in the St. Vincent, there is considerable variation in the plumage. The forehead, lores and cheeks are cobalt blue, blending to light green on the crown, extending to green throughout the nape, mantle, rump, tail- and wing-coverts. The feathers of the nape are heavily edged with black, the rest more lightly. Four secondaries have a vermilion outer web, which form a bright speculum when the wings are extended. On the upper side the primaries are royal blue on the outer web and black on the inner; underneath the wings is pale blue-grey.

On the underparts the greatest variation occurs: some specimens have an extensive scarlet throat patch, in others there are just a few red feathers or none at all. The breast, abdomen and thighs are pale green thinly edged with black. Those of the breast and abdomen, in most birds, are blotched with dull pinkish maroon, sometimes almost obliterating the green. Under tail-coverts are pale green with a tinge of turquoise around the vent. The tail feathers are black at the base on the underside and pale green towards the tip; on the upper side royal blue extends for the greater part of the length giving way to a pale green tip. The lateral tail feathers have a patch of red on the inner web at the base; the bill is largely grey, the iris orange, the periorbital ring is pale grey and the legs and cere dark grey.

The Jacquot, as it is known locally, is endemic only to St. Lucia, an island 238 square miles in area, and is restricted to the rain forest of the mountainous interior. It inhabits a region of some 25 square miles which is dominated by Morne Gimie (900 m), the highest peak in St. Lucia, with many lesser peaks and ridges which slope steeply down to bolder strewn ravines. The population is in the region of 125 specimens and its present range extends from Millet and Mt. La Combe in the north to Grand Magazine in the south, as far as Mt. Houlemon in the west and Mt. Beucop and Calforc in the east.

The forest is most beautiful, many trees are bedecked with a mass of epiphytes. It is moist and often dripping with the frequent rain showers. Little sunlight penetrates the dense canopy, the floor having only scanty growth. The parrots spend most of their time up in the canopy; consequently they are difficult to see from the ground. The dense foliage has few gaps and those 'windows' that exist only give restricted vision; even from the tops of the ridges and peaks it is not possible to see much. Thus the very nature of their forest home hampers any detailed study of this rare bird considerably.

Most of the forest is a reserve, set aside largely as a catchment area to conserve the island's water resources. Some inroads are still being made however, with clearance for shifting cultivation continuing, illegal plots are found well into the forest; some lumbering takes place as well.

The avifauna is relatively poor in regard to the number of species that occur; although the parrot is perhaps the most beautiful of the forest birds, a number of interesting species are to be found. Few of these are known to aviculture to any great extent. The bold humming birds are particularly numerous and endlessly fascinating. The Trembler is a curious species, sombre brown with an elongated downcurved bill, its wings are frequently draped and trembled, hence its name. The dainty little Bridled and Ruddy Quail Doves are delightful birds, occasionally encountered foraging among the débris on the forest floor, but more often their plaintive soft cooing is the only sign of their presence.

Our search for the parrot began in the northern part of the forest, using the agricultural rest huts at Millet as our base. A parrot was seen on our first day out in the area; a memorable experience to encounter such a rare species in the wild. Our searches of the forest in the north revealed few parrots. Nowhere were they abundant, except early one morning when a flock of twenty was observed flying over the Dame de Traversay ridge. In the south we were based at the Quillesse forestry hut, isolated in the heart of the forest and accessible only on foot along a narrow muddy path. The parrots were markedly more abundant in this region and consequently most of our work was carried out here. We were able to locate two nests in these parts and although the breeding season, which coincides with the dry season, was well advanced when we discovered them, some new and interesting data were obtained. This aspect is an important part of the programme, for the knowledge gained from field studies is useful to create

improved conditions so as to maintain the species successfully in captivity and of use in constructive conservation in the wild.

One nest was at a height of 18 m. in a Gommier tree *Dacryodes excelsa*. When first examined on June 6th it contained a well developed chick, which we removed the next day before it had a chance to fledge. The second nest was in a Bois Pain Marron *Talauma dodecapetala* 21 m. up where a bough had broken off and a cavity had rotted out. A single chick was also found in this nest, less developed than the other. We left this in the parents' care for a while longer but examined it regularly, collecting data on its development and making observation on behaviour at the nest. The parents were easily distinguishable, one a very colourful specimen, the other practically green, usually visited the nest about three or four times during an eight hour observation period. Arriving together flying silently into the branches near the nest, one would enter the cavity while the other perched quietly nearby before they changed over or it joined the other in the nest. They stayed for 20–30 minutes before calling loudly as they flew off together. While a parent bird was in the nest, the chick could clearly be heard vocalising and this often continued for a while after the adults had flown. Tragedy struck, however: the chick succumbed to some unknown cause, possibly due to a species of opossum, one of St. Lucia's few mammals. This was a great setback as it left us with a single youngster, far short of the eight or so we had hoped to acquire.

This bird did very well. It was fed on a mixture of Weetabix, Farex baby food, golden syrup, brown bread, mango pulp or mashed banana and powdered milk mixed into a porridge with warm boiled water plus one or two drops of vitamins. At first it was a little reluctant to feed, but it soon accepted the mixture being pushed from the end of a finger into its beak. It was fed four times a day, the first feed at 06.00 and the last at about 18.30. To begin with it was kept in a small wooden box but was later transferred to a cage constructed specially for it.

There is a clear pattern of daily activity; flying and calling as they disperse from roosts to feed soon after first light. Around mid-day they are extremely quiet and inconspicuous. Activity starts up again in the late afternoon and towards evening as they return to roost. During rain little activity is noticeable. A definite outward movement in the morning and return to the centre of the forest towards dusk is apparent but how widely they travel throughout the range during the day is difficult to tell. Usually they are seen flying singly, or occasionally in pairs or threes. One group of four was seen, containing at least one young recently fledged.

Food appears abundant, the birds eating the fruits of several of the forest trees and palms, even venturing into secondary growth to feed on some plants: our list of species fed upon is far from complete.

The author flew to St. Vincent for a week in May to meet Government officials who had kindly given permission for four St. Vincent parrots, already in captivity, to come to Jersey; there are extremely tight restrictions on the export of parrots from the island. Some time was also spent

observing the species in the wild; it is somewhat more plentiful than the St. Lucia Parrot and tends to stray into open land a little more, but is likewise restricted to what remains of the rain forest. The author returned to St. Vincent for the last few days in the West Indies to crate and settle the four parrots ready for the journey before boarding the banana boat. This boat docked in Port Castries the next day where the young St. Lucia Parrot was picked up. The birds travelled extremely well and it was not until on the voyage home that the St. Lucia Parrot began to feed for itself.

All five birds were quickly at home at the Jersey Zoo and have come through their first winter with no trouble, staying out under close observation during all weathers. A second St. Lucia Parrot, sent on breeding loan from the Bermuda Aquarium, Museum and Zoo, has been a welcome addition to the programme.

The greatest threat to the St. Lucia parrot's survival almost certainly lies in continued hunting. Slaughtered mainly for the pot, the few pet birds around the island are mostly those who recovered from injuries when shot, deliberate efforts sometimes being made to obtain a pet parrot in this fashion. Therefore no real moves were made to obtain any of the pets for fear of encouraging this practice. Such birds are often damaged in some way and so perhaps are not ideal for breeding. Laws exist prohibiting the hunting of parrots and also the keeping of pet ones. These laws are hard to enforce and are no real deterrent at present.

Adult parrots have few, if any, natural enemies. There are several predators on the island that may take eggs and young but there is no proof they do so. At one nest a Pearly-eyed Thrasher was seen to fly to the entrance and it is known on other islands that these birds take eggs and young and even compete for nest sites.

The parrot's future also rests on the rain forest. Much has already been lost, and continues to go, due to lumbering and clearance for shifting cultivation. St. Lucia must carefully protect its forest; it is vital for its water supply and of course, for the parrot. Those areas remaining must provide adequate habitat, particularly in regard to nesting sites, so that a healthy population can be sustained. Areas should be set completely aside for the parrots and a wildlife division should be formed with properly trained wardens who are given sufficient powers to clamp down on hunting, coupled with a proper forest management policy, to aid its conservation.

Uncertainty must hang over the future of the St. Lucia Parrot. Thus if a reserve of captive bred specimens could be built up, its survival would be safeguarded. Now is the time to start a captive breeding programme before the species becomes almost inevitably rarer. It is hoped that removing a limited number of specimens over the next few years, ideally as feathered nestlings, will have a minimal effect on the wild population.

It can only be hoped that present trends can be reversed and the parrot will once again flourish; however in the event of extinction it will not be lost for ever if a reservoir of captive-bred specimens remains.

A further expedition to the Antilles is planned and it is hoped to obtain further specimens for the programmes.

Other species in and about the forests of St. Lucia are:—

Broad-winged Hawk	<i>Buteo platypterus</i>
Red-necked Pigeon	<i>Columba squamosa</i>
Ruddy Quail Dove	<i>Geotrygon montana</i>
Bridled Quail Dove	<i>Geotrygon mystacea</i>
St. Lucia Parrot	<i>Amazona versicolor</i>
Mangrove Cuckoo	<i>Coccyzus minor</i>
Lesser Antillean Swift	<i>Chaetura martinica</i>
Purple-throated Carib Hummingbird	<i>Eulampis jugularis</i>
Antillean Crested Hummingbird	<i>Orthorhyncus cristatus</i>
Grey King Bird	<i>Tyrannus dominicensis</i>
Rusty-tailed Flycatcher	<i>Myiarchus tyrannulus</i>
Lesser Antillean Pewee	<i>Contopus latirostris</i>
Caribbean Elaenia	<i>Elaenia martinica</i>
Scaly-breasted Thrasher	<i>Margarops fuscus</i>
Pearly-eyed Thrasher	<i>Margarops fuscatus</i>
Trembler	<i>Cinclocerthia ruficauda</i>
Forest Thrush	<i>Cichlherminia herminieri</i>
Rufous-throated Solitaire	<i>Myadestes genibarlis</i>
Adelaide's Warbler	<i>Dendroica adelaidae</i>
Bananaquit	<i>Coereba flaveola</i>
Blue-hooded Euphonia	<i>Euphonia musica</i>
St. Lucia Oriole	<i>Icterus laudabilis</i>
Lesser Antillean Bullfinch	<i>Loxigilla noctis</i>
St. Lucia Blackfinch	<i>Melanospiza richardsoni</i>
Black-faced Grassquit	<i>Tiaris bicolor</i>

* * *

RECORDS OF BREEDINGS UNDER CONTROLLED CONDITIONS IN BRITAIN

BIRDS OF PREY

By BERNARD C. SAYERS (Chelmsford, Essex)

I, like Dr. Harrison in his list of breeding records (crows to touracos), do not claim that the breedings cited are necessarily "firsts". I have discounted accounts where vague terms such as "have bred" or "have nested" are employed, as in many instances authors seem to have used these phrases when describing nesting attempts involving eggs being laid and perhaps hatched, but no chicks being reared to maturity. I have concentrated on locating records that leave little doubt that chicks were in fact reared to maturity: however it is quite possible that some of the earlier records that I have discarded were completely successful. It is probable that I have failed to trace a number of published accounts of successful breedings of birds of prey and I would therefore be grateful if Society members would notify me of any omissions in my list. Records so far published in the Magazine have followed the sequence Passeriformes to Struthioniformes and have been in numbered parts. This part is not numbered because it is sequentially out of place.

ACCIPITRIDAE

BLACK, COMMON or PARIAN KITE *Milvus migrans*

London Zoo (*List of Verts.* 1865) Bred in 1864.

GRIFFON VULTURE *Gyps fulvus*

Chester Zoo (*A.M.* 1941, p. 157) Bred in 1940.

SPARROW HAWK *Accipiter nisus*

Dr. L. H. Hurrell (*Captive Breeding of Diurnal Birds of Prey* 1972, p. 8) Bred in 1971.

RED-SHOULDERED BUZZARD *Buteo lineatus*

P. E. B. Glasier - Falconry Centre.

BUZZARD *Buteo buteo*

R. C. Tout (*Captive Breeding of Diurnal Birds of Prey* 1971, p. 8) Bred in 1971.

FERRUGINOUS BUZZARD *Buteo regalis*

P. E. B. Glasier - Falconry Centre (*A.M.* 1975, p. 47) Bred in 1974.

JACKAL or AUGUR BUZZARD *Buteo rufofuscus*

G. H. Gurney (*A.M.* 1906, p. 360). Bred in 1906.

GOLDEN EAGLE *Aquila chrysaetos*

G. Dangerfield (National Press and Television) Bred in 1975.

FALCONIDAE

COMMON or BRAZILIAN CARACARA *Polyborus plancus*

P. E. B. Glasier - Falconry Centre (*Hawk Trust Annual Report* 1972, p. 77) Bred in 1972.

AMERICAN KESTREL *Falco sparverius*

Edinburgh Zoo (*Int. Zoo Yearbook Vol. 13 1973, p. 298*) Bred in 1972.

KESTREL *Falco tinnunculus*

W. H. St. Quintin (*A.M. 1896, p. 77*)

MERLIN *Falco columbarius*

P. E. B. Glasier – Falconry Centre (*A.M. 1975, p. 47*) Bred in 1974.

LANNER FALCON *Falco biarmicus*

P. E. B. Glasier – Falconry Centre (*A.M. 1975, p. 47*). Bred in 1974.

LUGGER FALCON *Falco jugger*

Dr. L. H. Hurrell (*Captive Breeding of Diurnal Birds of Prey 1974, p. 14*)

Bred in 1974.

OWLS

Records of the captive breeding of owls appeared in the Magazine (1974, vol. 80, no. 3, p. 120). Two additional records are given here and because some subspecies differ significantly in appearance from others of their species, I have included them in this list.

CAPE EAGLE OWL *Bubo capensis capensis*

London Zoo. (*A.M. 1949, p. 104*) Bred in 1905.

KENYAN or MACKINDER'S EAGLE OWL *Bubo capensis mackinderi*

London Zoo (*A.M. 1962, p. 147*) Bred in 1962.

MAGELLAN EAGLE OWL *Bubo virginianus nacurutu*

London Zoo (*A.M. 1968, p. 191*) Bred in 1968.

TURKMENIAN EAGLE OWL *Bubo bubo turcomanus*

P. J. M. Smith (*A.M. 1974, p. 156*) Bred in 1973.

SAVIGNY'S EAGLE OWL *Bubo bubo ascalaphus*

London Zoo (*A.M. 1972, p. 211*) Bred in 1972.

BENGAL EAGLE OWL *Bubo bubo bengalensis*

L. Simmons (*A.M. 1975, p. 49*) Bred in 1974.

ABYSSINIAN EAGLE OWL *Bubo africanus cinerascens*

London Zoo (*A.M. 1968, p. 191*) Bred in 1968.

BOOBOOK OWL *Ninox novaeseelandiae*

B. C. Sayers (*A.M. in prep.*) bred in 1975.

NEWS FROM THE BERLIN ZOO

(October to December 1975)

By HEINZ-GEORG KLÖS (Scientific Director)

Birds hatched:

3 Vulturine Guinea-fowl *Acryllium vulturinum*, 2 Crested Quail Doves *Geotrygon versicolor*, 1 Great Yellow-headed Amazon *Amazona o. oratrix* x Panama Amazon Parrot *Amazona ochrocephala oratrix* x *panamensis*, 3 Black-headed Conures *Nandayus nenday*.

New arrivals:

2 Tinamous *Tinamus major*, 1 Great Skua *Catharacta skua*, 1 Gannet *Morus bassanus*, 2 Grey-necked Wood Rails *Aramides cajanea*, 2 Boat-billed Herons *Cochlearius cochlearius*, 4 Crested Curassows *Crax alector*, 2 Satyr Tragopans *Tragopan satyra*, 2 Green Peafowl *Pavo muticus*, 2 Wood Pigeons *Columba palumbus*, 2 Bleeding Heart Doves *Gallicolumba luzonica*, 1 Diamond Dove *Geopelia cuneata*, 1 Tawny Owl *Strix aluco*, 1 Indian Ring-necked Parrakeet *Psittacula krameri*, 1 Great-spotted Woodpecker *Dendrocopos major*, 1 Indian White-eye *Zosterops palpebrosa*, 1 Diuca Finch *Diuca diuca*, 1 Painted Bunting *Passerina ciris*, 4 Serins *Serinus serinus*, 4 Goldfinches *Carduelis carduelis*, 1 Ribbon Finch *Amadina fasciata*, 2 Bronze Mannikins *Spermestes cucullatus*, 3 Java Sparrows *Padda oryzivora*, 1 Zebra Finch *Taeniopygia guttata*, 1 Blue Tit *Parus caeruleus*, 1 Jackdaw *Corvus monedula*.

At the end of August, 1975, we received a pair of the Bornean Rhinoceros Hornbill *Buceros rhinoceros borneoensis*, a large black bird with white tail, ivory-white bill surmounted by a massive red and yellow casque. In the male the casque has two "horns" and in the female one, but this is not the only difference to be seen in the sexes, for the irides of the male are red and of the female white. This bird inhabits the sub-montane forests, living singly or in pairs in the tops of trees 150–200 feet from the ground, feeding mainly on fruits. These newcomers make eight species of hornbill now exhibited in the Bird House.

Every year in December the number and species of the animals kept in the Berlin Zoo are checked. This time, the stock was as follows: On December 31st, 1975, 1,177 mammals of 260 species and 2,834 birds of 711 species in addition to 4,788 invertebrates of 257 species, 2,543 fish of 685 species, 555 amphibians of 99 species and 634 reptiles of 303 species. Altogether 12,531 animals of 2,315 species were living here at the end of 1975 and this collection was seen by 2.4 million visitors.

THE BREEDING OF KEAS

In 1962 when the new Bird House was completed, the Berlin Zoo received four Keas *Nestor notabilis*. They were put into an aviary measuring about 3 x 3 m. with a hollow tree trunk and branches lying on the ground and with a small pool where fresh water is always running. During all the years the birds never made any attempt to nest, but in March 1975 when

the number was reduced to a pair, another hollow trunk was fixed upright in the ground and soon after this the male, identifiable by a yellowish cere and yellow circle around the eyes, and his mate became very interested in this trunk and entered it through a hole about 50 cm. above the base. After eight days three white eggs had been laid and the female brooded them for 12 days and then lost interest in them. Two of the eggs were infertile and the third contained a dead embryo.

This year the first egg was laid on March 24th and as we did not disturb the birds and as the male became very aggressive, we did not inspect the nest to see when the rest of the clutch was laid, but after 27 days, on April 20th, a chick was hatched. When it was 78 days old it left the nest for the first time.

Normally the food consists of a mixture of seeds, nuts, cooked rice, potatoes, maize, carrots and other vegetables, fruit, beef and horse meat, Vita Kalk and a multi-vitamin. Additionally we now give hard-boiled egg, rusk, minced beef and freshly cut grass. This is the first breeding success with Keas in our Zoo, and naturally we hope that it will not be the only one.

REVIEW

KEEPING A PARROT IN THE FAMILY. By Rex A. Harper. Published privately by the author. Pp. 69. 12 photographs and five sketches. Price 90p. post paid and obtainable from the author at The Rosery, Bolingey, Perranporth, Cornwall.

Basically purchasers of imported birds can be divided into two categories; pet owners and those who keep birds for breeding and/or exhibition purposes. Those in the latter category, often having had a long interest in birds, usually have a fair idea of how to care for their acquisitions, but pets are frequently bought on impulse by well meaning but totally ignorant individuals.

Of the commonly imported birds, it is undoubtedly the members of the parrot family and to a lesser extent mynahs, that prove most popular with pet owners, presumably because of their powers of mimicry. I have often wondered how many imported parrots are lost during their first few months in this country, but I suspect that it is a very significant proportion. This can probably be attributed to two main causes; the very delicate nature of freshly imported parrots and ignorance on the part of some owners. To a certain extent the new quarantine regulations, if properly applied, will mean that parrots offered for sale will be less likely to be diseased, which leaves the problem of ignorance for which the best remedy is education.

Unfortunately many of the books published on parrots are aimed principally at the collector and in the main consist of myriads of detailed descriptions of the numerous species; also, being bulky books, they are unavoidably expensive and unlikely to appeal to a pet owner. However the book under review is exactly what is required, for the text is lucid but simple and concise, the content is sound and the price reasonable.

Mr. Harper is obviously a sympathetic parrot keeper with considerable practical knowledge of the species commonly kept as pets. The disadvantages of keeping parrots in the home are as cogently explained as the advantages; also the unsuitability of some proprietary cages is discussed. I was particularly pleased to note that a varied diet is advocated and explained in detail. "Seed-eater" is a misleading term, as very few birds live solely on seed and certainly the species of parrots kept as pets both need and enjoy a wide variety of fruit, vegetable, salad, meat etc.

In conclusion, I would recommend this book without reservation to owners or would-be purchasers of pet parrots. If all pet parrots were treated exactly as suggested by Mr. Harper, I feel certain that in general they would be happier and longer lived than is at present the case.

B.C.S.

NEWS AND VIEWS

Mr. Bernard Sayers has kindly sent the following ten news items:-

The Curator of Birds at East Berlin Zoo, Dr. Wolfgang Grummt, reports that some 30 forms of owl are now represented in the collection, including ten forms of eagle owl and four races of Barn Owl *Tyto alba*. Avicultural rarities such as the Bay Wood Owl *Phodilus badius*, Malaysian Eagle Owl *Bubo sumatrana*, Great Grey Owl *Strix nebulosa* and Hawk Owl *Surnia ulula* are exhibited. Several species have bred successfully including Boobook Owl *Ninox novaeseelandiae* and the Rusty Barred Owl *Strix hylophila*, the latter believed to be the first captive breeding.

* * *

Barham Zoo has an unusual Kestrel *Falco tinnunculus*, for it has the colouring of a male, but has proved its sex by regularly laying eggs. It has the typical grey head and grey tail with black and white terminal bands, though the tail is faintly cross-barred. Although a tiercel is housed with this bird, none of the eggs have been fertile.

* * *

R. E. Cornhill reports that his female Sparrow Hawk laid three eggs from the perch during the spring of 1975 and then laid a further four in the nest built by the male. The female died suddenly after two weeks of incubation and all the eggs contained partially formed embryos. Examination revealed that she died from aspergillosis and a calcium deficiency was thought to have been a possible contributory cause of the bird contracting the aspergillosis.

* * *

P. Dugmore reports that he recently received a Milky or Verreaux's Eagle Owl *Bubo lacteus* from Kenya. This species is rare in Britain and the only other known specimen is in the Hon. Secretary's collection at Sladmore. Mr. Dugmore's pair of Bengal Eagle Owls, one an imported bird and the other bred at Linton Zoo in 1974, are proving extremely prolific, rearing two chicks when the captive bred bird was only 11 months old and in November 1975 the female laid seven eggs, but as she was having difficulty in covering such a large clutch, two were removed. Three chicks hatched and are now independent.

* * *

The breeding season started early in Mr. Sayer's own collection, Collared Scops Owls *Otus bakkamoena* laying on January 4th and Indian Barn Owl *Tyto alba stertens* on January 17th.

* * *

A magnificent book on the North American owls is now available. It is THE OWLS OF NORTH AMERICA by Karl E. Karlus and Allan W. Eckert and in it every species and subspecies occurring in the area is described and depicted in colour.

* * *

Mr. F. W. Perowne reports that two attractive hybrids occurred by accident in his collection - Baikal x Cinnamon Teal and Falcated x Laysan Teal. The latter nested in 1975, but the eggs were infertile, prompting Mr. Perowne to wonder if this hybrid is sterile.

* * *

Mr. P. S. M. Smith's pair of Turkmenian Eagle Owls excelled themselves in 1975, laying in February and having chicks about half-grown when a severe blizzard came. As the nest was on the ground and unprotected from the snow, the chicks were removed to save them from being buried and were hand-reared. The parents started again and produced a second clutch, all chicks being reared. This gave a total of nine chicks from the one pair which has produced 14 young in three years.

* * *

Mr. I. Brodie is now establishing breeding mustelids such as Wolverines; also European owls at Penicuik. Great Eagle Owls and Snowy Owls have already been obtained and attempts are being made to acquire some of the species that are rare in captivity.

Mr. C. Whittle is intrigued by some of the young that he bred from his visually normal white-breasted Barn Owls during 1975. These young birds are exceptionally dark and Mr. Whittle describes them as being very similar to the dark-breasted *Tyto alba guttata* of continental Europe. Other chicks from the same nest resemble the parents.

* * *

Writing in BRITISH BIRDS (1976, vol. 69, no. 4) Mr. Robert Hudson reviews the history, biology and status of the North American Ruddy Duck *Oxyura jamaicensis* as a feral bird in Britain, for this species was admitted to the British and Irish list in 1971. The first of these feral birds flew off from the Wildfowl Trust's collection at Slimbridge in about 1952-3 and the first breeding occurred in 1960. Apart from a setback in the severe winter of 1962-63 the wild birds have increased to an estimated 50-60 pairs in different parts of the country and at the end of that (1975) summer to an estimated total of 300-350 birds. The feral Ruddy Ducks in winter tend to congregate on large reservoirs, particularly those in Avon and Staffordshire; otherwise they frequent suitably deep meres and pools where there are sufficient areas of emergent vegetation. Ruddy Ducks in 1975 were nesting in eight or nine counties.

* * *

Mr. Malcolm Ellis writes:-

In February, I received a letter from a fellow member Mrs. Barbara Glover, who with her husband Michael, has Birdland at Malindi, Kenya. The letter contained the news that at the third attempt, a pair of Crowned Hornbills *Tockus alboterminatus* have successfully bred. The female broke out of the rather unusual nest (in a gourd) on 22.1.76, and two young on 11.2.76. Five days later, when the letter was written, the parents were continuing to feed the young who had made no attempt to feed themselves. They were getting paw-paw, banana, meat and biscuit meal mixed with boiled egg. The two young were only very slightly smaller than the parents, with their bills a paler colour and their eyes almost cream, instead of yellow.

Barbara Glover comments, "It was very interesting, that during the whole period the male was feeding the female and then the young in the nest, he never ate one of the grasshoppers, given each afternoon, himself. Also, the female did not feed the young for the first day-and-a-half she was out of the nest".

The letter added that there were two broods of Allen's Gallinule *Porphyryla alleni* chicks in the "Walk in" aviary. Birdland, which is on the coast of Kenya has a fairly large collection of mainly East African birds which I wrote about in the Magazine, Vol. 80, No. 6, November-December 1974.

Mr. P. J. S. Olney writes to say that a Green Singing Finch *Serinus mozambicus* collected by Mr. David Attenborough on his B.B.C. Zoo Quest to Sierra Leone in 1954, and given to Mr. Derek Wood of the London Zoo staff, died earlier this year. When collected, it was thought to be a juvenile bird, as indeed it must have been to have lived for a further 21 years, 40 days.

* * *

Dr. Jean-Marc Lernould, a Veterinary Surgeon, writes from Nieul-le-Dolent, France, that he has bred a considerable number of Hartlaub's Ducks. He obtained the parents from Gabon in 1972 and the female laid two clutches, each of 10 eggs, in September and October 1975. These were artificially incubated and 18 ducklings hatched, 16 of which were successfully reared and are thriving.

* * *

BRITISH BIRDS (1976, vol. 69, no. 4) contains a paper by Dr. H. Mikkola of the University of Finland which summarises the published records of European owls killing and sometimes eating or being eaten by other species of owl or by diurnal birds of prey. The Long-eared Owl is the most numerous prey of Great Eagle Owl and of Goshawk. The paper does not consider the records of diurnal birds of prey killing each other, but the tables include the killing of Goshawk, Buzzard and Kestrel by Great Eagle Owl.

* * *

We regret to hear from Mr. F. A. Ripper, Hon Secretary of the Avicultural Society of Australia, of the death in January of Mr. C. K. Lucas, the Society's President since 1948 and Editor of its magazine AUSTRALIAN AVICULTURE since 1947. Mr. Lucas was also a member of the Boards of Management of the Melbourne Zoological Gardens and of the Sir Colin MacKenzie Wildlife Sanctuary at Healesville. He was a Life Member of the Avicultural Society.

M.H.H.

* * *

CORRESPONDENCE

HAND-LIST OF THE ANSERIFORMES

Mr. Holyoak invites comment on his hand-list of the Anseriformes (A.M. 1975, pp 221-228). It seems to me that the ideal common name is one that is descriptive of the bird – its plumage or voice, habits, habitat, distribution and so on. Naturally some consideration should be given to the most commonly used name in the bird's native place, but the Australian name for *Tadorna radjah* – Burdekin Duck – has little to commend it, for Burdekin is a river in Queensland, so the name is inappropriate for a species that ranges into New Guinea, the Moluccas and other islands to the northward of Australia as well as far beyond the Burdekin River in Australia itself. Grass Whistling Duck is scarcely an improvement on the existing Eyton's or Plumed Whistling Duck, particularly as 'tree duck' is the most commonly used group name.

There is a good deal to be said for self-indexing, though it could sometimes mean separating closely related species – for instance *Biziura lobata*, the Musk Duck, is away from the other Oxyurini and so is *Thalassornis leuconotus*, the White-backed Duck, though in this latter case I feel that, after having read Johnsgard on the species and talked to friends, this is an aberrant whistling duck and not a stiff-tail.

If *Polysticta stelleri* really is an eider, it is placed far from the typical ones – rightly, I think, as it happens, for it seems not much like them and a friend of mine who reared some from Alaskan eggs found them very un-eider like and in behaviour more like ducklings of Harlequin *H. histrionica*. Steller's Duck would be a more fitting name.

Easter Ellister,
Port Charlotte,
Islay, Argyll.

L. R. DAWSON

THE WHITE-EARED BARBET

I was interested to read Mrs. Eileen Yates' notes on a White-eared Barbet (A.M. 1975, p.197) in which she says that there is no record of captive breeding of this species. I bought two of these barbets in 1971 and kept them at first in a mixed collection of small insectivorous and seed-eating birds, together with two species of colly and two of hanging parrots; also two Crested Mynahs, Thick-billed or Grosbeak Weavers *Amblyospiza albifrons* and six Pied Barbets *Tricholaema leucomelan*.

In 1973 I built 12 long narrow indoor flights and one larger flight and into one of the smaller compartments I put the White-eared. They were supplied with rotten branches and trunks and in 1974 they excavated two holes, but

did not nest, so I was still not sure that they were a pair. In May 1975 I found an eggshell on the floor and at once supplied a lot of mealworms, but there was no evidence of living young. In July more eggshells were found and this time more mealworms were being taken. This continued through July and early in August a young barbet came out from the nest, but, since it was unable to fly, I put it back inside that evening. Three weeks later, as it did not re-appear, I sawed through the branch and could see the chick in the nest, but found that it had a broken leg which I splinted and bound up, but the bird died four days later. The young one was exactly like the parents. The nest was about 30 cm. deep; there was only one entrance and the parents did not open a second hole at nest level as described in the Magazine (1975, 121-130) in the case of the Red-headed Barbet.

The sexes of the White-eared Barbet are so alike in appearance that if I had to distinguish between these two, I should have to judge by the pubic bones which are apart in the case of the female in my aviary and close together in the male. My pair do not utter a sound except as I enter the aviary when they make a loud scream; when they had the chick, they made a dove-like cooing, but only when they saw me. Their food consists of an insectile mixture, various fruits and mealworms. They sometimes during the winter, are given some of the meat mixture that I give to woodpeckers, starlings and laughing thrushes and they like it; also a variety of insects whenever obtainable in the summer. The Pied Barbets, which roosted together in a hole they made in a branch, later nested and had eggs, but, due to some infection, all died as well as my colies. Of my other birds Red-shouldered Starlings reared one young one in 1975, White-crested Laughing Thrushes and Green Jays laid and a pair of Bush Petronias *Petronia dentata* reared two young almost to independence.

Sejstrup Mollegard
7840 Hojselev
Denmark

J. MOLLET HANSEN

BREEDING THE ROULROUL PARTRIDGE

The Roulroul Partridge or Red-crested Wood Quail *Rollulus roulroul* of the forested parts of south-eastern Asia is, in my opinion, one of the most beautiful of all the small members of the Phasianidae. In the autumn of 1973 I obtained a fully acclimatised pair and in the spring of 1974 their behaviour, especially that of the male, changed from shyness to comparative boldness and I saw him carrying small twigs to a corner of the aviary where, within about three days, he built a domed nest, lining it with bamboo leaves. The finishing of the interior was done by the female who shaped it so that it fitted her body, only her head being visible at the entrance, and a few days later she began to lay her glossy whitish eggs, about 3 cm. in length, laying every second day until a clutch of six was

completed. She did all the incubation and after two weeks I tested the eggs, finding five of them fertile, and on the 23rd day they hatched. The chicks grew well, but during the third week two died, an examination showing a navel infection, probably contracted at hatching time and taking about 20 days to run its course. A second clutch of only three eggs, all infertile, was laid and from a third of twelve eggs, eight chicks hatched after 22 days of incubation. At the end of the season I had five young males and three females, and by making exchanges through the kindness of M. Delacour and of Winged World I was able to start the 1975 season with five unrelated pairs and during that season 31 chicks were reared from the three pairs that bred.

My Rouloul Partridges are fed on chopped apple, pear and soaked raisins, these fruits being mixed with a meal composed of 50 per cent poultry meal, 25 per cent meat meal, 20 per cent fish meal and 5 per cent bone meal. In addition, the birds receive mealworms, locusts, ant cocoons and cleaned maggots.

19 Golflaan
9830 St. Martens-Latem
Belgium

W. VANDEVIJVER

DISPLAYS OF PARROTS

There appears to some evidence that "talking" parrots incorporate their repertoire into the mating/aggression/territorial display and that the imitation of human sounds is accompanied by at least some of the components of the display; *e.g.* Amazon parrots who contract the pupils, thus flashing the orange of the iris, while "talking".

The subject has aroused my curiosity as possibly throwing light onto the behavioural reasons for the imitation of sounds (not necessarily human) by parrots and I wondered if members could help me by sending me observations on their own birds.

I would like to know:

- 1 Species
- 2 Does the bird "talk"?
- 3 Usual breeding/aggression/territorial display
- 4 Are cries heard during display uttered at other times?
- 5 If the bird "talks", does it do so only during the display, only when not displaying or at all times?
- 6 Is "talking" accompanied by some of the components of the display always, sometimes or never?
- 7 Any other relevant comments.

I would be very grateful for any help that members could give me.

14 Church Lane
Trumpington,
Cambridge.

EILEEN YATES

RARE AUSTRALIAN PARROTS

In my opinion Mr. Barnicoat's letter does nothing to enhance the good name of aviculture, for though he does stress some safeguards and that rare or unsuitable species should not be collected, he is arguing that the Golden-shouldered and Hooded Parrots should be protected from the depredations of selfish and irresponsible aviculturists by having them kept in captivity by just those people who are responsible for depleting their numbers in the wild – and that it should be done officially.

I do not understand how anyone interested in nature can consider that species whose natural habitat is under no particular threat, as in the case of these birds, and which have no serious natural predators should be kept in captivity at all if the avicultural demand for the birds reduces their numbers in the wild state. To argue otherwise is a reflection on the mentality of those who keep these birds or sympathise with those who do and who, in so doing, bring aviculture into disrepute. The idea that people who keep such birds in captivity are acting from the highest principles in order to preserve threatened species from extinction is sanctimonious nonsense, for the number of cases where a species of mammal or bird may be helped or preserved by being kept in captivity is very small – the Père David's Deer and possibly the Nene (Hawaiian Goose) are about the only examples I can think of. Claims of extreme rarity in aviculture are often coupled, in my opinion, with an understandable desire to keep prices high and from my observations, which go back more than 40 years, I have no doubt that people and zoos who keep genuinely rare animals in captivity are primarily motivated by personal aggrandisement – the desire to possess something rare and costly which others do not have, and if it involves cruelty or the destruction of wild life in the process, that is not their business: it is the responsibility of someone else.

I believe that the Society should be doing more than just produce a pleasant and interesting publication. It should surely take steps to list species which should NOT be kept in captivity and this should be incorporated in the Rules of the Society – that anyone keeping such species should be disqualified from membership. The Golden-shouldered and Hooded Parrots should rank high on the list.

26 Canning Street,
Ainslie,
A.C.T. 2602
Australia.

ALASTAIR MORRISON

The letter from Mr. Barnicoat in the October–December 1975 number of the Magazine made interesting reading and his suggestion that the Australian Government follow the example of the Transvaal Provincial Administration in allowing a small number of birds to be caught and held at an approved station until established and then to allow a limited number to be exported to aviculturists would be a sincere gesture of conservation. Somehow I do not think that the Australian authorities would agree, and what to my mind is their failing is that they allow birds to be exported to approved zoos. I ask who have been the more successful in breeding Australian birds, zoos or aviculturists? I submit aviculturists, and if any birds are to be exported, it should be to them.

The Lodge,
Clonsilla,
Co. Dublin,
Eire.

T. BOURKE

The Editor does not accept responsibility for opinions, other than his own, expressed in articles, notes or correspondence.

* * *

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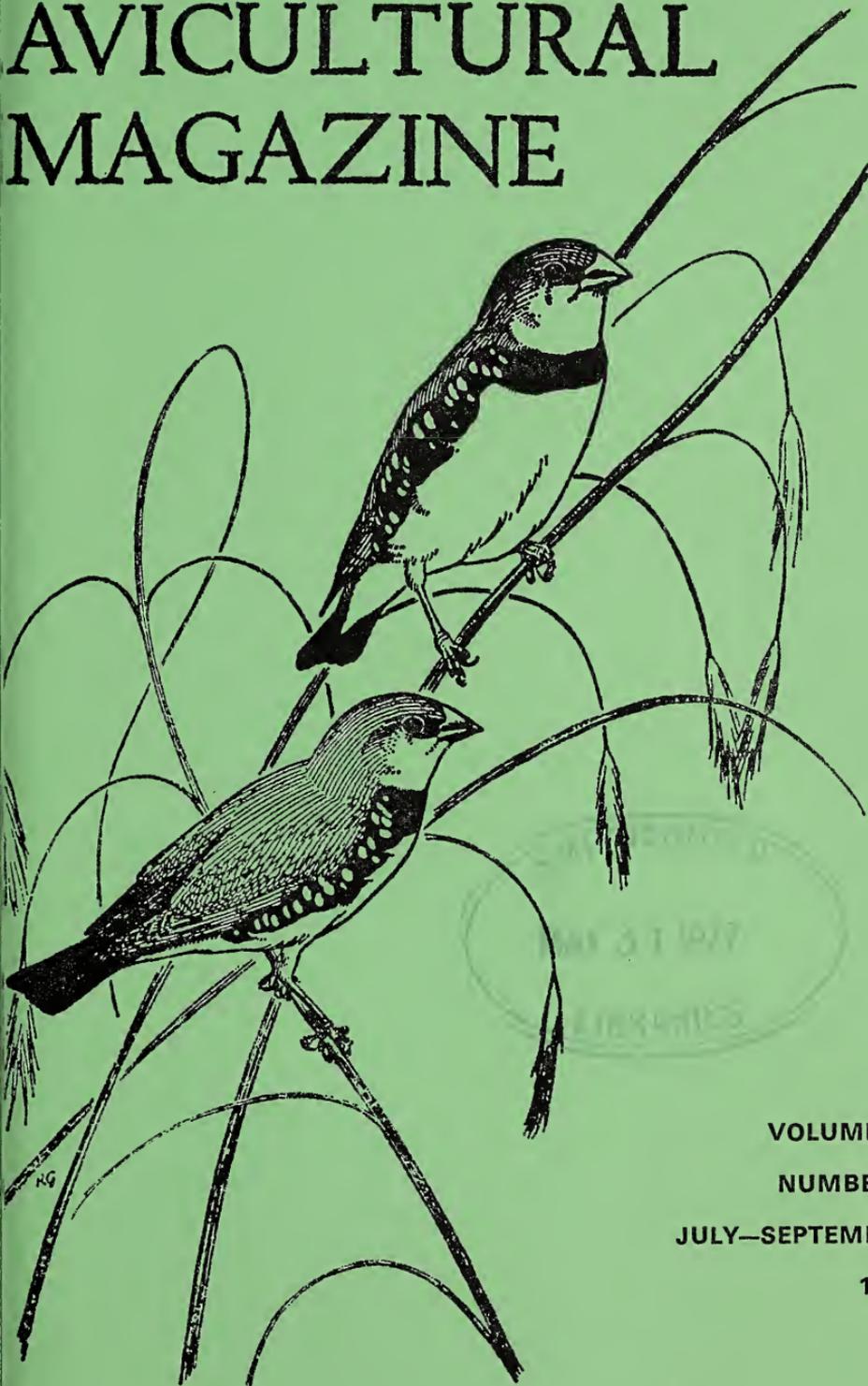
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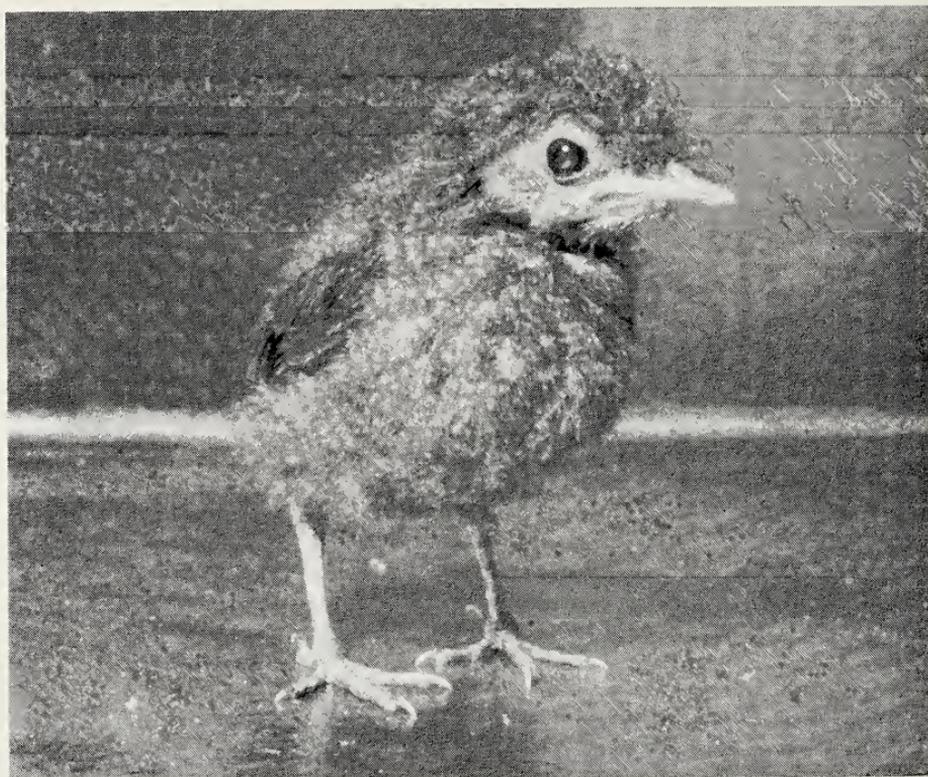
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William Meng
Rufous-faced Ant-pitta *Grallaria erythrotis* at one day old



William Meng
Rufous-faced Ant-pitta at 20 days

AVICULTURAL MAGAZINE

THE JOURNAL OF THE AVICULTURAL SOCIETY

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JULY - SEPTEMBER 1976

HATCHING AND HAND-REARING THE RUFOUS-FACED ANT-PITTA. NOTES ON ANTBIRDS KEPT AT THE NEW YORK ZOOLOGICAL PARK

By JOSEPH BELL and DONALD BRUNING (Department of Ornithology)

With a total of more than 230 species, antbirds (Formicariidae) comprise one of the largest avian families in the New World. In view of this fact it may seem strange that so few of these birds have ever reached the collections of zoos or private aviculturists, but their general appearance, habits and habitat preferences have all served to protect them from would-be collectors.

Living alone or sometimes in pairs, antbirds are found in the lower part of the forest or in thick scrub. While ants are not the principal food of all the species, many follow ant columns, feeding on other insect life disturbed by the ants in their march. Some forms are crested or strikingly patterned, but most are clad in sombre tones of grey, russet-brown or black. The sum total of all these characteristics has made antbirds difficult to find and capture and even more difficult to hold, once taken.

In reviewing bird department records here, it came as something of a surprise to the authors to learn that since the first antbird arrived at the Bronx in 1942, 29 specimens (13 species of 7 genera) have been represented in the New York Zoological Society's aviaries. Less surprising is the fact that with the exception of the bird reared here, every one of these specimens came to us through the efforts of Charles Cordier, a bird collector without peer.

Notwithstanding Cordier's skill at trapping these birds and establishing them on a captive diet, our success as a whole in maintaining them has been poor: most survived only months, a few for several years and a single Chestnut-crowned Ant-pitta *Grallaria r. ruficapilla* lived for nearly five years. The problem seemed to be chiefly one of space and adequate cover. The small, shallow displays in our old bird house offered little or no seclusion for even a single specimen of these highly strung secretive birds and, as the record shows, only a few ever managed to become well established.

The situation was still much the same in the fall of 1968 when Cordier forwarded the first Rufous-faced Ant-pittas *G. erythrotis*. There is no visually evident sexual dimorphism in these chunky, long-legged brown birds

and although three more specimens were added during 1970 and 1971, attempts to establish possible pairs in the cramped quarters of the 1905 bird house were unsuccessful and several of the birds were lost.

It was only after the entire small bird collection was moved to the World of Birds that we began to have renewed hopes of establishing a pair of ant-pittas, for the large, heavily planted exhibits in the new facility offered the space and seclusion that seemed to be needed. In the spring of 1972, several combinations of the remaining three ant-pittas were tried in a circular display, with a 10 metre diameter, that featured small tanagers, manakins, honey-creepers and pigmy kingfishers, but it was not until a third try was made during the summer that favourable results were achieved with two of these birds showing no aggression towards each other and even calling back and forth as they foraged in the thick plantings near the exhibit's floor.

Real nest-building activity began in the early fall when, after several false starts, a rather ragged structure of small twigs, assorted leaves, moss and other plant parts was finally completed in October. Attached to, and partially hidden by tropical foliage, the nest was situated two metres above the exhibit floor and measured 20 centimetres wide and 30 high with a cup a full 14 cm. deep.

On November 1st, the nest was found to contain two pale bluish-green subelliptical eggs that measured 28 mm. in length and 23 mm. at the widest point: one weighed 8.8 grams and the other 9.4 grams. Unfortunately, the eggs of this clutch and another discovered on December 9th all proved to be infertile, but one of a third clutch, laid later in the same month, contained an embryo that died during the first week of incubation. Our hopes ran high at this turn of events but three successive clutches of eggs laid during 1973 were all either infertile or broken, and the behaviour of the pair was also cause for some concern: periodically one of the birds (suspected, and later proven to be the male) would harass the other relentlessly. This pattern of intermittent aggression continued into 1974, when two early sets of eggs were also broken.

When a third clutch was laid early in April, observers were posted to keep the nest and pair under constant surveillance during the daylight hours. For several days the situation was peaceful and incubation appeared to be normal but then the male began to drive again with such ferocity that the female had to be removed—she died subsequently from wounds received in this encounter and the eggs were taken for artificial incubation.

Placed in an automatic, forced-draft incubator (Humidaire) set at a temperature of 97.5°F, with a relative humidity of 60–65 per cent, one chick started its shell on April 18th and hatched at 3.00 p.m. the following day. The embryo in the second egg died prior to hatching.

The newly hatched ant-pitta chick was placed in a small woven nest in a Lyons glass hatcher where the temperature was maintained at 97°F, and the humidity at nearly 90 per cent. The chick weighed 5.7 grams and began

begging for food by 6.00 p.m. when it was fed four tiny pieces of meat (newborn white mice are frozen and kept for this purpose) and one half of a fly larva. The following morning the chick produced a stool in a well formed faecal sac.

GROWTH OF RUFIOUS-FACED ANT-PITTA

<i>Days of Age</i>	<i>Weight in grams</i>	
	<i>A.M.</i>	<i>P.M.</i>
1		5.7
2	5.8	7.5
3	7.1	9.2
4	9.1	
5	11.4	
6		
7	15.4	eyes opening
8	18.9	
9	21.6	
10	24.5	
11	28.	
12	29.	
13	32.3	
14	38.9	
15	42.	
16	44.5	
17	54.	
18	-start trying to get chick to feed from pan	
19	49.9	
20	49.9	
21	—	
22	50.1	
23	—	
24	—	
25	—	
26	64.5	
27	62.5	
28	—	
29	—	
30	64.5	
31	—	
32	—	
33	69.5	
40	65.5	

During the next week, the young bird was fed regularly seven or eight times each day between 6.00 a.m. and 7.00 p.m. (see chart). Feathers began to show on the sixth day and the eyes started to open on the seventh. The temperature in the hatcher was lowered one or two degrees each day during the second week as the chick's need for warmth decreased.

Small portions of water-soaked Gaines Meal (a commercial pet ration) were added to the diet on the fourth day and, with the pieces of baby mouse, formed the total diet during the rearing period; amount and size of the portions were adjusted as the young bird grew.

At fifteen days of age, the chick had become very active, began leaving the nest and hopping around the floor of the incubator. It was moved to a large brooder and began eating on its own at three weeks of age. At four weeks old, it was fully independent.

To the authors' knowledge, this represents the first antbird of any kind ever to be raised in captivity.

* * *

THE 1976 BREEDING SEASON

By ROSEMARY LOW (Barnet, Herts)

The disappointments of last year's breeding season, which outnumbered the successes, were described in the Jan-Mar 1976 issue of the Magazine. This year's results with the same birds except the Edwards's Lorikeets and plus a pair of Yellow-streaked Lories *Chalcopsitta sintillata* were more encouraging. The latter did not attempt to nest, neither did the Grey and the Purple-bellied Parrots which nested last year. Only one pair (Red-capped Parrots) nested for the first time but three species were reared for the first time. These included Meyer's and Iris Lorikeets, the hand-rearing of which is described separately, and the breeding of a Bronze-winged Parrot, also recounted separately.

The pair of Eclectus Parrots which reared one youngster last year went to nest at the beginning of January. There was snow or below-minus temperatures every day of the week during which the chick hatched, on the 29th or 30th. It died on the 31st—the only chick which the pair has failed to rear to date. The most disappointing aspect of this hatching was that, on *post-mortem*, the chick proved to be a female: it was to be followed by four males!

On February 25th there was one egg in the Eclectus' nest. This hatched on March 23rd and, when the nest was inspected on the 27th, there were two chicks. As usual, corn-on-the-cob was the principal rearing food. It was of interest to observe the different growth rates, the elder being one third

larger during most of the period the chicks spent in the nest. On fledging it was only slightly larger—longer in the body than the male, in fact.

One of the youngsters was seen to look out of the nest on May 22nd; the younger fledged and left the nest on June 11th and the elder on the following day. Neither was at all nervous, in direct contrast to the first youngster reared by this pair in 1974. They were removed from the aviary on July 10th, when the male—who shoulders most of the hard work of feeding—was definitely tiring of their presence. A normally gentle bird, he would occasionally jab at them, but without causing any harm.

On July 17th the female had one egg in the nest; once again, both eggs hatched (August 14th and 16th). By August 21st one chick was one third larger than the other, but as they developed, there was less discrepancy in their sizes than in the chicks from the first nest. On September 8th the first chick could be sexed and on the 12th those first green feathers on the upperparts indicated that yet again we had two males! However, we were delighted that the pair should rear four youngsters in one year when the sum of their first two years together was only two young. In contrast, a second pair, the female of which had been laying and incubating continuously for a year, has still to hatch her first chick.

The Dusky Lories *Pseudeos fuscata*, which reared one youngster last year, hatched a chick on or before May 22nd. It fledged on August 4th after at least 75 days in the nest, compared with about 67 days for the 1975 youngster.

The pair of Fairy Lorikeets *Charmosyna pulchella rothschildi*, which hatched a chick last year, had two clutches of two eggs, one in their winter quarters in an indoor birdroom and the other in their summer aviary, but unfortunately, neither clutch hatched. In this delightful little lorikeet, the male shares incubation duties: unfortunately, this male has been ailing in health for some months and because of this, his incubation duties were somewhat erratic.

Our original pair of Iris Lorikeets, received in 1972, were at last successful in rearing a youngster. The nest box was not at any time inspected, but the chick was first heard on June 26th and left the nest on August 21st. It was considerably smaller than the adults and had been plucked on the nape of the neck. It had a most feminine appearance and lacked the violet colouring on the crown present in the hand-reared youngster from another pair, which is a male.

Its parents are extremely tame and, like most tame birds, will eat almost any food offered. I feel that this is why this pair reared their youngster while the second pair, which eat only sunflower seed, panicum millet, apple and nectar, do not rear theirs. The successful pair also eat corn-on-the-cob, carrot, celery, niger and canary seed, lettuce and a variety of fruits.

The hen of our pair of Red-capped Parrots *Pionopsitta pileata* laid for the first time at the end of May. The male had fed chicks on two previous

occasions with a different female, but these died at an early age. On June 27th a chick was heard, possibly hatched three or four days previously. The nest was inspected on one occasion when the chick was about one week old; there was one egg inside and another on the aviary floor. Unfortunately, the chick died on July 14th; on autopsy it was found to be badly bruised on one side of the body but there was no sign of disease. It was a slight consolation to know that the bird was a male, for females of this species are extremely hard to come by.

BREEDING OF THE CHINESE (LIGHT-VENTED) BULBUL

Pycnonotus sinensis sinensis

By R. E. OXLEY (Hornchurch, Essex)

Writing in the October 1899 issue of the AVICULTURAL MAGAZINE, Dr. A. G. Butler said of the Chinese Bulbul—"This is a rather pretty bird, mostly ashy and olive-yellowish above; brownish yellow and white below; the head and neck may be roughly described as black and brown with conspicuous white patches on crown, sides of head and throat; the wings and tail feathers dark brown edged with yellow." This 7½ inch bulbul is apparently a common resident in and around the gardens of Hong Kong but winters in N.E. Tonkin. Another race (*Pycnonotus sinensis hainanus*) which lacks the white patch on the crown is found in S. China, Hainan and Taiwan; and is a common resident at low elevations in North and central Annam and Tonkin.

Since Butler described this bulbul, a few specimens were apparently kept and exhibited successfully prior to the last World War but very few have been available since. During the last ¾ years, however, a limited number of these birds have become available in the U.K. appearing on dealers lists as, White-capped, White-crowned and Harter's Bubluls.

It was from one of the trade stands at the 1973 National Exhibition of Cage and Aviary Birds, that I purchased my first Chinese Bulbul. After the initial period of settling in and acclimatization this bird was released in a small outside aviary which contains our breeding colony of Lineolated (Barred) Parrakeets, as at that time all our other aviaries contained various other potential breeding pairs of softbills. The bulbul remained in this flight during the summer and autumn and it soon reached peak condition and began to sing—it was obviously a male.

In November 1974, a friend offered us another of these bulbuls which was the survivor of a pair which he had bought the previous year; we lost no time in purchasing this bird. It was obvious on placing the two birds together that the new arrival was a hen, as the original bird immediately

displayed and began to chase it about the aviary. The display was exactly as that described by Dr. Russ in the article written by Butler in 1899. He said that "when chasing its mate, it hops round her either on branches or on the ground with highly erected crest and nape feathers, drooping wings and fan-like tail, it indeed appears to be white-headed; but then it puffs out its entire plumage, so that it seems considerably larger than it actually is."

Both bulbuls remained in the aviary with the parrakeets until the beginning of May, 1975, when they were transferred to one of our planted flights which is approximately 9 feet x 5 feet x 6 feet high and which they shared with two Diuca Finches and a pair of Chinese Painted Quail. Feeding was carried out via a feeding hatch at the front of the aviary and the food provided was the diet upon which they had been fed since their arrival; our home-made softbill food, diced fruit (grapes, apple, pear etc.), a nectar mixture and madeira cake soaked in the nectar. Seed was, of course, provided for the finches and the quail.

The aviary contains an assortment of small shrubs which gave ample protection at ground level to the quail and the finches, which spent much of their time on the ground. Very soon, however, the whole of the front and top of the aviary became completely covered with bindweed and Russian vine (*Polygonum*) which was allowed to grow rampant so as to afford privacy to the inmates. Plenty of nest sites in the form of boxes, baskets, etc. and nesting material had been provided in the hope that the birds would decide to breed. Apparently, bulbuls build cup shaped nests in the wild and, shortly after being released in this aviary, a cup nest—built from dried grass—appeared in the densest part of the vine. Little or no interest was taken in this nest after its completion, although by now observation of the interior of the aviary had become increasingly difficult owing to the density of the foliage.

On July 22nd, whilst feeding the birds, one of the bulbuls was seen to be unmercifully chasing one of the Diuca Finches around the aviary and the other finch lay dead by the seed containers. This chasing continued and, fearing for this finch's life also, I decided to remove it to safer quarters. The capture of this bird proved to be a rather difficult operation owing to the dense growth which made the netting of it, although successful, difficult. Meanwhile the bulbuls screamed continuously while I was in the aviary and, as I had disturbed them, decided to look in the various nesting receptacles out of curiosity. Imagine my surprise and delight when looking in a nest box which hung on the back of the aviary two small heads, on equally small bodies, shot up from the depths of the box and began to gape for food. Until this time I had no idea that any serious nesting attempt had been made, let alone having any chicks, which I estimated to be approximately $\frac{2}{3}$ days old, so I quickly left the aviary and the shrieking adults, taking the Diuca Finch with me.

The nest which contained these two chicks was made solely from dried grass and was constructed in a half open wooden box 9 inches long x 5 inches

x 5 inches which was, as previously stated, fixed to the back of the aviary about 4 feet from the ground. No live food had been provided for these bulbuls since we received them, although we use gallons of maggots and plenty of mealworms, grasshoppers, etc. for feeding to our other softbills during the year. This was rectified, however, and very soon maggots, mealworms and chrysalids were seen to be taken to the nest and fed to the young. Observation of this nest was comparatively easy as the box which contained it was situated away from the densest end of the flight and could be viewed easily through the vine on the front of the aviary.

The weather had been, and was at this time, extremely hot and dry and consequently many small insects must have been caught by the adults for their young prior to our providing any additional live food. In addition to the items of food already mentioned, bread and milk was offered to the parent birds who were seen to feed small quantities to the babies. The parents were devoted to their two young which rapidly feathered and on the morning of July 28th, were both seen sitting upright on the edge of the nest. That same afternoon both babies left the nest and one was seen sitting on top of the nest box while the other perched on some vine a foot or two away. Both birds were extremely tiny as one would expect, as they could at the most have only been 9/10 days old. The plumage of these two youngsters was grey on the head and back, darker on the wings with whiter underparts and a half-inch grey tail. During the following week or so the parents continued to feed the youngsters and both were successfully reared, soon becoming as large as the adults, moulting into full adult plumage at about eight weeks of age. Unfortunately one young bird suffered badly from rickets, its legs and feet being terribly deformed, in spite of taking the precaution of dusting the maggots and mealworms with powdered Vionate during the rearing period; its nest mate was, however, perfect in every detail.

All four bulbuls remained in the aviary until the middle of November, when they were transferred to an inside flight in the birdroom for the winter. I never found any trace of eggshells and so am unable to describe them although they are said to be purple-white in colour.

According to Butler, "Dr. Russ's pair went to nest in 1893, but the first nest was destroyed through the interference of a Porto Rico Pigeon *Columba squamosa*; indeed he says he lost two broods from this cause. Eventually the hen pigeon died and he took out the cock, so now he says he hopes to have satisfactory results". I have, however, been unable to trace whether Russ was successful in breeding this species, but rather doubt it.

I understand that a Mr and Mrs Peck of Cheltenham also bred the Chinese Bulbul during 1975, rearing two young. It does appear that these are the first two successes in this country.

BREEDING THE LITTLE RINGED PLOVER

Charadrius dubius

By L. J. PRIOR (Snetterton, Norfolk)

In an aviary measuring 25 feet x 10 and about eight feet high, a pair of Little Ringed Plovers were put at the beginning of March this year. The birds had this aviary to themselves; it had the floor covered with concrete to exclude vermin and on this was put gravel to a depth of three to four inches on one side of a stream which ran lengthwise through the aviary and on the other side was put soil to a depth of about six inches in which nettles and other weeds grew. By the end of March the male was displaying and making nest scrapes in the gravel and when I entered the aviary he would fly at me making a piping noise.

The birds were fed on the diet that I give to my small insectivorous birds—an insectile mixture to which is added scrambled egg, minced raw and steamed ox heart, grated cheese, minced green food, currants and sultanas and a vitamin compound powder.

The first egg was laid on April 28th, but after a few days it became apparent that the hen was not going to complete the clutch or incubate the one egg. The male then became very aggressive towards her, chasing her away from the nesting area, so I removed the egg and the birds settled down. The male then lined one of the scrapes with tiny white stones and on May 15th another egg was laid, after which one was laid every other day until the 23rd when four had been laid and the birds started to incubate them, both sharing the incubation and the nest would only be left if I entered the aviary, but incubation was resumed as soon as I left. The first chick hatched on June 16th and a second on the 17th: for a day or two the father brooded and cared for these while the mother continued to sit on the remaining eggs. After this time I took the eggs and found them to be infertile.

Food for the young was a problem at first, but I scattered scrambled egg and other food on the gravel and put into the aviary a heap of well rotted chicken carcasses which attracted numerous small flies and other insects; I also threw small maggots and mealworms to the birds. The young ones thrived on this diet and by the beginning of July were as big as the parents—in fact I removed them on July 12th whilst they could still be distinguished from the adults.

As described, the Little Ringed Plover *Charadrius dubius* has been bred by Mr. L. J. Prior and this may be the first success in this country. Anyone knowing of a previous breeding of this species in Great Britain or Northern Ireland is asked to inform the Hon. Secretary.

THE BOOBOOK OWL

Ninox novaeseelandiae boobook

By BERNARD C. SAYERS (Chelmsford, Essex)

The genus *Ninox* comprises a group of hawk owls that occupy the Oriental, Malagasy, Australasian and eastern Palaearctic regions and the 18 species included in this genus vary in size from the Philippine Hawk Owl *Ninox philippensis* at 150–200 mm. to the Australian Powerful Owl, which at 630–650 mm. occupies the ecological niche associated with eagle owls in other parts of the world. The species *novaeseelandiae* is sub-divided into numerous races; Peters (1940) lists 15 and Mees (1964) lists 16. All these races inhabit Australia, New Guinea, New Zealand, and adjacent islands and many are isolated island forms.

Ninox n. novaeseelandiae

SYNONYMY

- Strix novae Seelania* – J. F. Gmelin, 1788, Syst. Nat., 13th. Ed. I, p 296–nova Seelandia.
- Strix fulva* – Latham, 1790, Index Orn. I, p 65–nova Zealandia.
- Strix novaeseelandiae maculata* – Kerr, 1792, Anim. Kingdom I, p 538 New Zealand.
- Noctua Zelandica* – Quoy and Gaimard, 1830, Voy. Astrolabe I, p 168 pl. 2: fig. I–la baie Tasman, dans le détroit de Cook, à la Nouvelle Zélande.
- Noctua venatica* – Peale, 1848, U.S. Expl. Exp., p. 75–Bay of Islands, North Island, New Zealand.

DISTRIBUTION

New Zealand (North and South Island), Taranga or Hen Island, Great Barrier Island, Little Barrier Island, Three Kings Island, Kapiti Island and Stewart Island.

DESCRIPTION

This is one of the smallest and darkest races. Length about 300 mm. Wing ♂ (12 specimens) 186–203 mm. and wing ♀ (21 specimens) 183–202 mm.

Coloration is brown above with scattered buff flecks on head and neck, whitish flecks on remainder of upperparts; white forehead and face at base of bill, the bristles black; flight feathers spotted white or buff on upper and prominently barred white or buff on lower surface; tail dark brown with obscure paler brown bars; feathers of under surface have brown centres and prominent white spots or stripes on outer margin giving a mottled pattern, the whole under surface being more or less washed with orange-brown; brown and white barred under tail-coverts; tarsus (feathered) yellowish

brown to reddish buff; toes yellow to brownish-yellow, dark brown claws; bill variable brown, yellow or white; irides yellow.

ORNITHOLOGY

Said to be common throughout most of the wooded and settled districts of New Zealand, although numbers have apparently decreased in areas where the introduced Little Owl *Athene noctua* has become established.

Diet in the wild seems to consist mainly of moths, beetles, spiders etc.; although some pellets examined have shown that lizards, small birds, particularly House Sparrows *Passer domesticus*, rats and mice are also taken.

A hollow tree is usually chosen as nest site; more rarely it is situated in the fork of a tree or on a platform such as that provided by a bird's old nest. Breeding takes place between October and November and the clutch consists of two or occasionally three eggs.

The vernacular name of Morepork is an onomatopoeic derivation from the call which is most commonly heard. Some observers state that "quor-coo" is a more accurate likeness to this call. A more prolonged "more-pork-pork-pork" and a scream which is mostly heard during hunting forays are also mentioned. During the breeding season a vibrating "cree-cree" is uttered. The Maori name for the Morepork is Ruru.

Mathews and Iredale sub-divided the New Zealand population of Moreporks into two subspecies; a light form from North Island being identified as *Ninox novaeseelandiae venatica* and the darker birds from South Island remained as the nominate form. However, more recently, researchers (Fleming *et al.* 1953 and Oliver 1955 p 433) have stated that as no constant and significant difference separates the North and South Island populations, this sub-division is unwarranted.

Ninox novaeseelandiae plesseni

Ninox fusca plesseni – Stresemann, 1929, Orn. Mber. 37 p 47. – Tanglapoi in West Alor.

DISTRIBUTION

Alor.

DESCRIPTION

Wing ♀ (1 specimen) 211 mm. Dorsal surface prominently marked with white and pale brown spots which are faintly cross-banded. Breast longitudinally striped, becoming ocellated towards the lower parts. Rectrices show pronounced banding.

Ninox novaeseelandiae fusca

SYNONYMY

Strix fusca

– Vieillot, 1817, Nouv. Dict. d'Hist. Nat VII, p 22–Saint-Domingue et Porto Ricco (in error)–Timor.

Strix maugei

– Temminck, 1821, Recueil d'Ois., 8 livr., pl. 46 Antilles (in error)–Timor.

Strix (Athene)-guteruhi - S. Muller, 1845, Verh. Nat. Gesch. Ned. Overz, Bez., Landen Volkenk., p. 279-Timor.

DISTRIBUTION

Timor.

DESCRIPTION

A dark grey-brown form.

Ninox novaeseelandiae moae

Ninox novaeseelandiae moae - Mayr, 1943, Emu 43, p 13-Moa Island.

DISTRIBUTION

Moa, Romah and Leti.

DESCRIPTION

Wing ♂ (6 specimens) 208-221 mm. and wing ♀ (3 specimens) 215-228 mm.

This subspecies is said to be very similar to a dark form of *ocellata*.

Ninox novaeseelandiae cinnamomina

Ninox boobook cinnamomina - Hartert, 1906, Novit. Zool. 13, p 293-Tepa and Babber.

DISTRIBUTION

Babar and Tepa.

DESCRIPTION

Wing ♂ (4 specimens) 210-215 mm. and wing ♀ (2 specimens) 212-215 mm. This race is noted for its deep cinnamon coloration.

Ninox novaeseelandiae remigialis

Ninox novaeseelandiae remigialis

- Stresemann, 1930. Bull. Brit. Orn. Cl. 50, p 61-Kei Islands.

DISTRIBUTION

Kei Islands.

DESCRIPTION

Similar to *moae*, but with less pronounced barring of primaries and secondaries.

Ninox novaeseelandiae pusilla

Ninox novaeseelandiae pusilla

- Mayr and Rand, 1935, Amer. Mus. Novit. 814, p 3-Dogwa, Oriomo River, Territory of Papua.

DISTRIBUTION

Lowland areas of southern New Guinea opposite Cape York.

DESCRIPTION

Length 250-275 mm. Culmen 25 mm., tarsus 35 mm.

Wing ♂ (3 specimens) 193–200 mm. and wing ♀ (2 specimens) 194–196 mm.

This race is very similar to *ocellata*, but is slightly darker and more vinaceous in coloration. It is also smaller than *ocellata*.

Rand and Gilliard (1965) say that this owl is quite common in the savannah country of southern New Guinea and is frequently encountered in small groups of from two to four birds.

Ninox novaeseelandiae melvillensis

Ninox boobook melvillensis – Mathews, 1912, Aust. Avian Rec. I, p 34–Melville Island, Northern Territory, Australia.

DISTRIBUTION

Melville Island.

DESCRIPTION

Wing ♂ (3 specimens) 203–213 mm. and wing ♀ (2 specimens) 199–210 mm. This is a small dark race similar to *rufigaster* but smaller.

Ninox novaeseelandiae ocellata

SYNONYMY

- Athene ocellata* – Bonaparte, 1850, Consp. Gen. Av. I, p 42–Oceania = Raffles Bay, Cobourg Peninsula, Northern Terr.
- Ninox boobook mixta* – Mathews, 1912, Novit. Zool. 18, p 255 – North-West Australia (Parry's Creek).
- Ninox boobook macgillivrayi* – Mathews, 1913, Aust. Avian Rec. I, p 194–Cape York, North Queensland.
- Spiloglaux novaeseelandiae everardi* – Mathews, 1916, Birds Aust, V, p 332–Everard Ranges, Central Australia.
- Ninox ooldeaensis* – Cayley, 1929, Emu 28, p 163–nr. Ooldea, South Australia.
- Ninox novaeseelandiae arida* – Mayr, 1943, Emu 43, p 16–Mt. Anderson area of Fitzroy River, West Kimberley District.
- Spiloglaux boobook parocellata* – Mathews, 1946, Working List Aust. Birds, p 55–South West Australia.
- Spiloglaux ocellata carteri* – Mathews, 1946, Working List Aust. Birds, p 55–Mid West Australia.

DISTRIBUTION

This race seems to occupy an intermittent range covering most of Australia.

DESCRIPTION

This form varies considerably both in size and coloration. But generally

it would appear to be paler than other Australian races.

Wing ♂ (34 specimens) 204–239 mm. and wing ♀ (37 specimens) 203–240 mm.

Ninox novaeseelandiae rufigaster

Ninox novaeseelandiae
rufigaster

– Mees, 1961, J. Roy. Soc. W. Aust. 44,
p 106.

DISTRIBUTION

South-western Australia and is said to range about 300 miles inland.

DESCRIPTION

This race is similar to *melvillensis* and *boobook*, but is larger than the former and more rufous than the latter. Wing ♂ (13 specimens) 215–234 mm. and wing ♀ (24 specimens) 226–246 mm.

Ninox novaeseelandiae boobook

SYNONYMY

- Strix boobook* – Latham, 1801, Suppl. Indic, Orn., p 15–
Nova Hollandia.
Athene marmorata – Gould, 1846, Proc. Zool. Soc. Lond. 14,
p 18–S. Australia
Spiloglaux boobook tregellasi – Mathews, 1913, Aust. Avian Rec. 2, p 74–
Frankston, Victoria.

DISTRIBUTION

Distributed over the whole of Victoria, New South Wales, southern Queensland and eastern South Australia.

DESCRIPTION

A large rather variable subspecies. Typical examples have soft, warm brown upperparts and the under surface is generally striated. Wing ♂ (54 specimens) 230–255 mm. and wing ♀ (52 specimens) 227–261 mm.

Ninox novaeseelandiae lurida

SYNONYMY

- Ninox boobook*, var. *lurida* – De Vis, 1887, Proc. Linn. Soc. N.S.W. (2)
I, (1886), p 1135–near Cardwell.
N(inox) lurida – De Vis, 1889, Rep. Sci. Exp. Bellenden-Ker
Range, p 84–Herbert Gorge, Bellenden-
Ker.
Spiloglaux boweri – Mathews, 1913, Aust. Avian Rec. 2, p 74–
North Queensland.
Ninox yorki – Cayley, Emu 28, p 162–Cape York
Peninsula.

DISTRIBUTION

Restricted to the forested regions of north-eastern Queensland.

DESCRIPTION

A large dark race similar to *leucopsis*, but without spots. Wing ♂ (4 specimens) 210–220 mm. and wing ♀ (5 specimens) 207–221 mm.

Ninox novaeseelandiae halmaturina

Ninox boobook halmaturina – Mathews, 1912, Novit. Zool. 18, p 254–Kangaroo Island.

DISTRIBUTION

Kangaroo Island.

DESCRIPTION

Similar to *boobook*, but the ground colour of the underparts is rufous-cinnamon, not white. Wing ♂ (2 specimens) 215–226 mm. and wing ♀ (2 specimens) 236–245 mm.

Ninox novaeseelandiae leucopsis

SYNONYMY

- (*Athene*) *leucopsis* – Gould, 1838, Proc. Zool. Soc. Lond. 5, (1837), p 99–Van Diemen's Land.
 (*Noctua*) *Maculata* – Vigors and Horsfield, 1827, Trans. Linn. Soc. Lond. 15, (1826) p 189–Australia.
Spiloglaux boobook clelandi – Mathews, 1913, Aust. Avian Rec. 2, p 74–Flinders Island.
Spiloglaux boobook leachi – Mathews, 1913, Aust. Avian Rec. 2, p 74–Victoria = Melbourne.

DISTRIBUTION

This race appears to be partly migratory and although Tasmania is given as the range, it is also found occasionally in Victoria and New South Wales.

DESCRIPTION

A small, dark race with the upperparts liberally spotted with small, white dots. The under surface is heavily ocellated. Wing ♂ (10 specimens) 198–222 mm. and wing ♀ (6 specimens) 203–220 mm.

Ninox novaeseelandiae albaria

Ninox albaria – Ramsay, 1888, Tab. List Aust. Birds, p 36–Lord Howe Island.

DISTRIBUTION

Lord Howe Island.

DESCRIPTION

A light brown race with an ocellated under surface. Wing ♂ (4 specimens) 209–215 mm. and wing ♀ (3 specimens) 218–222 mm.

Ninox novaeseelandiae undulata

SYNONYMY

- Strix undulata* – Latham, 1801, Suppl. Indic. Orn., p 17–Insula Norfolk.
Ninox boobook royana – Mathews, 1912, Aust. Avian Rec. I. p 120–Norfolk Island.

DISTRIBUTION

Norfolk Island.

DESCRIPTION

Similar to *albaria* but appreciably darker. Wing ♂ (9 specimens) 196–205 mm. and wing ♀ (15 specimens) 199–208 mm.

BREEDING THE BOOBOOK OWL IN CAPTIVITY

The first success that I can trace is that of David Fleay who bred them in his aviaries in Ballarat, Victoria in 1925. Mr. Fleay had five of these owls, three males and two females, in the same aviary and one pair mated and reared two chicks. Apparently no friction between the breeding pair and the unmated birds occurred; indeed the latter are said to have assisted in the rearing of the chicks. In 1934 the Melbourne Zoo recorded the rearing of four young Boobook Owls in their collection and in 1941 this species was bred at the Sir Colin Mackenzie Sanctuary, Healesville, Victoria, although it is not stated if the chicks were reared to independence. Melbourne Zoo reported a further three Boobook Owls reared in the collection in 1966 followed by two more in 1967.

In 1970 West Berlin Zoo imported two Boobook Owls from Australia and these were housed in an outdoor aviary measuring 4 x 2 metres. Their diet consisted of mice, sparrows and minced meat mixed with egg yolk. In February 1972 these owls were observed displaying and eggs were laid in mid-April. Between 10–15th of May two chicks were hatched and these left the nest box on June 14th. One of these young owls was subsequently lost, but our member Prof. Dr. Heinz Georg Klös, the zoo's Scientific Director, very kindly offered me the survivor. Although Boobook Owls are not uncommon in the wild, they are rarely exhibited in European collections, so I am extremely grateful to Prof. Klös for entrusting such uncommon birds to a small private collection.

I received the initial Boobook Owl in early 1973, the transfer being delayed for a long period while my application for an import licence was being considered by the Home Office. This bird was installed in an indoor flight cage 3 x 1.5 x .75 metres and I was immediately impressed by its tame and confiding manner. It was fed on the standard diet that I provide to all my medium sized owls *i.e.* day-old chicks and captive-bred mice. No other food or supplements have ever been offered to the Boobook Owls.

In 1973 West Berlin Zoo were again successful in breeding a single Boobook Owl and this bird was sent to me when independent. On the arrival of the second bird I was fairly confident that I had got a true pair. The new bird was far less phlegmatic than the original and over the last few years I have noticed that female owls tend to be far more unsteady than the males. The new bird was appreciably larger than the original, although, as can be seen from the foregoing tables of comparative wing measurements, this factor is by no means conclusive, and the shape of the head differed

markedly from that of the original bird. The head of the presumed male was narrow, flat across the top and the feathering above the eyes formed heavy brows which made the eyes appear recessed, whereas the other bird's head was much broader, well rounded and lacked the heavy brows. In fact the latter appeared to wear a permanent look of "wide-eyed amazement".

The two birds settled down well together, but although a plywood nest box .30 x .30 x .40 metre high was installed in early January, no attempt to breed was made during 1974. In the early part of March of the following year the female's temperament changed dramatically. Her normally shy and slightly nervous response when I entered the birdroom became one of aggression. Whenever I approached the Boobook Owls' flight, the female would crouch low on the perch, spread her wings and snap her beak angrily. By the end of March the female spent most of each day in the nest box, but in the evening she was usually with the male in the flight. In early April she appeared to be permanently in the nest and I assumed that she had laid, although as I am a firm believer in disturbing breeding birds as little as possible, I did not open the box to confirm this.

As there was no evidence of any chicks having hatched, I opened the box on May 10th, as I assumed that the eggs were infertile and should be removed; however, I found that the two eggs were fertile and close to the point of hatching. The eggs looked uniform in size, were well rounded and the one that I removed for examination measured 41 x 36 mm. Like all owl eggs that I have examined, they were off-white in colour.

On the evening of May 14th a chick was calling when I serviced the owls' cage and by the rather weak volume of this call I assumed that the chick was only a few hours old. As Boobook Owls are said to incubate for 30-31 days, it is evident that the female sat for several days prior to laying the first egg. Two days later two chicks were heard calling simultaneously, one call being much stronger than the other.

The rearing of the chicks progressed uneventfully: the female brooded them very closely and although the male always appeared aloof and rather disinterested in his family when I was in the birdroom, by looking through a window I could see that he quickly took the day-old chicks and mice that I left and offered them to the female. By the time the young ones were three weeks old, they were frequently seen looking out of the nest, although the female immediately ushered them to the back of the box when she realised that I was present. The chicks left the nest when they were five weeks old, although they frequently returned to it if startled. At this stage they were much smaller than the adults and they were predominantly downy in appearance; however both could fly strongly from the first day that they left the nest.

I separated the chicks from their parents in early August, by which time it was difficult to distinguish them from the adults.

As described, the Boobook Owl *Ninox novaeseelandiae* (boobook) has been bred by Mr. B. C. Sayers and this is believed to be the first success in this country. Anyone knowing of the previous breeding of this species in Great Britain or Northern Ireland is asked to inform the Hon. Secretary.

BREEDING THE BENGAL EAGLE OWL

Bubo b. bengalensis

By KIM SIMMONS (Linton Zoo, Cambridge)

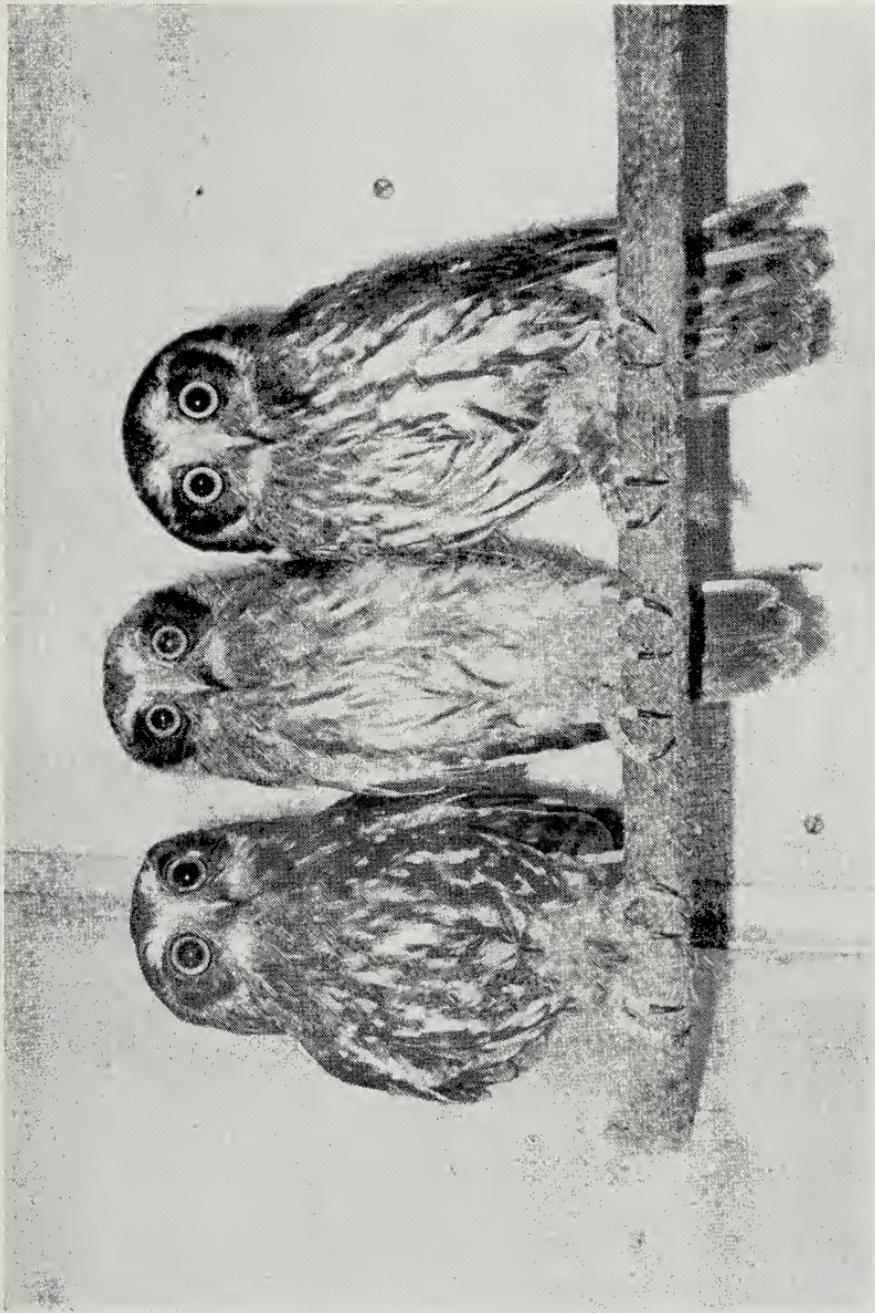
The Bengal Eagle Owl is a small, pale coloured form found in India from Kashmir through the lower Himalayas to Assam, south to Sind, the Nilgiris, the region south of Madras and Arakan. It is generally accepted to be one of the many subspecies of *Bubo bubo*, although some authorities argue that in spite of the fact that this race is possibly sympatric with other races of *Bubo bubo*, no evidence of intergradation exists, which might suggest that the status of a full species is warranted.

Our first Bengal Eagle Owl was purchased in 1972, but as this bird's arrival coincided with a programme of extensive rebuilding and landscaping activities within the zoo, no immediate attempt to locate a second bird was made. However, quite by chance a second was offered to us in June 1973 and although the sex of both birds was uncertain, this offer was accepted, the new owl was installed in the aviary already occupied by the original specimen and it settled in comparatively quickly.

The aviary was not particularly elaborate, consisting of 2 inch wire-netting stretched over a rustic framework and it measured 20 feet x 16 feet x 6 feet. high. In fact this structure was only provided as temporary accommodation until a more permanent, planted enclosure could be erected. Although a number of branches and logs were provided for perching, both birds seemed to prefer to spend most of their time on the ground amongst the thick undergrowth. The public are only admitted to the front of this aviary, as one side is bounded by a large paddock the other side is protected by another aviary housing Tawny Owls *Strix aluco*. The aviary backs on to an overgrown hillock created from the spoil from an adjacent disused chalk quarry.

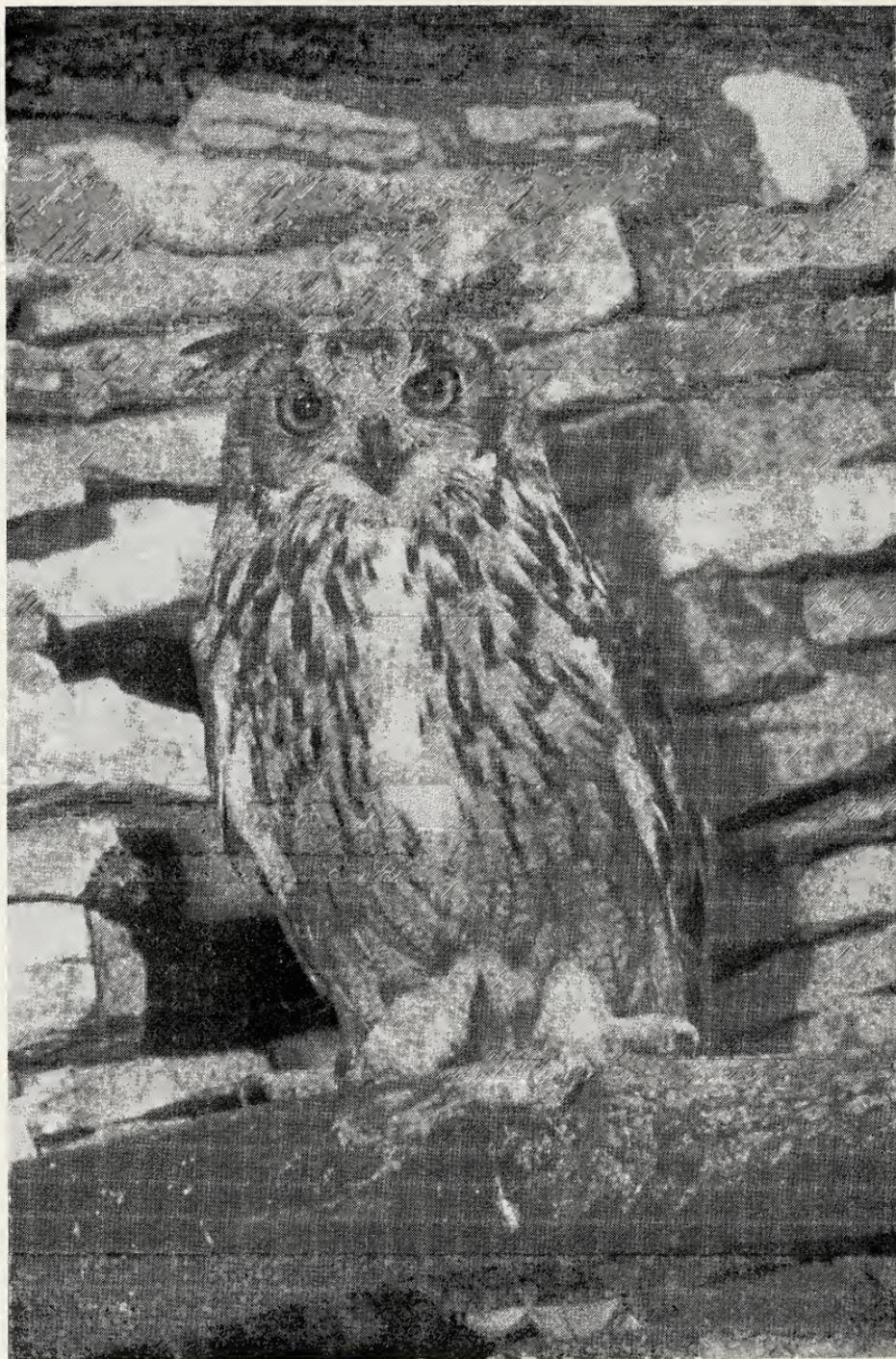
The diet consists of day-old poultry chicks, young rabbits and guinea pigs, adult mice and gerbils. Both birds show a marked preference for day-old chicks and we feed every day apart from Sundays when all the birds of prey fast for 24 hours. The birds' consumption varies, but 6-8 chicks are provided for each bird and this seems to be in excess of their normal requirement.

On September 20th. 1973 we noticed the more recently acquired owl



Boobook Owls, parents and young (centre)

B. C. Sayers



Bengal Eagle Owl

casually dusting itself in the far left-hand corner of the aviary, in a manner of a chicken dust-bathing and on September 21st, whilst giving out the food, I noticed that the dusting area had a neatly prepared concave scooped out. It was only at this stage that we thought that the owls were in fact a true pair and that they were preparing to nest, so from that time we kept a close watch on the activities. When the aviary was approached, the supposed female would crouch low into the nesting hollow, while the other bird would show obvious signs of agitation by turning the head from side to side and snapping its beak.

On October 14th 1973 the female laid the first egg and commenced incubation. The nest, which consisted simply of a hollow in the earth, was situated completely in the open, but yet the female persistently incubated through a variety of weathers while the male stood alongside, warning of the approach of any intruders.

The incubation period for most eagle owls is 35 days, so five weeks after the first egg was laid we maintained careful observation. On November 19th I noticed that the day-old chicks had been arranged around the nesting hollow, so we increased the amount of food. On the evening of November 26th. I crept along the side of the paddock to observe the female. She was sitting very tightly but the head of a chick was clearly visible poking out from under her wing, then as she turned to one side, the downy body of another chick was visible. At this stage the chicks were covered with yellowish-grey down and the eyes were still closed.

On December 7th four chicks were observed: then on December 8th we experienced a torrential rain storm during the night and the nest was flooded. In spite of this the female continued devotedly to brood the chicks, although it seemed unlikely that they could possibly survive under such wet, muddy conditions. As a result, we decided that the only solution was to hand-rear any survivors. When my father inspected the nest, he found it part full of muddy water and one of the chicks already dead, but the remaining three, although cold and wet, were still alive. I rushed them to our kitchen where we had already prepared a box with a lining of hay and towelling. We then placed them in their makeshift nest alongside the cooker to warm and dry them. When they were warm and thoroughly dry we removed them to a quiet corner of the kitchen and covered them over with a cotton sheet. They were then left undisturbed for about four hours.

Initially it was difficult to get the young owls to feed and it proved necessary to force feed them with pieces of day-old chick; however, they soon gained confidence and called for food whenever anybody approached their box. On their first day in the kitchen they consumed three chicks between them. By this time their body size had almost trebled since I first saw them; their eyes, which appeared greenish, were open and the down seemed darker. The young owls were weighed regularly and a chart was compiled giving details of their weight, food consumption, development and response. The weight increase in ounces was as follows:—

Date	Owl A	Owl B	Owl C
8-12	13	14	15
10-12	16	16½	16
13-12	18	18	18½
17-12	24½	24½	24½
24-12	31	33	32
30-12	33	35	34

At first the chicks were entirely dependent on us: they appeared to be unable to stand, but could use their claws to grip. They seemed to respond mainly to sounds, although their vision was obviously developing. The food consumption increased daily and we encouraged them to be diurnal by feeding them during the day. The first feed was at 7.30 am and the last was at 12.30 am. The strength in their legs gradually increased until, on December 18th, when they were still less than a month old, they had sufficient balance to perch quite confidently on my knee.

By December 25th they were becoming more independent and were attempting to tear up small pieces of the chicks. Their vision appeared exceptionally good and their iris colour had turned to orange-brown. The down-covered eyelids now had well developed eyelashes and one of the chicks sported downy ear tufts that were held permanently erect.

By December 30th they had feathers on wings and tails, but the remainder of the body was still clad in brown down. They spent much of their time playing on the kitchen floor and would make clumsy attacks on spiders and insects after sitting and studying them for some time, although they never seemed to retrieve their victims. They also delighted in playing with the seed from an avocado pear, in fact their behaviour rather reminded one of a group of domestic kittens. The young owls were capable of flying short distances by January 30th and were almost fully feathered. It was then found necessary to transfer them to an aviary in an outbuilding. On February 21st feathered ear tufts were discernible, although they were still small and really only visible when the birds were alert. By February 28th, they were fully feathered and closely resembled the adults, it was particularly obvious that they were appreciably larger than their parents. On January 28th 1974 the mother was seen to be incubating two eggs and on March 5th two more young ones were observed in the nest scrape: on March 28th these left the nest. On December 5th the female was incubating yet again and to date we have successfully reared twelve Bengal Eagle Owls and all have been transferred to other zoos or private collections for breeding purposes. Two of these birds, which were each mated to imported specimens, themselves reared young in the aviaries of our members, Philip Dugmore and Peter Smith, when they were only twelve months old.

CARE AND GROWTH OF CAPTIVE WHITE PELICANS

By Y. A. GREICHUS, A. GREICHUS and D. J. CALL
(South Dakota State University, Brookings, South Dakota)

Concern has developed in recent years regarding the effects of organochlorine insecticide and polychlorinated biphenyl (PCB) residues upon the biology of fish-eating birds. A study on the physiological effects of PCB's or a combination of DDT, DDD and DDE in juvenile White Pelicans *Pelecanus erythrorhynchos* was conducted at South Dakota State University (SDSU) during the summer of 1972 (Greichus *et al.*, 1975). The present article describes the care and feeding of these captive birds.

Pelican nestlings were collected on June 19th and July 7th, 1972 at LaCreek National Wildlife Refuge, Bennett County, South Dakota. On June 19th, the young at the rookery ranged in age from newly hatched to approximately three weeks. On July 7th, the young ranged in age from approximately two to six weeks. The birds collected were estimated to average two and five weeks old, respectively, on the two collection dates (Hall, personal communication).

The nestlings were transported to the Wildlife Research Area at SDSU, and housed in cages which have been described in detail (DeLaRonde and Greichus, 1972). Heat lamps were used for the first few days for added warmth during the night. On July 15th, 27 pelicans for the experiment were randomly placed into nine cages, three birds per cage. They were housed in this manner until the end of the study in mid-October. The cages were cleaned daily and fresh water was supplied to their swimming tanks as needed.

The captive birds were fed black bullheads *Ictalurus melas*, carp *Cyprinus carpio*, bigmouth buffalo *Ictiobus cyprinellus* and white suckers *Catasomus commersoni*. The fish were supplied by a local commercial fishery and frozen until needed. Some fish flesh is low in thiamine content (U.S.D.A., 1963) and contains a thiaminase enzyme (Melnick *et al.*, 1945; Cantarow and Schepartz, 1962). Therefore, as a precautionary measure, a supplement of B vitamins (A-H Robins Co., Richmond, Va.) was administered to all birds starting on July 27th. This daily supplement contained 7.2 mg of thiamine mononitrate. Chura and Stewart (1967) supplemented the fish diet of captive Bald Eagles with multiple vitamins to prevent possible vitamin deficiencies in these birds. Whole, not eviscerated, fish were fed to the pelicans.

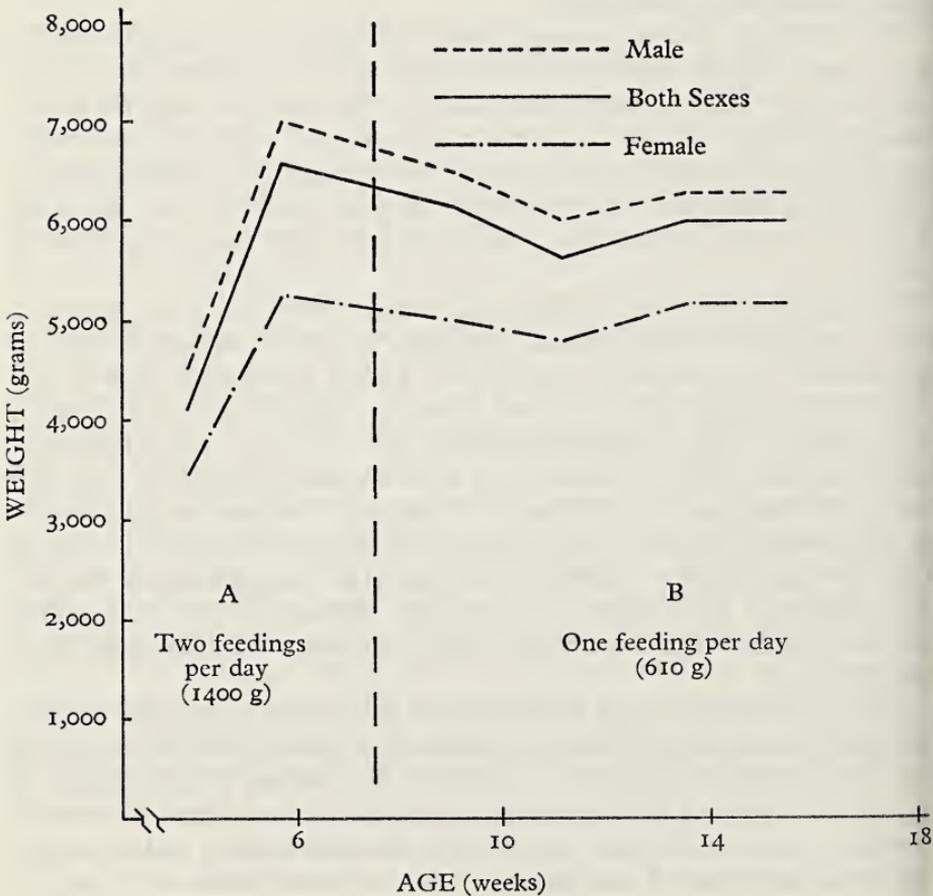
Early in the study it was noted that the skin of the young pelicans was very pale. Consequently, blood was drawn from six birds and an average red blood cell count of .76million/cu mm of whole blood, a haemoglobin of 3.5 gm per cent, and a haematocrit of 12.7 per cent was found. Three wild nestling pelicans of the same age and from the same rookery had an average red blood cell count of 1.98 million/cu mm, a haemoglobin of 7.9 gm per

cent, and a haematocrit of 26 per cent. To prevent further anaemia from occurring, approximately 15 mg. of iron supplement was administered orally daily in the form of ferrous sulfate (Mead Johnson Laboratories, Evansville, Ind.) or ferrous gluconate (Winthrop Laboratories, New York, N.Y.). After six weeks the treatments were stopped. The average red blood cell count of the treated birds had increased to 3.04 million/cu mm. The average haemoglobin and haematocrit values had also increased to 15.2 gm per cent and 43.3 per cent, respectively.

It has been observed by the authors that wild pelicans consume salamanders and frogs in addition to fish. This may account for their haemoglobins being higher than in the penned birds.

Food regimens used in the pesticide study and subsequent growth curves are shown in Figure 1. The pelican growth curves were similar to

Figure 1. GROWTH CURVES OF CAPTIVE JUVENILE WHITE PELICANS



those of captive Double-crested Cormorants (DeLaRonde and Greichus, 1972), Growth peaks for the pelicans occurred at five to six weeks while cormorants attained maximum weights at six to seven weeks. When first placed in the pens the birds were force-fed, but after a few days they readily accepted the fish. The daily food intake of each pelican was 1,400 g. for the first six weeks of captivity. After this time the birds did not consume all the food that was offered and the daily food intake dropped to approximately 600 g. Consequently, the two per day feedings were reduced to one per day. The average body weight of the male pelicans was higher than that of the females throughout the study.

The fungal disease, aspergillosis, has been reported to be common in young Double-crested Cormorants and White Pelicans (Bicknell *et al.*, 1971; DeLaRonde and Greichus, 1972; Greichus and Greichus, 1973). Preventive measures against aspergillosis and secondary bacterial complications were taken by periodically fogging the birds with amphotericin B (Squibb Co., New York, N.Y.) and Terramycin (Pfizer Co., New York, N.Y.) solution. The solution consisted of 0.1 mg/ml amphotericin B plus 1.2 mg/ml terramycin, and was sprayed as a fine mist into a sealed cage with an atomizer (Root-Lowell Corp., Lowell, Mich.). All birds received seven 30-minute treatments over a period of seven weeks. Two birds, observed to emit rasping respiratory sounds, received an additional treatment. Upon necropsy, *Aspergillus fumigatus* lesions and/or granulomas were observed in the lungs and air sacs of three of the 27 pelicans.

Gular pouch haematomas were caused by heavy infestations of the pouch louse *Piagetiella peralis*. These haematomas gradually disappeared from all birds after the lice were removed with forceps and the infected areas disinfected with 80 per cent ethanol. Two species of intestinal roundworms, *Contracaecum spiculigerum* and *Skrjabinocara squamatum*, were identified from these pelicans and from Double-crested Cormorants in an earlier study (Greichus *et al.*, 1974). Two birds that died before the start of the experiment were heavily infested with roundworms. All birds were treated for roundworms with 100 mg/kg body weight with piperazine worming medicine (Miller Chemical Co., Omaha, Neb.). This represented the dosage recommended for turkeys. Roundworms were present in the captive pelicans at the end of the experiment.

The removal of the ectoparasites from the birds was necessary for another aspect of this project (Greichus *et al.*, 1974). This necessitated washing the birds in a mild detergent solution. To perform this the birds were sedated prior to immersion in the detergent bath. Several compounds were tested for their sedative qualities including Thorazine (chlorpromazine) and Vetame, a derivative of phenothiazine. No pronounced sedative effects were observed after administration of these drugs. Ketamine hydrochloride (Parke-Davis Co., Detroit, Mich.) at a dosage of seven mg/kg was found to be a very effective sedative. Following an intramuscular injection in the thigh they could be readily handled and washed about 10 minutes later.

After the washing process was completed the birds were dried and placed under heat lamps to recover, as body temperatures were lowered during anaesthesia. Recovery to a standing position required about 40 minutes, and to a state of normal co-ordination and mobility in about two hours. Some regurgitation and loss of appetite occurred, but normal appetite was restored within one day.

Two birds developed relatively deep flesh wounds during the study. The wounds were sprayed with an antiseptic and each bird received an intramuscular injection of two ml of an aqueous suspension of penicillin and dihydrostreptomycin (Pfizer Co., New York, N.Y.). Both wounds healed cleanly and the birds exhibited no ill effects from the treatments. Superficial wounds were treated with methylene blue or iodine sprays.

In one case, treatment for foot swelling was initiated. The swelling was found to be the staphylococcus-caused chronic suppurative pododermatitis, or "bumblefoot." The infected bird was isolated in a carpeted cage and treated with two weekly 0.05 per cent copper sulfate foot baths (Meinecke, personal communication). The swelling diminished and the bird was later returned to its original cage.

ACKNOWLEDGEMENTS

The authors thank V. Pat McCrow, Lauren Poppen, Steven Schultz, Barbara Ammann, Margaret Pearson, and Gordon DeLaRonde II for their assistance in raising the pelicans.

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NOTES ON SOME SPECIES OF PARROT IN CAPTIVITY

By GEORGE A. SMITH (Peterborough)

*Continued from p. 83*THE HAWK-HEADED PARROT *Deroytus accipitrinus*

The Hawk-headed Parrot was formerly very scarce in British collections (Greene 1883-87, Prestwich 1968, Low 1972). Perhaps they are less uncommon at present: I can think of 35 individuals during the past five years. Some of these have since died and, as I could not have possibly known all the birds, the present U.K. population might be somewhere around 25. I strongly doubt it to be higher than 30, of which only three are English-bred and most of which were imported by Mr M. Clifford of West Bromwich as nestlings in 1970, 71, 72. Very few have arrived since these dates although I obtained a further pair, from Brazil, in March 1976.

Description

Good illustrations are so readily available (see references) that it may suffice to say that the Hawkhead is physically about as large as a Rock Pigeon *Columba livia* and the shape of the tail approximates to that of the Wood Pigeon *C. palumbus*, reminding me, as they did Miss Low (1972), of *Pyrrhura conures*. The back, wings and tail are holly-green; the head brown with a lighter, greyish front and the brown feathers of the cheeks are lightly shaft-streaked. The bill, skin around the eye and feet are dull black and the outer rim of the iris dirty yellow. By far the most distinctive feature is the broad blue edge to the maroon feathers of the chest, belly and neck. Like the similarly coloured feathers of the Vinaceous Amazon Parrot *Amazona vinacea*, those of the occiput are raised when the birds are frightened, or when they are threatening others, and form a wide halo. Despite the thick blue edging of these maroon-coloured feathers being so particularly obvious, the bird recently has sometimes been pathetically called the Red-fan Parrot. Is the fan of this whimsy the ruff of occipital feathers? The three healthy birds weighed were two females at 265 and 260 grams and a male at 260 grams.

Sexual differences

I have carefully examined eight individuals of KNOWN sex, including four dead ones, and it is my opinion that it is quite impossible to determine the gender of a Hawkhead by its colour, but the size of the head and bill might be some guide. Behavioural differences are seen; males are more aggressive and more vociferous, but I would not like to hazard a guess without directly comparing the behaviour of an unknown with known sexed birds.

Hawkheads are very variable in colouring: the edging to the maroon

feathers can be any shade between cerulean, dull grey-blue or, in some cases about the neck, green. The outer ring of the iris varies from almost white to a dirty yellow, although the inner ring is invariably a slate grey. The whiteness to the front of the head might increase with maturity: I have not found that this, nor the proportion of red in the lateral tail feathers is related to the sex of the bird.

Feeding

Had they the choice, I am certain that my Hawkheads would live almost entirely on fruit and bread soaked in milk. Seeds that are eaten include peanuts, pine nuts, sunflower, hemp and canary seed. From August until they become unavailable in December, or January, these parrots delight in the fruits of the hawthorn *Crataegus monogyna*. Despite their partiality for other fruits, the flesh of the haw is discarded as they quickly extract the stone. This stone is extremely hard and very small and to stop it rotating in the beak, the Hawkheads usually have to press the stone against an aviary wire or against the edge of an uplifted toe. The favourite green foods are dandelion seed heads and peas in the pod; otherwise they ignore most green food.

Voice

With the exception of the cooing of pigeons I find it quite impossible to convert the sounds that birds are said to make into the noises that they actually produce. Yet, as the Hawkhead is so noisy, it is impossible to describe the bird without making some attempt. There are very noticeable dialects between different Hawkheads but after some months of contact they come to sound the same. The voice does not have the horrible grating harshness of many South American parrots: it is extremely powerful and I can hear it half a mile away; fortunately distant neighbours, who might also hear it over this range, might not identify it as coming from parrots. Shortly after dawn, as I lie in bed, I always hear the contact call from the other side of the house. It is a ringing *yak yak yak . . .* and after several repeats, it usually finishes with a more piping, still powerful, *wa wa wa . . . weo*. So difficult is it to interpret sounds into words that to McLoughlin (1976) the phrase is *tak-heeya-heeya* and, in truth, from a distance it might sound something like this. When they are frightened, the laughing, slightly maniacal quality of the contact call changes to the shriller and faster produced disyllabic alarm and flocking call of *eea eea*. In extreme panic they squawk, but pairs communicate between each other, especially when they are feeding, with a very low *yak yak*.

Following a fight between two hens, the beaten one was heard plaintively uttering a most pathetic sounding *eee* as a sign of her submission. Threatening males growl and both sexes will hiss as they flick the head in anger or intimidation.

General behaviour

They frequently walk on the ground and if disturbed they do not fly upwards as most terrestrial parrots would do: I therefore assume that they are primarily arboreal. The similar size and shape to the body and tail does suggest that they might share the same preferred habitat as the Australian King Parrot *Alisterus scapularis*.

When I first had my two back from the Granthams, who had looked after them for two years or so, they were essentially wild, panicking and overwhelming me with their incredibly loud noises whenever I approached their aviary. I think that it was the nervous tension that caused one of the two hens to strip herself of feathers. In three days she was almost bald and, very reluctantly (because of the din) I took her into the house. She never plucked another feather and soon became perfectly tame. When her feathers had part regrown she was restored to her companion where she soon taught it to become equally confiding. Almost a year later I found her with a bloody wound on her back: as she was very much the boss, her injury must have been self-administered. She was brought into the house and carefully examined for parasites, using first a bag containing chloroform around the body—as is done to collect parasites in the wild—and then by dusting with pyrethrum, but none were found. After ten days inside the house, which she enjoyed because of the continual flow of tit-bits, she seemed as good as new. Alas on the very morning that I was to have put her outside she was found dead of a haemorrhage where she had severely mutilated her own back. She was a huge personality, being completely without fear, and despite extensive search I still remain puzzled as to what gave her that mortal itch.

Hawkheads are very observant; nothing that moves escapes their eye. The black skin around the eye is bare and as the eye bulges slightly from its orbit it gives a Hawkhead an uninterrupted field of view. It is probable that, like the similar "pop-eyed" rabbit, it can see backward, upward, downward, sideward and forward with the head held in the normal upright position.

A threatening Hawkhead is so very attractive a spectacle that it would be nice if one could summon up this display at will when showing people around the aviaries, but as the most spectacular show is only done when the Hawkhead itself is somewhat frightened, it is difficult to get tame birds to oblige unless one can show them a strange bird, as by holding a caged bird up to the wire. The wild garden birds are frequently threatened when they settle on, or near to, the aviary. As far as I have yet seen, the wild birds take not a bit of notice and it is ludicrous to see a tiny Blue or Cole Tit unconcernedly stealing food and seeds from inside the aviary whilst a relatively huge Hawkhead looms only an inch or two away threat displaying. The curiosity is that while the garden birds do not care, those South American parrots I have tried, including two very tame Spectacled Amazon Parrots *Amazona albifrons* are greatly impressed by what is, after all, so much bluff, and frantically try to get away.

When the Hawkhead is rather nervous, the nape feathers rise and the head resembles a Red Indian chief in his head-dress of eagle feathers. If really excited, the body feathers are sleeked, the tail is wide-spread and the wings held away from the body as the bird writhes a little, blazes the eyes and suddenly starts and hisses at the same time. In all essentials this threat is the same as that of frightened Sun Conures *Aratinga solstitialis* (in a cage), caiques *Pionites*, Amazon parrots or those other New World parrots known to me.

The male threatens me as he does known rival Hawkheads. He lowers the head and raises the feathers of the chin, cheek and body slightly but not the ruff, and the head is raised and lowered once or twice. The wings are held off the body not quite fully extended, somewhat in the position of the wings of a stooping falcon. The wing nearer to me is usually held further from the body, in which case, by moving my position, I can get the male to extend first one wing and then the other while his eyes fairly blaze. Such a display is eerily silent, although he sometimes growls a *kwow kwow*. He steadily walks towards me in the very purposeful and absolutely characteristic way of threatening American parrots, with the head so low that the bill only just skims the surface of the perch. Or he may twist the head to one side and advance with one eye pointing skywards and the other to the earth and yet, because of wide field of vision, still looking straight at me. After one of his slow charges the male usually walks back along his perch to re-position himself for a repeat. When he walks back it is strange to sometimes see him looking back at me even though his head is facing the direction in which he is moving. During the threatening walk up and especially if he is none too certain of himself, he stops occasionally, sleeks his plumage tight and flicks his head. This sudden flicking, interrupting the very slow pace of the walk, is strangely startling even when it is expected. As he reaches the wire separating us, he takes hold of a strand and bites it in such a way that his lower jaw keeps slipping from the wire to make a popping sound. Hardy (1963) took "beak popping" to be part of the courtship display of the Orange-fronted Conure *A. canicularis*. With the greatest of respect I feel that he may have been mistaken. I believe "popping" to be an antagonistic gesture: a rattling of arms, for male Black-headed Caiques *P. melanocephala*, when thwarted by the wires of the cage from directly attacking a rival, similarly beak-pop on the wire or may do this from the top of vertical twigs. In both Hawkheads and Caiques the popping is seemingly directed not to the female but always towards the rival. From the description and circumstance of Hardy's colonies, I think that this might have applied for his Orange-fronted Conures.

Breeding

Initially I had two hens; the one that killed herself often spent long periods chewing away at the inside of her nest box. Twice she so heavily persecuted the second hen that I had to take her away for several days. The

second bird, because of her quiet demeanour, was correctly taken to be a female. Males might well be, as male caiques certainly are, the more noisy sex. It was especially kind of Peter Paris to lend me a Hawkhead in March 1974. After worming, this was directly put with the other (not without some qualms). After an hour or two of careful and mutual reconnoitring and head flicking they began preening each other. In April and early May I heard them pairing several times a day. (Like Bronze-winged Parrots *Pionus chalcopterus* during the whole protracted sequence of treading, both sexes growl a quite harsh *kaaaa* . . . A noise distinctive and loud enough to attract attention from myself, the first time that I heard it, from fifty yards off). The active bird, for sometimes the female may take the male role, and in this case both were hens, raising and lowering its head yet only putting one foot on the back of the other bird, the other foot retaining its grip on the perch.

The first egg, of a three egg clutch, was laid on May 15th 1974. The first few days of incubation were desultory but after that she sat well, but came off the nest several times a day to feed. I never once saw the other bird feed the incubating hen, which confirmed my suspicions about its sex. By May 25th the borrowed Hawkhead proved my guess as to its correct sex, for it began to share the brooding and on June 2nd I removed the infertile eggs. Egg measurements were: 35.5 x 26, 34 x 26 and 33.2 x 26.8 mm.; average weight 13.8 grams when the air space was filled with water.

On August 20th she began her second clutch, this time of two eggs. Four days following these the second hen laid her first egg of a clutch of three. Eggs are laid at $2\frac{1}{2}$ or 3 day intervals.

Peter Paris kindly sent me a male and the first borrowed bird was paired up in the next aviary with a two year-old English-bred bird (by Mrs Howard) lent to me by the Granthams. The Grantham bird also proved to be female and would flirt with the male through the separating wires and angrily display at his wife: she also spent long periods chewing away inside her nest box.

The pair laid on February 5th 1975 a clutch of three which failed to hatch with "dead-in-shell", a common failing with winter-laid eggs. The second nest of that year was another clutch of three begun on October 4th: these eggs were smashed by the birds, through no fault of their own, and the nest box was rebuilt to make it smaller and more cosy. Pairs of Hawkheads use the nest as a dormitory throughout the year and nest chewing is performed by both sexes, but usually only one bird works away at a time.

In 1976 the first egg (of a clutch of four) appeared on March 21st. It was dangerous examining the nest, for the male was fearless and ferocious; if the hen was out of the box then the two would attack together. The only defence against such angry birds (my fear is of inadvertently injuring them in self-defence,) is to show them a catching net, but in the case of Hawkheads this was a frail defence, for the cock would wrench this out of my hand while my attention was being given to the box; and a Hawkhead

rapidly pulling tuft after tuft of hair from my head always made me escape as fast as I could.

During the incubation I whistled to the male (something I'd not done before) and he immediately whistled back and now continues to do this imitation whenever he gets close to me. This is the only "foreign" noise in his repertoire.

On April 16th, using someone to divert the birds' attention, I managed to get a prolonged look into the box. Unfortunately this aviary is exceptional because I have to get inside with the birds to see into the nest. To my surprise I found that a definite nest, that is a shaped cup made of strips of wood arranged with the long axis of each around the circumference, had been made to contain the clutch. The eggs started to hatch after 26 days of incubation. The chicks soon disappeared and the part-mutilated chick that I rescued from a pipping egg died despite my attempt to hand-rear it. The next clutch, this time of three eggs, was started on May 20th. Again after 26 days of incubation the eggs began to hatch. Because the first chick was missing on the second day, I took away the pipping egg and the other fertile egg was dented removing it. The chick which hatched I successfully hand-reared in that it has no 'hunger-traces' in the feathers, but by October 20th, that is at 18 weeks old, it still will not eat for itself. Not that it could not: for weeks now it has been able to crack open pine nuts, sunflower seeds and apple pips, yet it discards the kernels. I take it that this 'laziness' is a combination of a lack of parental example and my inability to "starve it into better ways". The parents are nesting again: the first egg was laid on September 29th and, because it will soon be winter, I shall take the eggs away and see if I can hand-rear these chicks.

One live chick from thirteen fertile eggs demonstrates the inefficiency of my Hawkhead breeding and why I have now decided to hand-rear the next few clutches.

From the widespread dates of laying—February, March, April, May, August and September it may be that Hawkheads, like many tropical parrots, are able to breed at any time of the year.

General observations

McLoughlin & Burton (1976) raise the question as to how the Hawkhead relates to other American parrots. The more my acquaintance with the parrots of this continent the less I believe that there are any great differences between the several genera: they differ in size, colour, length of tail but share, or overlap, in their general behaviour. Nevertheless I feel that the Hawkhead has far more behavioural similarity to the 'conures' and caiques than, say, the Amazon parrots.

The chick of the Hawkhead is like that of other American parrots. It has a sealed earhole for the first weeks of life. The down is thin, white and rather long and the upper mandible has a huge bulbous swelling at either side which finally disappears some months after weaning. The lower bill is

shorter than the upper one when adult but in the juvenile it is wider and longer with thickened rims. This huge "sugar scoop" makes hand-rearing so easy because the food can be almost poured directly into the mouth. The toes are zygodactyl on hatching and the very young chick moves about on all four limbs. Indeed it has to, for the legs are so very tiny and the wings much larger and better developed.

SPIX'S MACAW *Cyanopsitta spixii*

Digression

It is rather unusual for any bird to be coloured almost entirely blue; however it is well known in parrots for a simple mutation to arise that prevents the bird being able to synthesise yellow and red pigments, and this mutation converts what would otherwise have been a green parrot into a blue one. Blue mutations have been found in more than 30 species—including the Budgerigar, the Indian Ringneck, the Blue and Yellow Macaw and the curious case of the Kakapo *Strigops habroptilus*.

However there are eight, or possibly nine, species of naturally blue parrots. The three that occur in the Old World may well have been founded upon such a simple blue mutation: the Ultramarine *Vini ultramarina* and Tahitian Lory *V. peruviana* on first occupying their isolated islands were probably green like the, say, Blue-crowned Lory *V. australis* of the next island group; yet at some point a recessive blue mutation arose and, because of the inevitable high degree of inbreeding of small island forms, soon produced blue examples. The strangeness is why the blue form was at a selective advantage compared with the, originally, more numerous green (?) examples. Whatever the advantage of the blue over the green, it also seems to have applied on Rodrigues, in the Indian Ocean, where Newton's Parrakeet *Psittacula exsul* seems very much like a blue mutation of the Ring-necked Parrakeet *P. krameri*.

The five blue parrots of the New World, being larger in size and mainland species in direct competition with other species of parrot, do not seem to be simple blue mutations. For the Hyacinthine *Anodorhynchus hyacinthinus*, Glaucous *A. glauca* and Lear's Macaw *A. learii* have yellow skin on the face, near to the beak and around the eyes, that it seems they can still produce yellow pigments. The Blue and Yellow Macaw and the Caninde Macaw *A. canindae* (a most dubious species) have a yellow chest and belly: the blue mutation of the Blue and Yellow Macaw is white in these areas. Spix's Macaw has no yellow colour, save in the iris; but I have read somewhere in a back copy of the AVICULTURAL MAGAZINE that immature Spix's are speckled with green feathers.

Spix's Macaw is very rare nowadays in captivity. My own bird came from Portugal in February and has long been a captive. Apart from her (?), I know of a pair in Naples Zoo, one of which has laid eggs; the other bird was the property of Mr Alfredo Marques. It is said that President Tito of

Yugoslavia also has a pair. Unfortunately my bird was once tethered by its leg and the resulting fracture, from such a wicked practice, has left it a cripple. It shuffles along, using both legs and can hold food freely in a foot to eat. As my chances of obtaining another are nil I shall try to hybridise it with another species of small macaw.

Description

Spix's Macaw in body is about as large as a Hawk-headed Parrot. I have not weighed it but would guess it to be not more than 200 grams. The wings are very long and seem too large for the body; the tail is also very long. The overall colour is greyish-blue with a more bluish head and blue wings and tail. The bill, facial skin, feet and legs are black. The bill is not very large for a macaw, nor is the voice, for, although an extremely noisy bird, it does not produce harsh screams but crow-like *caa caas* and its contact call is an *ugh ugh squah squah*, which latter it does incessantly, blazing its eyes with each *squah*.

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To be continued

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THE BLACK-FACED GRASSQUIT

Tiaris bicolor

By ROBIN L. RESTALL (Caracas, Venezuela)

The genus *Tiaris* is well known in aviculture, thanks to two species. These are the Cuban Finch *T. canora* and the Olive Finch *T. olivacea*. Of these, the Cuban Finch is mainly a bird of memory and although it is well served in the literature, virtually the only source of supply of the species since the coming to power of Fidel Castro in Cuba during 1959 has been aviary-bred birds. It is the most colourful member of the genus, is comparatively easy to breed in confinement and was always in demand. In contrast, the Olive Finch appeared to be the dull cousin: dealers frequently advertised it as the Cuban Olive Finch, presumably in an effort to stimulate a demand among a clientele that was well read, but not too well read. This species never attracted the attention of the fancy very much and is consequently poorly served in the literature.

There are several other species of *Tiaris* distributed in what might be called broadly the Caribbean area, but the attention given to them by avicultural writers seems to be in direct relation to their colourfulness. Following this criterion, one would therefore expect the Black-faced Grassquit to be very poorly dealt with indeed, since it is one of the dullest of the genus, and this is, in fact, the case. My library is not the greatest in the world, neither is my memory, but I can find only two references to the species ever. The first of these is in AVICULTURE where it is mentioned by A. Decoux. I would like to repeat what that eminent French aviculturist wrote in full:-

“The last example of this genus—the Dusky Finch (*Phonipara bicolor*)—differs from the others by the absence of the black on the mask and throat. It is found in the Antilles, Venezuela and Colombia. There is a sub-species found in Jamaica, but many writers refuse to differentiate them from the type. This last is less handsome than the Cuba or Olive Finch; in an aviary their behaviour is the same.”

The characteristic specifically mentioned by Decoux as distinguishing the species from the others makes one wonder whether the bird(s) that he had were either all females or examples of another *Tiaris*. In fact, the only male *Tiaris* which would fit his description is *T. obscura*. The only other mentions in the literature are my own (1968, 1975). Since coming to live in Venezuela in 1974, I have had a fair amount of experience with the Black-faced Grassquit and the following notes are an effort to put an adequate comment on record for the benefit of any aviculturist fortunate to add the species to his collection.

Distribution and nomenclature

According to James Bond (1968), there are seven races of the species recognised; however, the only one which is widely distributed is *T.b. omissa*. This race has a range extending from Florida, where it is a rare vagrant, through the Bahamas and the Antilles to northern South America where it occurs in northern Venezuela and northern Colombia. The other races, assuming that they are still recognized as valid, are found each on outlying small islands, (e.g. *T.b. tortugensis* is restricted to the Venezuelan offshore island of La Tortuga).

Black-faced Grassquit is a perfectly satisfactory and adequate name, but Bond records the Bahama Black-faced Grassquit *T.b. bicolor* (1968) and the following for the West Indies (1974):— Parson Bird, Parson Sparrow, Sin Bird, Chitty Bird, Black Sparrow, Grass Bird, Straw Bird, Cane Sparrow, Tobacco Seed, Parakeet, Grass Quit, Chamorro Negro, Gorrión Negro, Juana Maruca, Barbitto (Cuba), Torneguín Prieto (Cuba), Petit des Herbes (pron. "ti-Zeb"), Ci-ci des Herbes (pron. "si-si-zeb"): French (1973) records Carib Grassquit. In Venezuela it is called Tordillo or Tordillo Común, Tordito or Tordillito. It should be noted by anyone travelling to the islands that local bird names, especially for the less distinguishable birds, are usually non-specific and may be applied more or less indiscriminately by the local populace. An example of this in Venezuela is that the names given to *T. bicolor* are also used equally for the Blue-black Grassquit *Volatinia jacarini*.

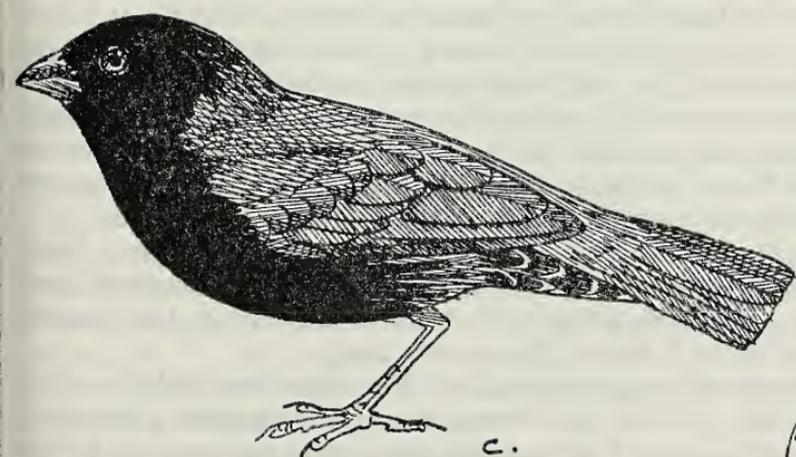
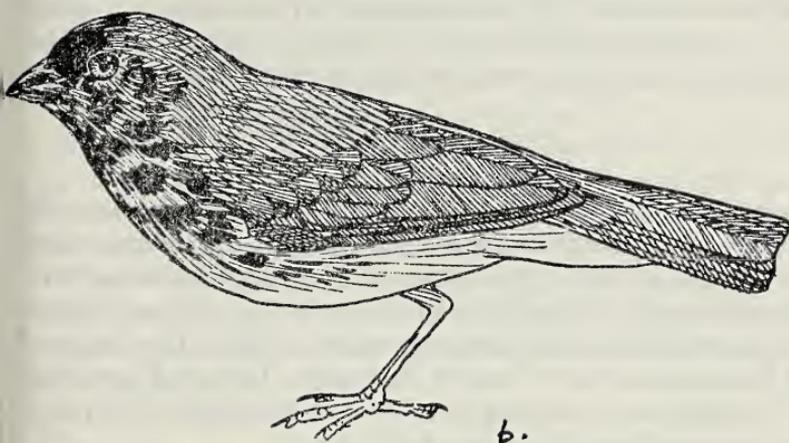
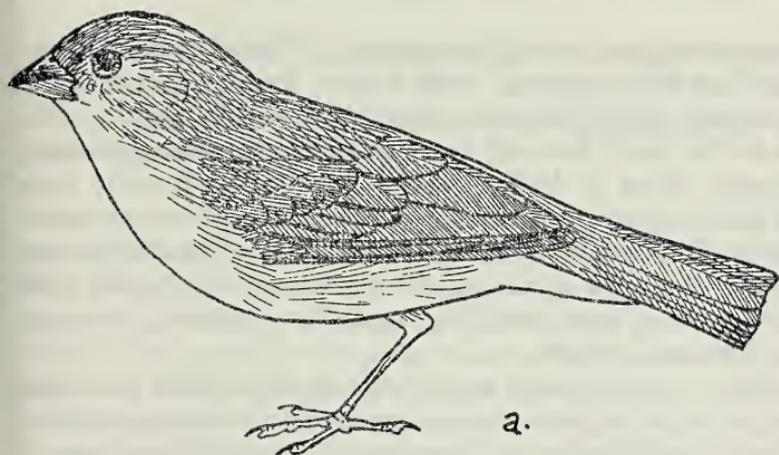
Habitat

It is naturally a bird of grassy scrub, but seems to be particularly fond of areas surrounding human settlements. The mixed growth of grass, weeds and shrubby open woodland and scrub that surrounds most human habitation in this part of the world suits this grassquit very well, and it is a common bird along roadsides and in gardens. Whenever well-wishing bird lovers establish regular feeding stations in their gardens, it quickly becomes the commonest bird in the vicinity apparently adapting (reducing) its territorial requirement to accommodate the food supply.

For several months from Easter 1975 onwards, then again for one month over Easter 1976, I systematically caught and ringed this bird in my garden. I estimated the local population at any given time to be around 25 birds in an area half the size of a football pitch (in the middle of which was a large apartment block). Birds of the year wander a great deal (unless stabilised by a bird feeder) showing a distinct preference for grassy areas.

Description (T.b. omissa)

Length 4.5. inches (10.8 cm.). Adult male: front of head, sides of neck, underparts from chin to flanks and belly jet black; ventral region greyish-olive; under tail-coverts black, edged cream; all upperparts olive green.



BLACK-FACED GRASSQUIT

- a Adult female
b Juvenile male at six months of age
c Adult male

There is no sheen or gloss to the plumage at all. The bill is black, irides sepia, legs and feet flesh coloured. Adult female: Entire upperparts dull olive green, usually slightly browner above but may be slightly more greyish than in the male; face and breast paler greyish-olive; remaining underparts paler, fading to buff on under tail-coverts. Juvenile birds resemble the female closely, but tend to be paler, slightly browner above and greyer below. The easiest way to separate immatures from adult females in my experience is by the condition of the plumage, for the old birds invariably show signs of wear, usually the tips of the tertiaries, the upper tail-coverts and around the lores.

At about three months, young males begin to show black feathering about the face and my illustration shows a typical male at about six months. The bill of both adult females and immatures is variable from horn to dark horn, blackish on the upper mandible, especially the culmen, and on the tip of the lower mandible. Bill colour cannot be relied upon as a sexing diagnostic, but in adult females it tends to be darker; also with young males showing black feathering. Very young birds invariably have the bill horn-coloured.

Nesting

Breeding in the Bahamas "begins in March and continues well into the summer". In Tobago, it seems to occur "from August to November and January". In Caracas and along the littoral of northern Venezuela, territorial activities and singing begin in earnest in March. By April most breeding territories are established and breeding begins in May. The height of the breeding season seems to be October–November, falling off rapidly in December. The males are not singing from December through to February. I once saw an immature being fed by an adult in April.

The nests that I have found have been oval in shape, about 8 to 10 inches long, with the entrance at one end forming a 3-inch long funnel; the height was about 6 inches. The outer structure has invariably been composed of straws and heavy coarse grass, with a few weed stalks: the inner chamber was lined with finer grasses. Bond (1968) records nests up to 20 feet above the ground, and French mentions up to 45 feet high. Normally, however, the nest is placed in the centre of a bush just a few feet above the ground.

Bond (1968) gives the clutch size from 2 to 5, with sets of 3 or 4 being most common. He gives the clutch size of *T. olivacea* as "usually 3", and *T. canora* as 2 to 3 in his guide to West Indian birds (1974), but does not give a clutch size for *T. bicolor*: French gives 2 or 3.

The few nests with eggs or young that I have found have had three. The eggs are whitish, speckled with brown, more heavily marked at the thick end. I do not have a record of incubation time, nor an accurate time for the nestling period. Tropical finches are notoriously precocious, however, and undoubtedly fledge in a shorter period than their European equivalents. One brood of *T. bicolor* that I studied fledged in 11 days; another was

disturbed by me and the nestlings left the nest, to survive, when they were probably 9 days.

Both sexes co-operate in the entire breeding cycle, building the nest, brooding and feeding the young.

Voice

The new fledgling utters a sibilant "zeet", very fine and difficult to locate. The adult, when aware of a danger to the fledglings, such as a cat or a clumsy bird watcher, will keep up a regular and persistent buzzing "bzit" during which time the fledglings remain utterly still and totally silent. In the absence of the parents' warning note, the fledgling will continue to call even though the intruder is present, unless unsettled by its close proximity, in my case about 4 feet. The call note is a weak "tsit". The song is variously described as "tik-seeëë, tik-tik-zeeëë," or "dik-zee zee zee". To get a better idea of the timing of these syllables, I prefer to write it as "dit, di-diddle didee-didee". The Caracas birds at least do not buzz their song but whistle it, and I am not alone in being able to do a passable imitation.

Young males frequently utter a contracted version of the song, more of a "dit, didee" or the "tik-zee ëë" of Bond. This shorter song is more warning-like in its function and may be uttered by males of all ages when approaching a truce territory such as a bird table. The full sweet song is normally uttered by a male advertising territorial rights.

When chasing away an intruder at full intensity, the song is repeated rapidly and acquires a more buzz-like quality; however, when a resident male is approaching a visitor with some uncertainty the song is clear, sweet and complete.

Behaviour

Black-faced Grassquits are somewhat gregarious, although the only flocks that I have seen have been few, small, and of immatures. They may usually be seen in pairs during most of the year. The flight is normally short and direct. During the breeding season, the male will exhibit variations on a display flight. In territorial display it will fly slowly with shallow wingbeats, wings fully extended and fluttering rapidly; the plumage will be slightly puffed, head down, tail fanned and held slightly down, the bird singing repeatedly. When confronted with the female of the pair the male will alight on a branch above its mate, and pursue it. Occasionally this develops into a chase but, as often as not, the male's attention may be likened to that of a male pigeon. On occasion, I have seen a parachute-like descent by the male ending with it landing almost on top of the female and attempting to copulate immediately.

When confronted with an encroaching male from an adjoining territory, the display posture changes in emphasis. The head is directed straight at the opponent, or slightly raised; the bill is wide open, displaying a bright reddish-pink interior; the plumage is puffed more and the tail raised. The



A male Black-faced Grassquit reaches out for a seeding head—



-and holds it with a foot while eating the seeds

full ritualized treatment is given to known neighbours; a low intensity version may be accorded to visiting females. Wandering young males are given short shrift and are seen off by a direct frontal assault accompanied by some song, but rarely full display.

I once watched a female Large-billed Seedfinch *Oryziborus angolensis* feeding on the lawn in front of the building when a male *T. bicolor* flew down upon it in the fluttering parachute descent. It sang at high intensity upon landing, then chased the other bird away. This is the only time that I have ever seen aggression to another species.

Food

Like other *Tiaris* species and most neo-tropical finches, this little bunting is primarily a seed-eater and when the grasses are in ripe seeding condition, there is no doubt that they form a major part of the diet. Black-faced Grassquits will climb up seeding grass stalks, pull another stalk within reach and hold it with the foot while the seed is eaten: they also feed a lot on the ground. However, it would be a mistake to regard these birds as being as dependent on seeds as most *Sporophila* species. I have often seen them working across the scrubby hillside only yards from my bedroom window, searching diligently beneath leaves, apparently for insects. Whilst I am sure that they do feed newly-hatched chicks with some insect food, there is no doubt that nestlings are given large quantities of vegetable matter. These grassquits will readily come to cut oranges that are placed out on a bird feeder, but will rarely sample banana. The day before writing this article I saw a pair feeding in a Cují tree, *Calliandra* sp. The male deliberately and carefully ate the centre parts of a flower; the female bit off a whole small leaf and, just like any saltator, ate all of it.

Treatment in aviculture

During the past two years, I have kept about 30 individual Black-faced Grassquits in cages for observations on diet preferences, behaviour, and for painting. It is certain that, as a species, this bird is a typical *Tiaris* which adapts very quickly and satisfactorily to conditions normally found in aviculture. I have kept individual birds in very small cages and groups of birds in medium and large cages. I have controlled their diet to the strictest regimens and given them wide varieties: in every case, they have responded well. Towards the end of the breeding season, they have shown a preference for plain canary seed but, just before the start of the breeding season, I found a marginal preference for small millets. On balance, I would recommend a mixture of 50 per cent traditional European canary mixture with 50 per cent mixed millets. Lettuce and orange are both appreciated very much, as is fresh seeding grass and seeding weeds; however, other fruits are not readily taken and I have never had a bird who would even sample soft food. Observations on bird feeders, however, have shown that they will readily eat broken rice and will sample bread and milk. Black-faced

Grassquits enjoy bathing and should be given a bowl of fresh water every day for this purpose.

I have placed freshly caught, fully adult males in individual cages in the birdroom and on the wall on the outside of the building. These birds have resumed singing and challenging other males that they hear within a day. On a couple of occasions, individual males have sung within a matter of hours. In contrast, when these birds have been placed in the large flight cage with other members of their own species, or in a mixed collection, they appear to be simply members of the group and the odd male who has been singing has done so only after a few weeks of settling down, and then sung only sporadically.

I have never seen any aggression by any individual under any circumstances in my cages, but I have no doubt that, were a pair breeding, or in facilities suitable for breeding and they begin a breeding cycle, the male would definitely be aggressive towards other male *Tiaris*. I can only suppose, and this is hunch rather than knowledge, that the aggressiveness of a male *T. bicolor* when breeding in confinement would be more like that of *T. olivacea* than *T. canora*, which is at times exceptionally aggressive.

Paul Schwarz kept a modest collection of mixed *Tiaris* and *Sporophila* species in a large flight cage at the Biological Research Station up in the hills, including both *T. bicolor* and *T. obscura* (this latter appears in de Schauensee as *Sporophila obscura*). This was at about 6,000 feet and he found that the *Sporophila* did not do very well at that height whereas the *Tiaris* appeared to cope, showing no discomfort. When all his birds were moved down to sea-level, they all thrived equally well.

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PESQUET'S PARROT *Psittrichas fulgidus*: SOME OBSERVATIONS

By S. F. DE JAGER (Bloemfontein, South Africa)

INTRODUCTION

Pesquet's is a strange looking parrot and does not seem to fit into any of the five groups of New Guinea's 45 species of parrot. My first impression was that they were very similar in their movements to the Chattering Lory *Lorius garrula*, for they twitch the body and flick the tail upwards while the head is thrown downwards and forwards. Also, like lories, the cock will take an extra hold of the perch with his bill and then turn himself upside down. The hen can then walk over his toes, along the perch, and once she has passed over him he will pull himself back to now stand on the other side of the hen. But as Goffin's Cockatoo *Cacatua sanguinea goffini* also has a most lory-like way of progressing, the similar movements of lories and Pesquet's Parrot may be coincidental.

If Pesquet's Parrot cannot be included with the 21 species of New Guinea lories (because it has a pig-like, smooth, pink tongue and not a brush-tipped one) it fits even more incongruously with the four pygmy parrots, the five fig parrots and the two cockatoos. It might have more affinity with the diverse 12 species of what von Boetticher calls the "coral-billed" parrots: the Eclectus, King, Crimson-wing, hanging parrot complex.

HOUSING AND FEEDING

In August 1974 I imported two pairs of Pesquet's or Vulturine Parrot: they came out of quarantine on September 2nd. One hen died shortly after this but the three prospered. Through the winter of 1975-76 they agreed well together. On most nights there was frost and twice the temperature fell to minus 8°C but rose well above zero by 9 a.m. and these winter days were always pleasantly warm.

When first obtained, the birds were fed like lorikeets: a mixture of "Farex", boiled rice, condensed milk and honey mixed with water to a thin consistency and given twice daily together with banana and apple. As Farex is not readily obtainable in South Africa, the diet was gradually changed to a mixture of $\frac{3}{4}$ pint of "Pronutro", one dessertspoonful of honey and the same of condensed milk mixed up in one and a half pints of water. They are also given two bananas and a large apple each afternoon. Once a week a teaspoonful of multivitamins is added to the mixture and paw-paw (papaya) given when in season: as yet they eat no green food.

Since an attempted breeding, I have started adding dog food to the mixture as an extra source of protein, and this new recipe is taken very readily.

The aviary is 30 x 6 x 6 feet with an open-fronted shelter at each narrow end. Six feet of the centre of the aviary is covered and in the shade of this

the food and water are placed. One long side is completely enclosed while the opposite side adjoins other aviaries and a passage. The Pesquet's Parrots love to bathe in a spray of water falling from a sprinkler in the top of the aviary.

BREEDING ATTEMPT

Three nest boxes were given: one was open topped and of wood, measuring 2 x 2 x 2 feet. The second was also of wood but had a large entrance hole near the top and a welded ladder inside: this was a foot taller. The one in which the parrots nested was a three foot long spindle-shaped "log" cut from an American aloe with a centre bulge about 20 inches in diameter while the ends were about nine inches: one of the ends was closed. The nesting chamber was cleaned out by the mother; the male did nothing to help, and the eggs lay on about two inches of litter chewed from the inside. The wooden nest boxes were badly damaged by chewing.

Initially both cocks would sometimes feed the hen: however by August it was obvious that a pair had been formed for the odd bird always kept his distance. There appeared to be no fighting as the males got on well together. The pair sat close but not often close enough to physically touch. Sometimes they would playfully fondle each other's beak; far less frequently each lightly preened the back of the other's neck. The cock was seen to stretch his neck and wave it underneath the body of the hen: the hen did this also but far less frequently.

The hen asked the cock to feed her by crouching on the perch with her head moving backwards and forwards while she gave soft begging calls, and the cock gave the same sounds as he approached to feed her. After courtship feeding, both sexes would clean their bills on the perch. On September 9th I first saw them pairing and this took place every day until the hen laid. Mating sometimes followed courtship feeding: the hen would solicit for mating by crouching low on the perch, as if she were begging to be fed, I cannot recollect her making a noise; her wings were also lifted away from the body. The male would make a soft noise as he mounted the hen to mate: sometimes he would change from one side to another and might dismount from the opposite side. However on the few times that he did change over and make a second attempt I am led to believe he changed his position because of an incorrect stance on the hen. Copulation did not take as long as with Australian broadtails, and when mounted, the male stretched his neck and held it alongside the hen's neck while he swayed his tail from side to side. When the tail dropped for pairing his neck arched and the head was held at the base of her neck: he did not move the head up and down rhythmically. They were very docile and peaceful with each other and neither sex was dominant. It was seen, however, that when the spare cock was put back into the aviary after the chick had died that the hen became so aggressive towards him that he had to be taken away within an hour; the cock of the pair was always perfectly amicable with the second male.

Between the time of first mating until September 21st, when the first egg was laid, food consumption dropped to about half of what it was previously. On this date the hen disappeared into her aloe-log nest in the late afternoon and stayed there until the late afternoon of the second day when I found that she had laid her first egg: she later returned to the nest, but did not brood overnight. The next morning she went back and then used to come out morning and evening to be fed by her mate. Neither bird roosted in the log at night except when the hen began brooding. The male never, at any point in the breeding cycle, took to sleeping inside the log with the hen; indeed he was noticeably reluctant to go into the nest to feed her, and usually he would call her to the entrance or persuade her to come out of the log. When he did enter it was always to reappear very quickly. While the hen was preparing the nest, prior to her laying, the cock sat on top of the aloe log making soft sounds and peeping into the nest hole.

The second egg, to complete the clutch, was laid on September 26th—four days later. The eggs measured 44.4 x 36.4 mm. and 44 x 34.6 mm. After 40 days of incubation the hen deserted and I found one egg to be infertile while the other contained a dead chick: the eggs went to the National Museum in Bloemfontein. On the morning of December 6th I found that the hen had laid again and, as before, the second followed four days later. This time incubation started with the first egg and one, it was not known which, hatched on January 6th. The other egg, which was infertile, went to the British Museum (Natural History), at Tring. After hatching, the mother sat closely and was aggressive: the chick was first seen when two days old; it had a yellowish-white down.

A chick hatched from a pair in Chester Zoo and that died at a day old, was examined by Mr. G. A. Smith of Peterborough, and he told me that Mr. Timmis, the curator, observed that the yellow of the down was completely lost once the chick was dipped in formalin preservative. The down was long but sparse, except at the base of the head. The down of the head was extremely wide so that if it had been clipped short it would have resembled the "bristly" down of *Eclectus* and Ring-necked Parrakeet chicks. The head, and particularly the bill, closely resembled that of a lory: the preserved chick is now at Tring.

At 13 days old the skin of the chick was darker and the yellowish down was gradually replaced by black down covering the entire body except that the head now grew pale yellow, bristle-like feathers that stood erect. The chick grew rapidly and was fed by both parents: when it was 25 days old the mother stopped brooding it by day, but continued to do so at night. At 40 days old the first few black feathers could be seen on the back and breast and feeding became less regular. By 60 days the front and the back were well covered with feathers but the chick was bare on the rump and vent. The colour pattern of red and black was like that of the adult: the red spot behind the eye showed it to be a male. It was very strong and could easily climb the 45° incline of the log to peer out of the entrance. By now, at 70

days, a red frontal band could be made out joining the two red spots of the head: this band is not seen in adult birds. At this age the hen had stopped brooding it at night. The weather remained warm and although the parents appeared to feed it only in the morning and evening, the chick always looked well fed. On April 2nd, when the chick was 87 days old, it was found thin and hungry on the floor of the aviary: it was artificially fed with Pro-nutro and placed on the top of the nest, but at 4 p.m. it was dead, possibly because something was lacking in the diet.

RAISING OF BLEEDING HEART DOVES

By CARL NAETHER (Encino, California)

For well over two years a pair of Luzon Bleeding Heart Doves *Gallicolumba luzonica* has been at home in a small, planted aviary, which it occupies all to itself. During this time, the female has laid approximately one set of eggs per month, most of which proved infertile. She would incubate the eggs for three or four days, then abandon them, with the cock taking no part whatever in the brooding.

Since I was very desirous of raising some young from this attractive, lively pair of doves, I resorted to using a pair of Ringneck Doves to serve as foster-parents. I am happy to report that, following many failures owing to infertility, a setting of the Bleeding Heart eggs proved fertile. Four weeks ago (I am writing these lines in the middle of August), the young squabs, tiny creatures, hatched to my great satisfaction, for it is many a year since I have had the good fortune to breed these beautiful and rare doves successfully. Since the Ringneck Doves were quite tame, I have had—and have now—ample opportunity to observe at very close range the growth and development of the young Bleeding Hearts. When first hatched, they were dark-brown in colour, almost black, both being about the same size. I gave their foster-parents generous amounts of hard-boiled egg, diced cheese, and protein-rich puppy biscuits finely ground, in addition to the usual seed mixture which all my foreign doves get and relish. The Ring-necks preferred the hard-boiled egg and the dog biscuits, and they do so to this day.

As I was determined to raise these precious squabs, if need be by hand, I checked on their being well cared for and well fed every single day, the tame Ringnecks being not at all disturbed by this frequent interference in their family affairs. The youngsters grew very rapidly, their usually well-filled crops no doubt contributing definitely to their general well-being and their remarkable development. At the age of ten days—I happened to be in their aviary at the moment—I saw one of the young doves fluttering from the nest box, which hangs four feet off the aviary floor, to a perch two feet above the floor on which one of its foster-parents was sitting, and landing

there safely. Its nest-mate did not venture from the nest until the following morning, when it dropped rather clumsily to the aviary floor. At this time the plumage of the youngsters was a deep reddish-brown, their wing bars already showing in somewhat lighter brown.

Since Bleeding Hearts are classified as ground dwellers, and since Ringneck Doves are not accustomed to feeding their offspring on the ground, I was fearful that if the little squabs would stay on the aviary floor most of the time, perhaps hiding in the available bushy shrubbery, their foster elders would not seek them out to feed them. However, my fears proved unfounded! From the very beginning, the baby Bleeding Hearts showed themselves to be rather adept, though still somewhat clumsy, flyers. They did not remain on the aviary floor at all, but perched well above it, usually beside one or the other foster-parent. Not having seen me before, they were shy and flew vigorously against the quarter-inch aviary netting whenever I came into their abode. They did this, even when sitting beside their foster-parents, which, being thoroughly tame, tolerated my presence quietly and did not leave their perch. A few days later, on my going into the aviary again and finding the young again sitting close beside a foster-parent, they stayed with it, as if having "learned" meanwhile that my presence presented no danger to them.

I have been delighted to see the young Bleeding Hearts grow larger and stronger with almost every day of their young life. At two weeks of age they were eating the soft food which their foster-parents like so much. With keen anticipation I have been watching the gradual change-over from the juvenal to the adult plumage, which today, when the youngsters are four weeks old, is still very much proceeding, though very gradually. The principal change in plumage coloration is developing on the light-brown breast of the young pair, where a narrow strip of grey is both widening and whitening, now covering three-fourths of this area, having begun in the middle of the breast. And now the first faint signs of the "bleeding heart" are visible—a small, pinkish round spot in the midst of greyish-white feathers: the abdomen is a brownish-grey and the feathers of the nape are a shimmering green.

In other respects these young doves, being now independent and living in an aviary of their own, are more than half the size of their parents, and that at only four weeks of age! Their instinctive shyness reasserts itself when I approach them in their aviary, but I hope that in time they will adjust more and more quietly to my presence when I attend to their wants—and hopefully become dependable breeders. I shall report again when their first breeding activities begin, thus continuing my fairly close scrutiny of their behaviour.

THE PROBLEMS OF BREEDING SMALL NECTAR-FEEDING BIRDS

By RICHARD MARK MARTIN (Padstow, Cornwall)

The breeding of even large softbills is difficult enough, but it seems that the smaller they become, the greater are the problems. This may not be a particularly clever remark but the difficulties were brought home to me in no uncertain manner on the occasion of a brief return visit to the Tropical Bird Gardens at Padstow in 1976. At the time I was involved in three successive breeding attempts of a pair of Tacazze Sunbirds *Nectarinia tacazze*—which have survived in fine condition in the tropical house (see AVICULTURAL MAGAZINE 79:3, 89-93) since their arrival from Kenya in 1972.

In many ways these sunbirds have behaved predictably. After a seemingly statutory settling-in period of three years, they began to show interest in nest-building, and in 1975 actually built (eventually abandoning) a huge formless structure which was suspended by strands of *Ipomaea* (morning glory) some seven feet above a small waterfall.

Then in the spring of 1976, they began to court and to build again in the same position. This time they seemed to know exactly what to do, having perhaps learnt from the earlier failure but possibly also due to a wider selection of building materials. We placed in the flight many kinds of grasses, moss, coconut fibre, wood straw, shredded paper, sheep's wool etc. The strongest and most pliable materials were selected, together with a liberal amount of hairs from our dog, and a perfectly formed nest was quickly built. The female did most of the work with the male looking on in apparent bewilderment.

It was very noticeable that the sound or presence of running water initially stimulated the birds, and I venture to suggest that its provision might prove to be an extremely important element in the procreative management of some species at least. The pump which activates the water flow through the pools and down the falls is little used during the winter months, mainly for reasons of economy, but with it switched on every day from early spring the sunbirds showed great excitement. Assuming that breeding in the wild occurs following the rainy season when the rivers are in flux, it is highly likely that, with the nest built to resemble flood debris, and achieving added protection and humidity from being directly above water, the birds are conditioned to associating breeding with water movement.

Once the nest had been completed, by the end of March, it was lined with a prodigious amount of feathers which the female sought for herself (doves are extremely useful and generous in this respect) but which we added to whenever the supply seemed to be running short. Again the male took only minimal interest in anything other than the female.

The following extracts taken from our log-book (with additional com-

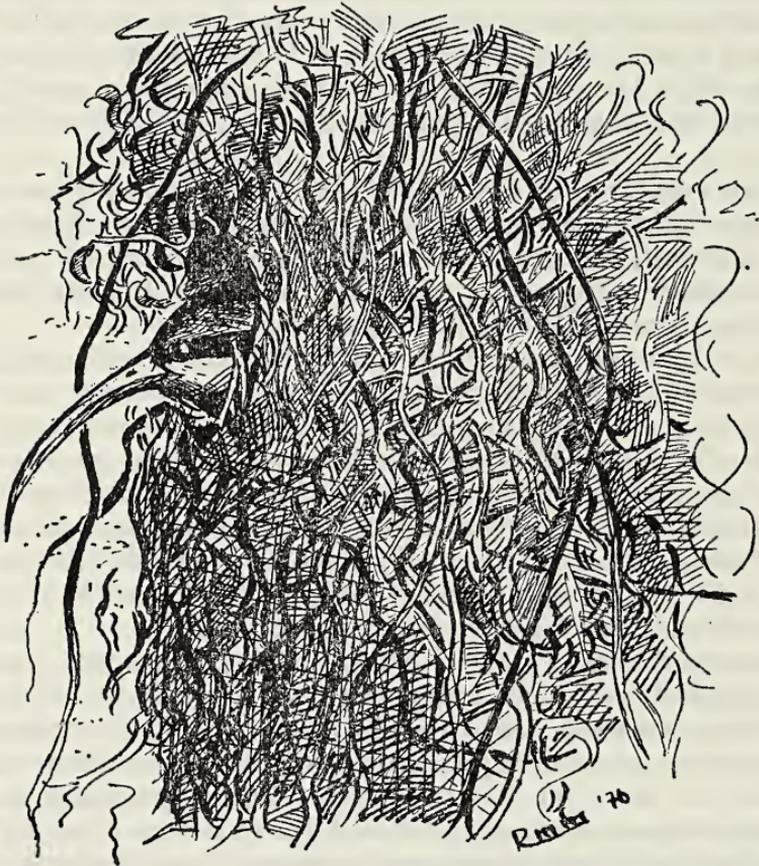
ments) give some idea of the chain of events.

April 1st: Nest perfectly formed.

2nd: Female inside nest; male visited. Both acting unusually quiet. Later in day female lining nest with feathers.

12th: Female sitting a lot. When disturbed left nest and fed. Male keeps a low profile in shrub nearby but occasionally chitters to himself.

(This was probably the first day of incubation)



Female Tacazze Sunbird incubating

18th: When the female left nest the male displayed by crouching, stretching, chittering, arching neck and half-spreading and quivering wings. Female responded by crouching in typical pre-copulatory position. Male approached by sidling quickly along twig, arching neck and stretching up and down—quivering half spread wings constantly. A much more subdued and meaningful display than hitherto witnessed.

19th: Female shuffled on to nest as if on eggs. Not at all bothered by

human disturbance very nearby (Bank Holiday Monday, and the nest was within a stick's reach from the public viewing area). *Incubation pattern seems to be alternating periods of about ten minutes on and off the nest. Female seen to thoroughly bathe, male bathing a lot.* (As a precaution, one of us remained in the house all day).

23rd: *For the first time the female stayed on the nest throughout cleaning* (in the morning). *Not seen off all morning and only twice in the afternoon.* (Cleaning of the Tropical House takes about an hour; invariably on my entry the female would be on the nest, her head protruding from the entrance in her favourite attitude. She soon left the nest but had always returned by the time I had finished).

24th: *Spiders put in* (in a steep-sided dish)—*inspected—one bashed and taken up to nest.* (This type of sunbird rearing food was introduced so as to familiarise the adults with it).

27th: *Inspection 0900 hrs. Found at least one chick* (*pecked my finger*). *Found half the eggshell which had been deposited some distance from the nest. Female catching fruit-flies from wing and perch. Male chivvying, Still ignoring spiders.* (The coloration of the egg was of dark brown blotches on a dull blue ground merging at the larger end [as is usual] to overall shades of grey/brown).

28th: *Found other half of eggshell when looking for faecal sac which the female was seen to lean in and take from nest after having fed young from outside. Carried to and dropped at same place as earlier eggshell find.*

Took c50 spiders (fed *ad lib.*).

29th: *Took c55 spiders* (fed *ad lib.*).

30th: *Male took one spider, female took nine, one after another; she visited nest but did not feed. Both bathed—male stimulating female to do so—both preened, female then visited nest and settled down.* 1400 hrs *Eating and visiting nest less.*

1535 hrs *Nest empty; female taking up feathers again.* (The whole episode had lasted a month).

May 10th: *Back on nest. Sitting much of the day.* (First egg of second clutch laid today).

11th: *Observed mating* (for the very first time), *more like rape! Female flew down to the ground with the male on top of her, consummated at ground level with the female shrieking constantly. Female on nest thirty minutes later after inspection had revealed one egg.*

25th: *Suspect hatching—judging by adults' behaviour.*

26th: *Feeding young. Tried 'hopper' locusts instead of spiders but ignored. This attempt, trying full nectar diet for full 24 hours instead of replacing in evening with sugar water.* (The nectar referred to consists of Complian or Boots Vitafood, approxi-

mately half as much Farlene, a tiny amount of Virol and diluted honey or invert sugar. Amounts and even ingredients are varied occasionally so that the diet never becomes boring, and, of course, in a well planted tropical house the birds have access to a wide variety of natural nectar and pollen).

27th : *Early morning found nest to have swivelled due to rotten supporting strand of morning glory. Re-hung with wire, adults scolded, heard chicks inside, inspection revealed two. Female not put off by activity.*

29th : *Nest found to be empty again in early morning, Day 4, as last time. In afternoon female again took feathers up. (NB. No spiders were offered on this occasion).*

June 6th : *On nest again—one egg.*

21st : *Hatched, one eggshell found in pool.*

24th : *Young vanished again. Adults seen mating.*

25th : *Back on nest again.*

After considering various possibilities, we are now beginning to think that the male sunbird is the most likely culprit, although we have never found one of the chicks. A Woodland Kingfisher *Halcyon senegalensis* was once suspected but has now been cleared as there is no way in which it could remove the chicks from the nest without wrecking the whole frail structure: also whenever it ventures too close, the sunbirds scold loudly and have even been seen to chase it off. Of course it is possible that this kingfisher consumed any chick, living or dead, thrown from the nest by the parents.

Such are the problems, then, of prospective breeders of this kind of bird, and such are the problems which have to be solved if we are to go on keeping them with a clear conscience.

* * *

PREDATORY BEHAVIOUR OF APLOMADO FALCONS IN CAPTIVITY

By JOHN C. SNELLING (Oklahoma City Zoo) and
BETH E. LEUCK (University of Oklahoma)

Very little is known about the Aplomado Falcon *Falco femoralis* aside from mostly anecdotal information (Bent 1938, Brown and Amadon 1968, Johnson 1965). Basically a Neotropical species, this small raptor ranges into the south-western United States, but is now extremely rare there. Some information on the predatory behaviour of captive Aplomado Falcons is presented here, in the hope that it will increase our knowledge of a little known species. Since 1972 the Oklahoma City Zoo has displayed three Aplomado Falcons. Two birds (one female, one sex unknown) were obtained from an animal dealer in Oklahoma in February 1972; they were probably of South American origin. A male was obtained on breeding loan from the Arizona-Sonora Desert Museum in April 1974, having come originally from an animal dealer in Florida; it too is likely to be a South American bird. In September 1974 one of the original birds apparently escaped from the cage.

The falcons occupy a large outdoor flight cage, designed to exhibit fauna and flora of the Patagonian region of South America. The cage, through which visitors may walk, occupies about 0.26 ha. and is 61.0 by 43.0 m. varying from 8.5 to 21.0 m. high. The superstructure consists of metal support poles, steel cable, and 5.0 by 5.0 cm. welded wire mesh. The outside of a building forms part of the south-west wall, and a gunitite (sprayed concrete) artificial mountain extends along half the length of the exhibit. The entire area is heavily planted, and there are numerous pools, streams and waterfalls throughout.

The species composition and number of animals in the exhibit vary seasonally, but usually about 75 specimens are in residence. Rodents are the chief mammals, and birds of ten orders are represented. In the summer iguanid lizards and land tortoises are also in evidence. Because of easy access and abundance of food, Norway Rats *Rattus norvegicus* and House Mice *Mus musculus* are common pests: in addition, wild birds such as House Sparrows *Passer domesticus*, Starlings *Sturnus vulgaris*, Cardinals *Cardinalis cardinalis* and Blue Jays *Cyanocitta cristata* also frequent the area at will.

The diet supplied to raptors in the exhibit consists of day-old cockerels (killed and frozen), a commercial birds of prey diet and chicken parts (mostly necks) fed once daily. The Aplomado Falcons seem to prefer the day-old chicks.

From December 1972 to January 1975 the falcons were observed on 12 occasions eating avian prey that they had probably captured alive. Three

Starlings were eaten by the male, four Starlings and one House Sparrow by a female, and three Starlings and a House Sparrow were eaten by the falcon of undetermined sex. We are confident that a large proportion of these observations followed actual predation, for on two occasions a female Aplomado Falcon was observed catching and killing Starlings. In both instances the prey was perched on the wire mesh in the north-west quarter of the exhibit when the falcon grabbed and pulled it inside. At the point of capture the mesh was vertical, and the area shaded by trees. Starlings rest momentarily in this area when entering or leaving the cage, using the horizontal wire strands for perches. The falcon seemed to dive onto the wire, and in one instance she killed the Starling before separating it from the wire mesh. On both occasions, she took the prey elsewhere before starting her meal.

Because of their size in relation to the area of the exhibit, the Aplomado Falcons are able to fly around the area almost without interruption; flights of five minutes' duration or more are not uncommon. The birds often cling to the wire, especially at the upper corners. In light of the observed prey captures, this active behaviour would seem to be a part of hunting rather than escape; apparently the falcons have learned that Starlings perched on the wire mesh are vulnerable. On one occasion unsuccessful attempted predation of a Starling followed the same pattern as the successful kills. Once, while perched in a dead tree, the male initiated pursuit of a Starling as it flew past. Arriving at the wire mesh about 0.5 m. before the falcon, the Starling made good its escape. In four instances, the female falcon was seen chasing a Starling in flight through the exhibit, the prey emitting alarm calls. Once, while perched, the female was observed intently watching House Sparrows in the bush beneath her; she dived into the bush, but failed to make a kill. This hunting method may correspond with two instances when the male was seen on the ground, underneath bushes, with a freshly killed Starling.

Ten of the wild kills occurred in the period November through February. This is the time when cold winter weather might stimulate a caged predator, fed only once a day, to hunt on its own; furthermore, the deciduous vegetation of the exhibit is leafless during these months, rendering prey more vulnerable. A wooden ledge about half way up the south-east wall of the exhibit was littered with Starling remains in December and apparently the Aplomado Falcons use this area as a food cache.

Bent (1938), and Brown and Amadon (1968) state that the Aplomado Falcon takes a wide range of prey in the wild, including insects, reptiles, birds and mammals. A summary of their remarks follows. Like many insectivorous birds, it utilizes grass fires as hunting sites. It hovers, on occasion, like the American Kestrel *Falco sparverius*. Pairs have been seen hunting co-operatively, especially for avian prey. Also while hunting birds, stealthy tactics like those of the accipiters and direct pursuit like that of other bird-oriented falcons (*Falco columbarius*, *F. peregrinus*, and *F.*

mexicanus) have been seen in the wild; both of these hunting methods are described here for the zoo environment.

Of apparent differences in hunting behaviour, D. Amadon (pers. comm.) reports "Two in immature plumage that I saw in Mexico were rather languidly making sallies from the top of a dead tree after insects. On the other hand, we saw three ripping down a dry wash in Argentina at a tremendous clip."

In the wild, prey the size of Rock Doves *Columba livia* (Brown and Amadon 1968) and tinamous (Johnson 1965) has been recorded, underscoring the Aplomado Falcon's ability to kill relatively large birds; Rock Doves outweigh even the largest female Aplomado Falcons. Our observations indicate that neither sex has difficulty in handling Starlings. A male falcon of 235 g. (Brown and Amadon 1968) which carries an 84 g. Starling (Roberts 1955) up to a perch from the ground, lifts 35 per cent of its body weight.

Our 12 observations do not show sexual differences in prey selectivity as seen in some raptors (Storer 1966). The male caught Starlings exclusively, and the female took Starlings with the exception of a single House Sparrow. However, we cannot be certain that some prey items were not presented to the female in courtship feeding; small bits of a day-old chick were transferred this way on January 7th 1975, a good indication that the birds are indeed a pair. This was the only courtship behaviour seen, and there have been no nesting activities recorded.

Many caged creatures are somewhat less than in harmony with their environment because of a number of sub-optimum factors, namely, lack of adequate space, appropriate food, and potential mates. The trend toward large, often mixed species exhibits, and enlightened husbandry practices has made it possible for zoo animals to be more comfortable in confinement, and perhaps to show more significant behaviour patterns. We believe that the Aplomado Falcons described here exhibit a unique compatibility with cage life, rarely described before.

ACKNOWLEDGEMENTS

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BOTULISM IN CAPTIVE BIRDS

By GEORGE A SMITH (Peterborough)

Before 1974, botulism was infrequently reported as killing wild, or captive, birds in Britain. The exceptionally dry and hot summers of the past two years changed this situation and botulism which, I suppose, is best described as a "food poisoning" has now become a very serious problem in European aviculture. In consequence the Editor has asked me to contribute this short article.

Many of the 'saprophytes', that is the fungi and bacteria which feed upon dead animals and plants and cause them to decay, secrete powerful toxins which serve to prevent other saprophytes from growing and competing with them for food. Not surprisingly some of these 'toxins', when isolated, have proved to be of quite exceptional importance in medicine; for when they are given to an animal (people are animals) suffering from some bacterial or fungal disease, they can kill off, or weaken, the organisms producing the disease. Well known examples of such useful saprophytic 'toxins' are the drugs penicillin and streptomycin; and such 'useful' phytotoxins are universally referred to as 'antibiotics'.

But there are other bacteria which secrete toxins that are extraordinarily poisonous to most other higher forms of life. For example; a small number of tetanus bacteria growing in an otherwise insignificant, although dirt-containing, wound can easily produce sufficient toxin to kill the host with "lock jaw". And, before the days of antibiotics and vaccination, a colony of other bacterial species growing within the throat used annually to kill hundreds of people with diphtheria and scarlet fever.

In 1896 a bacteriologist proved that the several people who had died of a rapid paralysis, following a village festival, were the victims of a toxin produced by the bacterium *Clostridium botulinum* which had contaminated a ham. Botulism, because the organism requires special circumstances in which to grow, has never been a particularly common disease. In parts of South Africa cattle which graze pasture that is deficient in the minerals necessary to form bone, actively search out and eat the bones of dead animals, and if the carcass has been polluted with *Cl. botulinum* the cattle die of botulism. Dead tortoises are responsible in parts of Africa for botulism in sheep on mineral-deficient pastures.

The 'type C' botulism, which affects birds, is well known in waterfowl. Outbreaks usually happen in warm weather, either after a persistent drought has severely reduced the surface areas of ponds and lakes or when flooding has submerged land vegetation. In such warm conditions the amount of oxygen dissolved in the water is minimal and *Cl. botulinum* is said to grow in the decaying vegetation. However, as warm water with very little oxygen dissolved in it kills fish and most other forms of water life, it may be that the *botulinum* bacteria flourish in the dead water animals. If

this is so, then the waterfowl become poisoned by consuming the invertebrates, such as blow-fly maggots, that have grown on this putrescent flesh. Certain experimental evidence, from the field, appears to support this hypothesis.

Cases of botulism in broiler chicks are often very difficult to explain (Roberts *et al.* 1973), unless it is that the birds have acquired their fatal dosages from eating the floor litter. My constant finding of fly-maggots in the similarly nitrogen-rich litter of damp nest boxes, when the weather is warm, causes me to query whether similar maggots might be bred in the litter of broiler sheds and that these are eaten by the birds and so cause the botulism?

Maggots are very important as a source of botulism in pheasants and caged birds and two recent cases emphasise this. On the Norfolk Broads summer botulism has occurred in wild birds almost annually since 1969 with particularly serious outbreaks in 1975 and 1976. Botulism had not been previously diagnosed in reared pheasants in this country: which is surprising, as it frequently kills pheasants in the United States. However, on a game farm but a few miles from the broads, there was a most severe outbreak in July of 1976 in which 1,050 (that is 84 per cent) of 1,250 eight and nine week-old poults died in a single fortnight. The veterinary investigator, Edith Borland (1976) suggested that the main factor precipitating this catastrophe was the persistent hot dry weather that started in early June. And any dead animal, or bird, in the pheasant release pens, would have soon become fly-blown, then maggotty, and pheasants are avid eaters of maggots. Mrs Borland remarked that pheasants show a tendency to cannibalise dead or ailing birds and that this also might have aided the spread of botulism and explain the rather explosive nature of this outbreak.

Most losses with aviculturists have been caused by feeding maggots contaminated with the *botulinus* toxin and, very likely, the responsible bacterium. It is generally held that the preformed toxin is the sole source of the intoxication and that no further toxin is elaborated after ingestion. In the nature of things many cases have never been reported: certainly in 1975 and 1976 I had several people telephone to ask what might have so suddenly killed a large part of their collections. No material has been received, but circumstantial evidence strongly supports my belief that many of these losses were due to botulism. Diagnosis cannot be done on a *post-mortem* examination as there are no *post-mortem* changes attributable to botulism; however bacterial culture and the use of mice or guinea pigs, which are very sensitive to *botulinus* toxin, will confirm.

Maggots delivered on the afternoon of Friday, December 20th, 1974, from a commercial breeder, were fed to about 250 birds that evening in the collection of the Zoological Society of London (Smith *et al.* 1975). Several birds were ill the following morning and during the course of the day 14 died. Maggot feeding was immediately stopped but on the 22nd seven further birds died and the loss continued for a further four days until

the final death toll was 37. The majority of the affected birds were passerines, but turacos, a toucan, a pigeon and a hornbill were included. The dealer had supplied three further bird collections from the same batch of maggots, and these also had a high loss, but reptiles and amphibia were unaffected. It was thought that the most likely origin of the toxin was poultry offal upon which the maggots were raised.

Diagnosis can only be confirmed by laboratory tests. Edith Borland (*loc. cit.*) said of the affected pheasants that they sat around with the wings drooping and in a hunched position. Some showed an intermittent flaccid paralysis of the head and neck. When approached, most affected birds could rise and run away a few feet before collapsing, but this exertion exacerbated the paralysis. Ailing pheasants that were still able to get up and run away became completely paralysed and died within half an hour of being seen.

In the London Zoo outbreak, the affected birds showed a characteristic statuesque behaviour. Some individuals stood motionless for over an hour despite the activity of the other birds, and the hospital staff, around them. All affected birds refused to eat for at least 24 hours: the iris was paralysed and the limbs to varying extents ranging from a single dropped wing to a complete paralysis of both legs. Death in these cases, as is typical, probably came because of an obvious difficulty in breathing, due to a paralysis of the respiratory muscles. In waterfowl the neck becomes paralysed as one of the most obvious of the effects of the toxin—hence the alternative name of “limberneck”.

Prevention, for unless the birds are not fatally intoxicated all treatments seem ineffective, is the only means of keeping this disease away from one's collection. Primarily all dead animals and birds should be removed before they have had time to become fly-blown or eaten by the other birds. The pond water for ducks and geese ought to be aerated by recycling through a pump, if a through-flow from a natural stream is not possible. Anyone who feeds maggots risks the possibility of botulism. Maggots are best ‘cleaned’ before being fed by allowing them to burrow into bran, sawdust or, if one wants ‘extras’, in Farex or other vitamin/mineral/cereal mixtures. This may remove much of the *botulinus* toxin. If possible it might be wise to adopt the practice of ancient Kings and first feed some of each batch to a ‘less valuable’ individual before giving them to the general collection. The only treatment is force-feeding, but whether it is advisable to handle birds in such a precarious state of nervous paralysis is debatable, unless the birds are very tame.

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NEWS FROM THE BERLIN ZOO

(January—September 1976)

By HEINZ-GEORG KLÖS (Scientific Director)

Birds hatched:

Thirteen Emus *Dromaius novaehollandiae*, five Rheas *Rhea americana* (one white), one Swan Goose *Anser cygnoides*, two Snow Geese *Anser coerulescens*, six Pacific Brent Geese *Branta bernicla orientalis*, 14 Hawaiian Geese *Branta sandvicensis*, 2 Egyptian Geese *Alopochen aegyptiacus*, two Ruddy Shelduck *Tadorna ferruginea*, two Red-crested Pochards *Netta rufina*, 16 Tufted Duck *Aythya fuligula*, 20 Mandarin Duck *Aix galericulata*, ten Carolina Duck *Aix sponsa*, over 200 Mallard *Anas platyrhynchos*, five Greater or European Flamingos *Phoenicopterus ruber roseus*, nine Chilean Flamingos *Phoenicopterus ruber chilensis*, two Andean Flamingos *Phoenicoparrus andinus*, one Black-headed Ibis *Threskiornis melanocephala*, two East African Crowned Cranes *Balearica pavonina gibbericeps*, three Silver Gulls *Larus novaehollandiae*, two Argus Pheasants *Argusianus argus*, 11 Silver Pheasants *Gennaues nyctemerus*, three Swinhoe's Pheasants *Hierophasis swinhoii*, 17 Common Pheasants *Phasianus colchicus*, one Kea *Nestor notabilis*, one Derbyan Parrakeet *Psittacula derbyana*, one Iris Lorikeet *Trichoglossus (Psitteuteles) iris*, two Peach-faced Lovebirds *Agapornis roseicollis*, two Grey-breasted (Quaker) Parrakeets *Myiopsitta monachus*, three Black-headed Conures *Nandayus nenday*, one Crowned Pigeon *Goura cristata*, four Pink-necked Green Pigeons *Treron vernans*, two Olive Pigeons *Columba arquatrix*, two Laughing Doves *Streptopelia senegalensis*, two Crested Quail Doves *Geotrygon versicolor*, two Great Eagle Owls *Bubo bubo*, three Snowy Owls *Nyctea scandiaca*, one Boobook Owl *Ninox novaeseelandiae*, two Laughing Kingfishers *Dacelo novaeguineae (gigas)* two Fairy Bluebirds *Irena puella*, two Cardinals *Cardinalis cardinalis*, one Hill Mynah *Gracula religiosa intermedia*.

New arrivals:

Two Trumpeter Swans *Cygnus c. buccinator*, one Blue-winged Goose *Cyanochen cyanopterus*, one Andean Goose *Chloephaga melanoptera*, two Philippine Ducks *Anas luzonica*, two Gadwall *Anas strepera*, seven Wigeon *Anas penelope*, eight American Wigeon *Anas americana*, two Chestnut-breasted Teal *Anas castanea*, two Cinnamon Teal *Anas cyanoptera*, two Bahama Pintail *Anas bahamensis*, two White-eyes *Aythya nyroca*, four Eider Ducks *Somateria mollissima*, one Marsh Harrier *Circus aeruginosus*, one Black Stork *Ciconia nigra*, three Marabou Storks *Leptoptilos crumeniferus*, two African Jacanas *Actophilornis africanus*, two Stanley Cranes *Anthropoides paradisea*, four East African Crowned Cranes, two Impeyan Monals *Lophophorus impeyanus*, two Red-crested Wood Partridges *Rollulus roulroul*, one Peafowl *Pavo cristatus*, one Moluccan Cockatoo *Kakatoe moluccanus*, one Banded Parrakeet *Psittacula alexandri fasciata*,

one Mealy Parrot *Amazona farinosa*, one Yellow-headed Parrot *Amazona ochrocephala oratrix*, two Scops Owls *Otus scops*, two Woodland Kingfishers *Halcyon senegalensis*, three White-fronted Bee-eaters *Melittophagus bullockoides*, two Blue-headed Hummingbirds, three Violet-eared Hummingbirds *Colibri coruscans*, two Rufous-tailed Hummingbirds *Amazilia tzacatl*, two Greater Pearl-spotted Barbets *Trachyphonus erythrocephalus*, one Keel-billed Toucan *Ramphastos sulfuratus*, two Crimson-rumped Toucanets *Aulacorhynchus haematopygus*, ten White-headed Buffalo Weavers *Dinemellia dinemelli*, 15 Orange Weavers *Euplectes orix*, two Spectacled Weavers *Ploceus ocularis*, two Golden Tanagers *Tangara arthus*, two Blue-grey Tanagers *Thraupis episcopus*, two Striated Tanagers *Thraupis bonariensis*, two Wattled Starlings *Creatophora cinerea*, one Purple Glossy Starling *Lamprotornis purpureus*, two Bali (Rothschild's) Grackles *Leucopsar rothschildi*, six Papuan Grackles *Mino dumonti*, two Hunting Crows *Cissa chinensis*, one Jackdaw *Corvus monedula*.

BREEDING OF ANDEAN FLAMINGOS

In 1974 our group of Andean Flamingos *Phoenicoparrus andinus*, living with six James's Flamingos *Phoenicoparrus jamesi*, built three mud nests, and one egg was laid in June, but it was infertile. Even so the fact that the birds had started nesting raised our hopes for breeding success in the following year. In June 1975 two eggs were laid, one of them fertile and after 31 days, on July 16th a chick hatched. It had a pink beak and legs, unlike the known chicks of other species, but this colour changed to black after ten days. During the first fortnight the chick did not leave the nest but after that it followed its parents. Although this chick grew quickly during the first weeks, it suddenly became weak and refused food, so it was artificially fed, but without success and on September 4th it died from a degeneration of the liver.

Despite this failure, this partial success was important because the chick was only the fourth to have been hatched in captivity, three having been hatched at the Wildfowl Trust, Slimbridge, in 1962 and 1969, two of them being successfully reared.

In 1976 the Andean Flamingos laid three eggs on June 5th, 15th and 16th. The last one was broken and after 29 days, on July 4th and 14th, two chicks hatched. The younger one died from pneumonia on August 3rd; the other is still alive (mid-October) and in excellent condition. The main factor in this breeding success is the special diet given to the birds, both Andean and James's Flamingos. It consists of a mixture of special poultry meal, corn meal, pulverised lucerne and algae, wheat meal, coarsely ground shrimps, cornflakes, soaked white bread, red "pepper" powder, a gruel made from oatmeal and rice flour, vitamins, Vitakalk and milk powder.

SUPPORT FOR THE WORLD WILDLIFE FUND IN GERMANY

For many years the Berlin zoo has supported the German section of the World Wildlife Fund. In Germany we still have some places of unspoilt habitat such as the fens in the northern part of the country and areas around the big lakes in the south. Only there can one see such birds as Black Storks *Ciconia nigra*, Sandwich Terns *Sterna sandvicensis*, Marsh Harriers *Circus aeruginosus*, Montagu's Harriers *Circus pygargus*, Black Grouse *Lyrurus tetrix*, Corncrakes *Crex crex*, Golden Plovers *Pluvialis apricaria*, Black-tailed Godwits, *Limosa limosa*, Curlews *Numenius arquata*, Short-eared Owls *Asio flammeus*, Nightjars *Caprimulgus europaeus*, Great Grey Shrikes *Lanius excubitor*, Red-backed Shrikes *Lanius collurio*, etc. All these species are still breeding there, but their habitat is threatened by cultivation and therefore the W.W.F. tries to buy these areas. The Berlin Zoo is contributing to most of these projects and has already given DM 85000 during recent years to save the threatened regions.

A very interesting project supported by the Berlin Zoo is the breeding of Peregrine Falcons in captivity. The first to start such a project was the ornithological staff at Cornell, Ithaca, New York, where since 1973, 68 birds have been reared and 16 of them set free in eastern parts of the United States where the species had become extinct and where now 12 of the released birds are reported as settled.

A similar project was started in West Germany where the wild population of Peregrine Falcons is only a matter of dozens and in West Berlin an institution is already very successful in breeding them. With the financial support of our Zoo visitors, new aviaries can be built so that this project can be accelerated. Soon the first of the captive bred falcons can be set free.

* * *

REVIEW

MYNAH BIRDS. By ROSEMARY LOW. 1976. Published by John Bartholomew & Sons, Ltd. Edinburgh and Bromley. Cloth-backed or reinforced paper covers. No price on review copy.

Rosemary Low, well-known for her success in keeping, breeding and writing about various parrots, here turns her attention to some of the starlings, Sturnidae. Rather over half the book deals with the keeping of the Hill Myna (or Mynah, as she or her publishers prefer to spell it) *Gracula religiosa* (formerly *Eulabes religiosa*), the "Talking Myna" *par excellence*. The rest deals, slightly less fully, with some of the starlings (or mynas) in the genera *Sturnus*, *Acridotheres*, *Leucopsar* and *Ampeliceps*. The Rose-coloured Starling or Rosy Pastor *Sturnus roseus* and our own beautiful if ubiquitous *Sturnus vulgaris* are not included among the *Sturnus* species described, presumably because they are not called "mynas" in avicultural circles.

Each species described is illustrated by a coloured drawing. These vary in quality but at their best are most lively and pleasing. I particularly liked the Pagoda Starling (sorry, myna!) on p. 73. Even at their worst these pictures are, in my opinion, far better than much of the costly and pretentious rubbish that, in recent years, has been foisted onto a gullible and indiscriminating public as, allegedly, superb bird art.

Not only are the birds illustrated in colour, but also the various foods, cages and equipment recommended, so those readers in any doubt about the basic differences between a cockroach and a grasshopper, the shape of a pear or which end of a banana to peel open first, will need to look no further.

The reviewer has no experience of keeping these birds himself, but even so doubts the implication in the (literally true) statement (p.66) that the mainly ground-feeding species in the genera *Sturnus* and *Acridotheres* "require exactly the same care in feeding and housing" as the arboreal Hill Myna. Under the specific headings the authoress has, however, given full information (when available in the literature) on the care and feeding of each species by those who have successfully bred it in captivity.

Rosemary Low's love of and consideration for birds shines through all her writing. She rightly insists that any myna kept in the wretchedly small commercially produced myna cages should at least be allowed frequent liberty in the room. She also wisely stresses the drawbacks involved in myna keeping. All in all a literally handy little work that can be warmly recommended.

D.G.

CORRESPONDENCE

NESTING OF THE LONG-TAILED SYLPH HUMMINGBIRD

I have, for some two and a half years, kept hummingbirds in an outside aviary which is heated in winter and which measures 8 x 6 x 6 feet high. The aviary has a wooden sheltered part and is planted with a variety of climbing plants and shrubs such as honeysuckle, passion flower, rhododendron, etc. and in it is a pool with a fountain.

In addition to a pair of Long-tailed Sylphs *Aglaiocercus kingi* there were three sugar birds, a sunbird and five other hummingbirds in this aviary. On December 13th 1975 when I was taking down some nesting boxes of the type provided for Zebra Finches, the female sylph flew out and I discovered a nest in one of these boxes containing two eggs on which she sat for 21 days, but the eggs were infertile. She laid again in the same nest around January 24th 1976 and these eggs were also infertile. On July 4th and 6th two more eggs were laid and after 16 days two chicks hatched. I had to go away at about this time, but before going I put all the other birds into another aviary, leaving the pair of sylphs alone, but when I returned I found only one chick surviving and it lived until it was 21 days old, but I do not know the cause of death.

The nest was composed of sheep's wool and fibre glass of the kind used for roof insulation: the birds are fed on fruit flies and a nectar mixture consisting of a teaspoon of natural pollen, one of Super Hydramin, 3½ ozs sugar and a very small quantity of Bovril, all mixed with one pint of hot water; the mixture when cooled is kept in a refrigerator. Mr M. F. Draper who saw the nest and chicks very kindly gave me advice and so did Mr. and Mrs. Scamell.

20 Brocas Drive,
Basingstoke,
Hants.

C. G. MOREY

BLACK APHIDES AS FOOD FOR BIRDS

With somewhat belated reference to the letter (Vol. 81, no. 2, p. 119) on this subject, I write to say that I have known the Yellow-fronted Kakariki or New Zealand Parrakeet *Cyanoramphus auriceps* to take the black aphid with avidity when it has chicks in the nest. On being given leaves of nasturtium

so infested, the aphides would first be picked off and then the leaves and stems would be eaten.

12 The Caravan Park
Burton Hill,
Malmesbury,
Wilts.

BRIAN G. DAVIS

Dr. Bowdler Sharpe (BRITISH BIRDS, vol. 1, p. 50, 1894) says of the House Sparrow "Doubtless during the nesting season the Sparrow largely feeds its young on insects, and we have seen one shot by our friend Major Wardlaw Ramsay, with its crop perfectly full of the Bean Aphid (*Aphis rumicis*) . . ."—*Ed.*

* * *

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OCTOBER - DECEMBER 1976

THE BLUETHROAT

Luscinia svecica

By ROBIN L. RESTALL (Caracas, Venezuela)

The Bluethroat is a widespread species ranging and breeding over much of Europe, from Scandinavia to Spain, and eastward right across Asia to as far as Alaska. In this enormous range, with varying migration patterns, some eight subspecies are recognised, two of which are known to British aviculturists.

The first is the nominate race, normally known as the Red-spotted Bluethroat because of the red spot at the centre of the blue gorget. This bird is the most widespread race, being known in Scandinavia, Germany, France and farther to the east, and some individuals from Sweden and Norway pass through Britain on passage to and from northern Africa: there is a record of a nesting of the Bluethroat in Scotland (Inverness) in 1968.

The second is the White-spotted Bluethroat *L. s. cyanecula* which ranges from south-western Russia south-westwards in a broad sweep until its distribution peters out in central Spain. The bird is about $5\frac{1}{2}$ inches long and the adults readily sexable, but some females, particularly older birds, may show the occasional blue and/or chestnut feather on the throat and may be taken for immature males that are moulting from the juvenile plumage. Juveniles very closely resemble juvenile Robins *Erithacus rubecula*, but may be immediately distinguished by the rufous patches at the base of the outer tail feathers.

The natural habitat of the Bluethroat is heavy vegetation, preferably in damp or marshy areas and, every time that I have found the white-spotted form it has been in this situation. In an aviary they have a skulking habit which will make them disappointing species for the aviculturist who likes to have his birds well displayed, but this is a small price to pay for keeping them in optimum condition.

The natural diet is insects characteristic of the habitat, but in fact

Red-spotted Bluethroat

Luscinia s. svecica

Drawn by R. David Digby

Plate donated by Palaquin Fine Arts, London.

Bluethroats are not particularly choosy and will take small earthworms, small snails, beetles, grasshoppers and all manner of insect life. They naturally take berries and other succulent vegetable matter particularly in the autumn and winter, and in this way they are characteristic of many thrushes. They are well able to adapt to the kind of diet offered by most aviculturists, but are much easier to establish in confinement in the autumn than in spring when their metabolism is more geared to insects. I have found them easy to "meat off" within a week by offering a variety of soft foods and the generous use of mealworms. Details of the diet given to captive birds can be found in the Magazine (1975, no. 4) in articles by Mr. M. Barber and myself.

The Bluethroat is a fine songbird, displaying many of the characteristics of the Nightingale *Luscinia megarhynchos* but, if anything, it has a finer power of mimicry. It has some of the liquid notes of the Robin and will willingly and repeatedly sing during the night. The Red-spotted Bluethroat is naturally single brooded, but the White-spotted is more often double brooded, as is so often the case with the more southerly races of wide ranging northern hemisphere species. It was, of course, this form that Mr. Barber bred in 1975 and it characteristically nested twice during the season.

BREEDING THE AMBOINA ISLAND KING PARRAKEET

Alisterus a. amboinensis

By JOHN BURGESS (Plymouth, Devon)

INTRODUCTION

The late E.N.T. Vane had an example of a Salawatti Island King Parrakeet *A.a.dorsalis*, a bird previously owned by the 13th Duke of Bedford. Since then, except for a single importation in 1969 by John Wilson, of Norwich, the island king parrakeets were not available to the trade until 1972/73: since that time somewhere between two and three hundred might have been brought into the country. Many of these were ill on arrival and others refused to be weaned from their staple diet of boiled maize and paddy rice and they gradually faded into death. Altogether I doubt if there are more than 70 still alive in the U.K.

The most commonly imported race was the Amboina, often advertised as "Red-billed Kings", with smaller numbers of the Buru Island King Parrakeet *A.a.buruensis*, incorrectly designated "Salawatti's" or "Black-billed Kings" and one or two of the Sula Island *A.a.suluensis*. This year, 1976, the very beautiful Halmahera King *A. a. hypophonius* has been in the

Indonesian dealers' lists; but the very high price asked (£1,000 or more, a pair), the knowledge that many (must) would die before they were acclimatised and the stringent importation restrictions make it most unlikely that any will enter the U.K., although they are now represented in Continental collections.

The island kings differ from the Australian King Parrakeet *A. scapularis* by having a very much longer and broader tail and in having the hen the same colour as the cock. They also lift their scratching foot over the wing to the head; the Australian King moves it under the wing. They are also more arboreal and readily enter dark or confined spaces. At night, sometimes when it is too dark to see them, they will fly about. This is done as part of their natural behaviour and is not panic, for my aviaries are in a walled garden, the walls topped with an electric fence to keep cats away.

Breeding

Like the very closely related Green-winged King Parrakeet *A. chloropterus* of central and eastern New Guinea, they appear to take several years before they reach a breeding maturity and once they start, they appear ready enough to lay annually. My three pairs of Amboina Kings were bought in 1973: each pair is housed in 7-foot high aviaries with a floor area of 20 x 3 feet, surfaced with stone chippings. A small shelter 4 feet high x 3 feet wide and 3½ feet deep is attached to each flight.

The nest boxes of 2 cm. thick exterior grade plywood are of the grandfather clock type, 10 inches square inside and 6 feet high with a 4-inch diameter entrance hole. These are rammed, 15 inches deep, with a mixture of peat and earth, and then capped with two inches of crumbled rotten wood.

I believe that hens may be separated from cocks because of their smaller heads making the eye nearer to the cere. Last year one hen laid eggs but her mate died of an accident: fortunately I easily acquired another male. When I put in the nest boxes on February 8th, this hen, and the cock, entered the same day: that both sexes go into the box is rather curious. Within four days courtship began in earnest. Both sexes, but particularly the cock, "eye blaze" with such intensity that the red/yellow iris could be easily seen almost as a glow, 30 yards away. The persistent chatter is not unlike that of courting Crimson-wings *Aprosmictus erythropterus*. The male would jump up and down as he paraded alongside the hen when on the ground, often with a twig held in the bill; he would also hold his head high and, like a cock Princess of Wales' *Polytelis alexandrae*, blaze his eyes and sway his head from side to side. Before regurgitatory feeding of the hen, the cock would sometimes swing his head in a circle; again like a cock Princess of Wales.

An egg was laid on February 16th; it was very cold at the time and she deserted after five days. However, a fortnight later she laid her normal clutch of two eggs and immediately began to incubate: again we had a cold

spell and she deserted a week after. Her next clutch was laid on April 5th and 7th. On the 27th a freshly hatched chick was found with a bloody scratch on its back. The hen had no further interest in the nest so the cold, second, egg was tested in warm water to see if the contained chick was still alive. As it did not react I started to carefully open the top of the egg when, to my horror, it began to bleed and I could see the chick moving inside. The egg was promptly put under a Mealy Rosella *Platycercus adscitus* which, by good fortune, had just hatched a chick of her own. To my delight I found both chicks alive and full of food the next day. The Amboina cock started to fight his hen so I took her away for two days.

Quite a difference was found between the two chicks: the King stood upright calling for food whilst the Mealy had a crouched position. Mr. G. A. Smith tells me that Ringneck *Psittacula krameri*, Eclectus *Eclectus roratus* and Princess of Wales', indeed all red-billed parrots, similarly stand upright. The chicks were brought inside after a fortnight because I felt that the parents were neglecting them. First they were fed on "Farex"—a baby cereal food—mixed with water and given at blood-heat. Subsequently various items were added to this mix including strained apple, vitamin drops and honey. The feeds were given at four-hourly intervals so that with the first being given on awaking and the last before retiring they had five a day. When 17 days old the eyes were nearly fully open and at 18 days the red-tipped tail feathers could be made out as could the primary feathers at 20 days. Now crushed carrot, shelled sunflower seeds and grated spinach were added to the diet. At 22 days blue and green feathers were visible on the wings and the red and blue ones of the tail. Growth was very fast so that by 38 days old the chick was fully feathered and it and its companion Mealy were put into a large flight cage. From then on soaked and shelled seed, seeding grasses and spinach were supplied daily. At 48 days old the Amboina chick was perching and preening itself easily and also picking up the seeds—in play. By June 30th the chick only needed feeding twice a day and I released the two into a small flight on the 6th July: the Amboina chick was then the size of the parents.

Astonishingly the parents went to nest for a fourth time: the first egg arrived on July 13th and the second two days later. Five days afterwards the cock was seen driving the hen so I took him away and put him into an adjacent aviary. These eggs hatched after 19 days: as the hen seemed to be doing such a good job and the weather continued very warm, so there was no fear that the chicks might chill, I did not return the cock. She reared the two chicks entirely on her own, feeding them mainly on hemp seed and bread and milk of which she was eventually eating two slices a day. The chicks fledged at nine weeks old when the hen went back to eating mainly sunflower seed. The young differ from their parents in that the peri-orbital skin is white, not black, and the eye is very dark, almost black. The tips of the tail feathers are red: they are black in the adults. A beautiful and rather surprising feature of these chicks is that the red of their chests and

heads is so much more pure and deep in hue than that of their parents. The chicks at three weeks could well have fed themselves although the hen still fed them a little.

As described, the Amboina Island King Parrakeet *Alisterus amboinensis* has been bred by Mr. John Burgess and this is believed to be a first success in this country. Anyone knowing of a previous breeding of this species in Great Britain or Northern Ireland is asked to inform the Hon. Secretary.

BREEDING THE BRONZE-WINGED PARROT

Pionus chalcopterus

By ROSEMARY LOW (Barnet, Herts)

No genus of South American parrots is notable for the number of captive breeding successes achieved and one, among those known to aviculturists, is quite definitely notable for the *lack* of successes. The *Pionus* are smallish parrots, measuring between 9 and 11 in (23 and 28 cm), readily distinguished by the red under tail-coverts. Only the Blue-headed *P. menstruus* is well known in captivity; it has been bred on a few occasions but breeding successes with the other members of the genus are rare—non-existent in some species. One reason is, of course, the small number of birds from which breeding has been attempted. When preparing THE PARROTS OF SOUTH AMERICA (in 1971) I could obtain no information at all on breeding *Pionus*. At that time I had three species in my possession—a single female White-crowned *P. senilis* which I eventually lent to someone with a male, a pair of Massena's *P. seniloides* and two Bronze-winged Parrots. To my great regret, the female Massena's was killed by the male and, after three years, I discovered that the Bronze-wings were two females!

In 1970 I had obtained one which, I was reasonably certain, was a male: later in the year I bought another and judged by its smaller build, especially about the head, and its quieter demeanour, that it was a hen. The two birds showed not the slightest interest in each other; however, subsequent events were to prove that even true pairs seem to lack the affectionate disposition displayed by almost all South American parrots and are rarely seen to preen each other.

I persisted in thinking that I probably had a true pair, but in April 1973 I was offered a Bronze-wing from the collection of the late Mrs. N. Howard. I bought it and introduced it into the aviary containing both birds, as I felt that this would provide a better indication of their sex. The reaction of my believed male was immediate: he displayed in typical *Pionus* fashion, fan-

ning his tail and walking along the perch with exaggerated gait. He began to behave aggressively towards his former companion which now became a rival; however, the latter bird showed no interest in the newcomer and after about two weeks I removed the unwanted one for its own protection, leaving my "male" and the newcomer.

The two birds got on well together and the "male" was seen shivering its wings and uttering a rasping noise which I had observed many times in the past. On May 6th I thought the birds were mating but could not be certain, as they moved apart on seeing me. I was reluctant to believe the evidence of my own eyes, but it appeared that they were "the wrong way round" and this was established without doubt some days later. The "male" was a female, and the newcomer, a bird with a small head and generally feminine appearance, was a male!

The hen spent long periods in the nest box, enticing the male inside on occasions, until eventually he was feeding her inside the nest. On June 9th two things happened: the hen laid her first egg and the male died suddenly. So often in aviculture, fortune and misfortune go hand in hand: the male looked unwell in the morning, moving only when the hen left the box. I felt it was essential to catch him up so that he could have the benefit of an infra-red lamp: this was done but, regretfully, he deteriorated very rapidly and died within minutes. There is a strange parallel here with the only other breeding attempt I know of which had occurred in Britain at that time: in this instance the cock also died while the hen was incubating. After the male's death, the hen gave me some cause for concern for I feared she might not leave the nest to feed. She did not feed at all on the day following the male's death so I placed a millet spray in the nest box and this was eaten, so feeding her in this way became a daily ritual. Fortunately, the hen was quite fearless and did not object to nest inspection: she sat very closely and I could not see how many eggs she was incubating. When placing the millet spray in the nest box on the morning of July 8th I saw two halves of an eggshell. The following morning there were shells from two hatched eggs in the box and later in the day I heard chicks cheeping. No more eggshells appeared. On one occasion I provoked the hen into moving slightly (a liberty I would take with no other bird) and saw one pink-skinned chick covered with fluff and this was to be my only glimpse of her offspring.

The squeaking of chicks was heard every day until July 17th. On the morning of the 18th the body of one of the chicks was seen in the nest and the next had died by the 20th. The hen refused to leave the nest box and I had to remove the lid to cause her to desert. I then discovered that the clutch had consisted of three eggs and removed the third; it contained a fully formed chick. The presence of the third egg meant that the incubation period is 27, possibly 29, days.

The death of the chicks was probably due to the fact that, without a male to feed her, the hen was not leaving the nest frequently enough (as far as I could tell, she fed only twice daily) and the chicks were not receiving

enough food. Perhaps the real cause, however, was that they were not receiving the correct diet. I offered corn-on-the-cob, greenfoods, various fruits and even bread-and-butter pudding. However, the hen would eat nothing but peanuts, a small amount of apple and sunflower seed. When the chicks were three or four days old she refused to eat millet spray, soaked or dry.

In November of that year I obtained two more Bronze-winged Parrots which were believed to be a true pair. The following year the proved hen was paired with the believed male but no nesting attempt occurred. That winter the hen appeared to be ailing and was therefore housed in my indoor birdroom. Unfortunately, she died some months later, and the autopsy revealed that her death was due to lymphatic leucosis (leukaemia) which, apparently, rarely occurs in birds.

I was thus left with three Bronze-wings and I reunited the pair bought in November 1973. This pair nested in 1975 (see account in AVICULTURAL MAGAZINE Jan-March 1976 p. 19). Briefly, three eggs were laid, two of which hatched. One chick died when a few days old and the other was killed, almost certainly by the male, when 31 days old.

During January 1976 I was surprised to see the male Bronze-wing coming out of the nest box early one morning, for I had never previously seen him go inside. A less pleasant surprise was in store: he had attacked the hen whose head was bleeding; however, there was no permanent damage. I immediately removed the male to another aviary, and returned him after five or six weeks. That incident strengthened my belief that it was the male who killed the youngster. The temperament of male *Pionus* in breeding condition can be treacherous, as I had discovered several years previously with the Massena's.

The pair was reunited on February 15th and no further trouble occurred. They are, unfortunately, housed in a very small aviary, originally meant as temporary accommodation only, yet it apparently suits them. They are rather nervous birds and the situation of the aviary, on the main path, has steadied them to a slight degree.

In 1976 the Bronze-wings nested in May and on the 18th I noted in my diary that the first egg might have been laid that day, as the hen was missing. Thirty one days later, on June 17th, a chick was heard but could, of course, have hatched several days previously. Bronze-wing chicks have a peculiar quavering cry, quite unlike any other parrot chick I have heard. As was the case in the previous year, the hen was not seen in the flight until more than four weeks after the chick was heard, *i.e.* I had not seen her for two months, although towards the end of this period she was occasionally seen to look out of the nest hole and the male would feed her from the nest box perch.

When, on July 18th, she was seen sitting unconcernedly in the flight, we feared the worst and my husband entered the aviary with the intention of taking the nest box down. If the chick or chicks had again been mutilated, inspection could do no harm and might be the means of saving them;

however, when my husband touched the nest box, the loud and angry cries of a chick within assured us that all was well. We would certainly have removed the young for hand-rearing if we had ever been able to surprise the hen off the nest; this seemed to be impossible and we certainly had no intention of tipping her out to remove the young. By the time she came out of her own free will, the chicks were too old for hand-rearing so we had no choice but to hope for the best. We were not too optimistic because our new next-door neighbours' young children had a piece of climbing apparatus a few feet from, and overlooking the Bronze-wings' aviary, so the birds had every justification to destroy or mutilate their chicks.

After July 18th the female spent increasingly long periods in the flight and the male was occasionally seen to enter the nest. On August 5th a young bird was seen at the entrance hole; thereafter it often looked out, at first withdrawing its head on seeing us, but it soon became more confident. Unfortunately, its head was almost bare of feathers; evidently one or both of the parents were plucking it. At 7 pm on August 18th it left the nest; at first it clung to the wire but it quickly learned to perch. Its underparts were plucked bare but the plumage which remained was different from that of the adults, the most noticeable feature being the green wings with a few brown feathers on the wing coverts. The naked skin around the eye was yellowish, that of the adults being red. When the underparts feathered, they were navy blue, as in the adults.

On the following day I saw the female enter the nest and heard, to my surprise, the sounds of another chick being fed. It was not seen to look out of the nest until August 24th; it, too, had the head plucked naked and when it fledged on August 26th we were dismayed to find that it was badly crippled with rickets. It was quite unable to perch and spent its time on the concrete floor of the aviary or climbing on the wire, using its beak for support. The joints of its feet were badly swollen, and its parents seemed as concerned at its condition as we were. Even its nest-mate would occasionally fly down to it. Although the male and female continued to feed it, it quickly learned to feed itself from food placed on the floor.

On the night of September 10th the weeks of drought ended with a vengeance and although the entire aviary had been covered over, the crippled youngster was found in a very wet condition the following morning. It was taken indoors and placed near an infra-red lamp and seemed to make good progress, being independent by then; however, it died on September 17th and on autopsy it was found to be a female.

The elder youngster was first seen to feed itself on August 30th, although it called for food occasionally for several weeks after that date. At the time of writing (October 5th), its underparts have feathered but not the head; possibly it is still being plucked. It is perfect in every other respect and less timid than its parents. Following its example, the adults now eat corn-on-the-cob, which they refused during the rearing period.

A wide variety of foods were offered, the most favoured being celery, carrot, Cheddar cheese, tomato and spray millet. The usual items of the diet, apple, sunflower and canary seed, pine nuts and peanuts were also eaten. Greenfood was seldom available, but lettuce was occasionally offered. Because of an invasion of ants in the area of their aviary, sponge cake and nectar, to which vitamins are normally added, were withheld.

I believe that this is the first occasion on which Bronze-winged Parrots have successfully reared their young in the U.K. In 1973 one youngster was bred by J. Stoodley of Hampshire: it was partly hand-reared and partly reared by rosellas, after being attacked by one of its parents when about 17 days old.

I am told that this species has also been bred in a European zoo—and would greatly appreciate receiving details of this breeding.

As described, the Bronze-winged Parrot *Pionus chalcopterus* has been bred by Mrs. Rosemary Grantham and this is believed to be the first success in this country, but anyone knowing of a previous breeding of this species in Great Britain or Northern Ireland is asked to inform the Hon. Secretary.

Mr. George Smith writes: The Swaenepoels had three pairs of Bronze-winged Parrots housed together and one pair nested unsuccessfully in 1972. Two of these, which were hoped to be the breeding pair, were kindly given to me the following year. The others were also disposed of and it was a pair of these which have since nested successfully in Belgium. In 1974 two clutches were laid by my birds and incubation started; but, as the laying bird always dives straight back into her nesting hole if I am lucky enough to see her off feeding, and she is very ferocious in defence of her eggs, they were never examined closely. That year I managed to weigh a fresh-laid egg at 22 grams (it measured 32.6 x 37 mm) and this year another at 23 grams. The hen weighs 220 grams so these are quite huge eggs for a parrot of this size. The interval between successive eggs has been three days and the clutch was always three.

The only occasion when I have caught the birds on the ground is just before egg-laying when the hen is searching for, what I take to be, old faeces and soil for extra vitamins and minerals. The first egg that I weighed was, in fact, found on the ground in the area where she had been seen so often eating something. The birds only appear interested in the nest box in the summer, although the hen may sometimes roost inside the box over some winter nights.

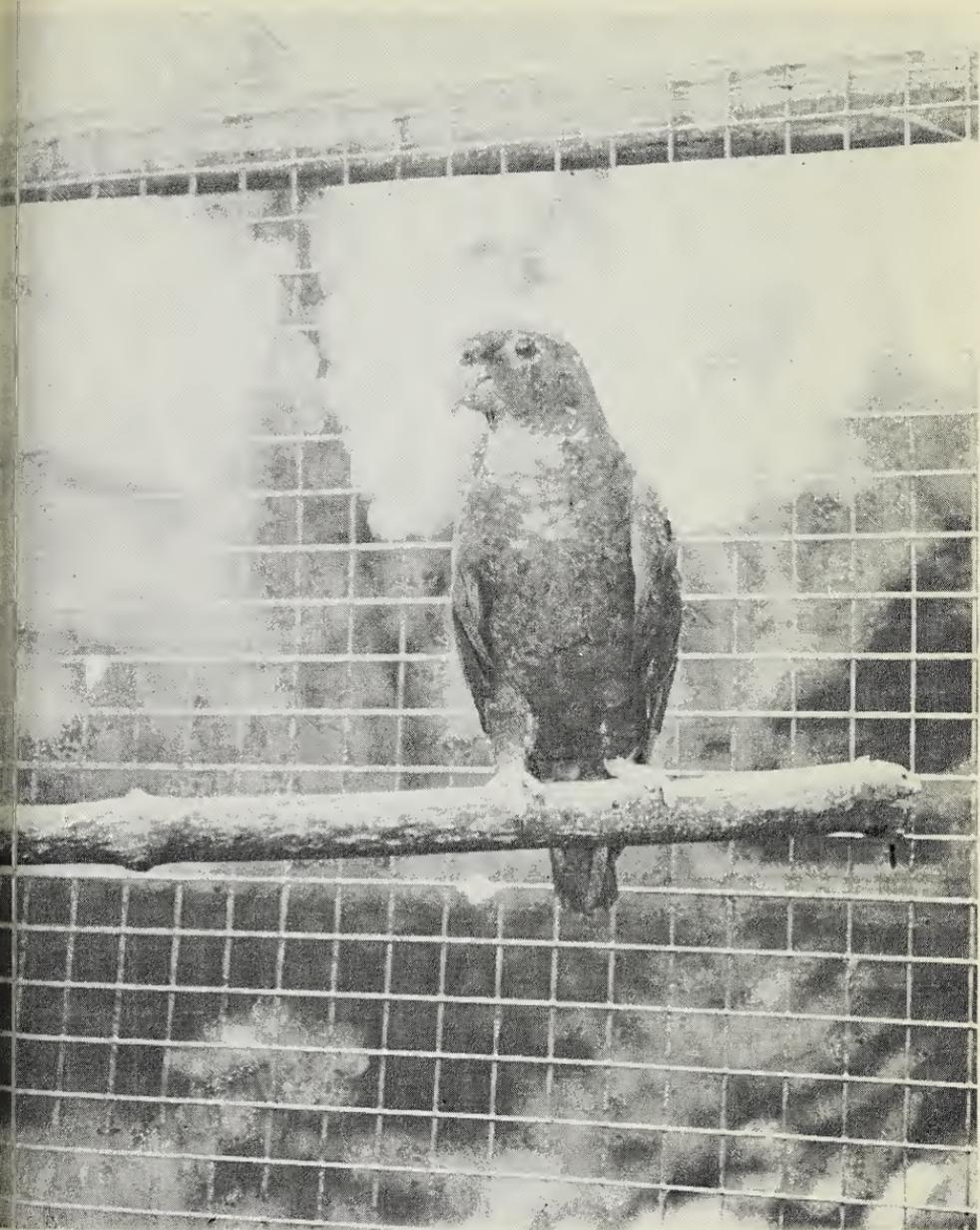
Both sexes take an interest in the nest box although I believe that the hen does most of the chewing. Even long before the eggs are laid the hen shoots back if she catches sight of anyone approaching: the male, in contrast, always forsakes the box when he hears someone. Even during the incubation the male sleeps outside the box, but frequently enters it during

the day where he ultimately chewed the hen's head as bald as that of a vulture. Judging from the noise of the freshly hatched chicks being fed, the incubation period is 26 days. Unfortunately the male eats them within a day of hatching: my one glimpse of a chick showed it to have long white down, a bulbous bill and a sealed ear-hole.

The dark blue of the feathers is a wonderful camouflage. Very often when looking directly into their small aviary it has taken some moments of careful search before the Bronze-wings can be made out. The feather colours so exactly match that of strong shadow that it makes them invisible even in a near-bare aviary. The outermost ring of the iris is reddish-gold and the inner light brown. The naked peri-orbital skin of my hen becomes quite glaring red when she is breeding: that of the male is only slightly more flushed than when not breeding. I cannot see any difference, other than this (and the overgroomed head of the hen) between the two sexes.

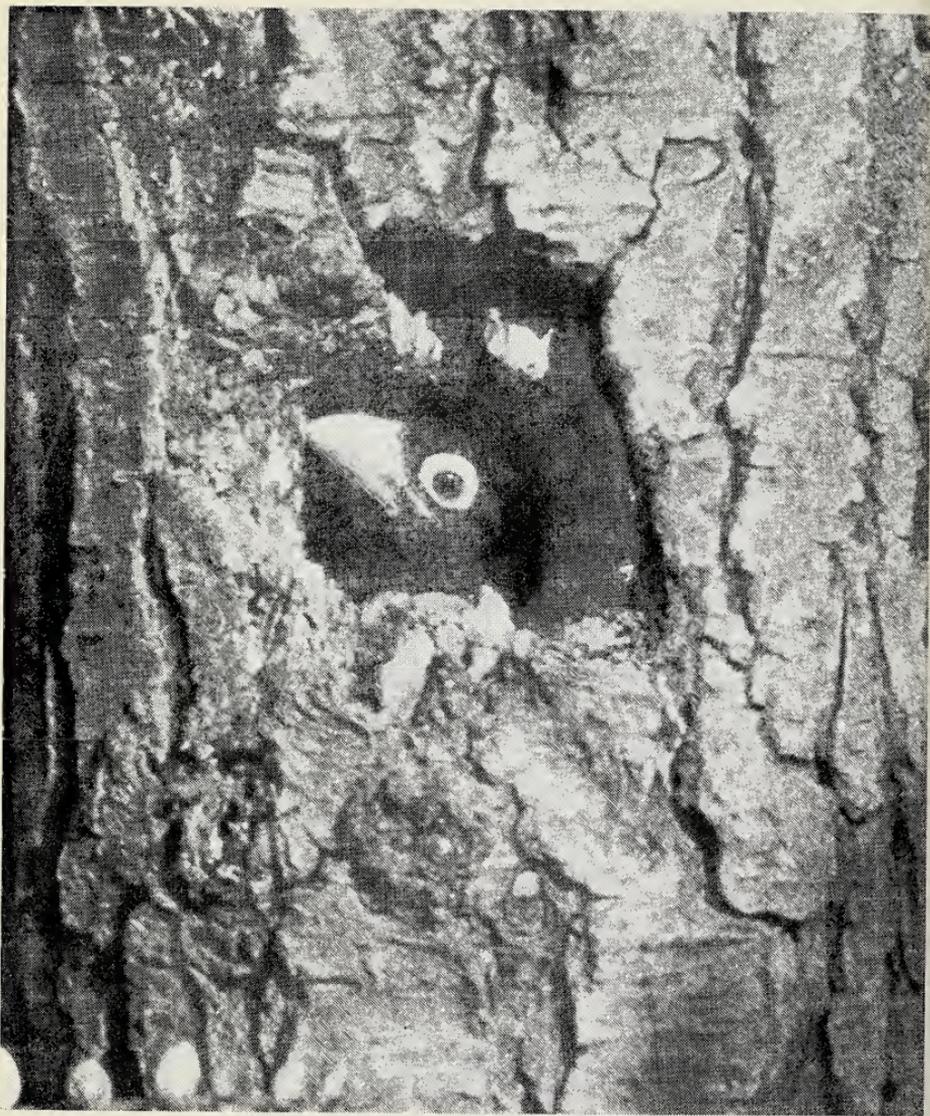
Most of each head feather is white: this is not usually apparent because of their grey-black tips. This is even more noticeable in the lovely puce of the Plum-headed Parrot *P. tumultuosus* and (a subspecies?) the Hoary-headed Parrot *P. seniloides*. In my experience *Pionus* parrots are not much given to mutual preening except when breeding. They do sit close together during the day although mine invariably roost separate. The head-preening, once it starts, is rather vigorous, for it breaks off the dark grey tips to the head feathers to leave huge white patches. It may be that this permanent revelation of the underlying white serves to signal to the preening bird that it is becoming too aggressive. If so these white bases to the feathers may serve to inhibit aggression as does the hidden white nape-patch of broadtailed parrots (England, M.D. 1945. AVICULTURAL MAGAZINE (5)4: 63-64).

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Male Bronze-winged Parrot

R. H. Grantham



M. D. England

A fledgling Double-toothed Barbet at the nest entrance, having
already been out during the previous two days

BREEDING THE DOUBLE-TOOTHED BARBET

Lybius bidentatus

By M. D. ENGLAND (Neatishead, Norfolk)

I imported my Double-toothed Barbets privately in May 1974, and they quickly proved amenable by readily entering their shelter to feed and by roosting indoors in the hollow log provided. I know no species of barbet which, in the wild, does not roost in a hole, and I regard the provision of a suitable roosting place—even if it be no more than a nest box—as an important factor in keeping members of this family in contented good health.

They proved to be somewhat tricky feeders in that, even more than most other species of barbet, they have marked preference phases, for some weeks eating little but grapes, then perhaps a period on diced apple and tomato, followed by sultanas only. Mealworms seem to be their only constant choice, even locusts being ignored at times. Just before and during breeding they become more than ever insectivorous, on some days taking no fruit at all. This particular pair sometimes gave cause for alarm by fasting almost completely for more than a day at a time—nearly always in the worst possible weather.

It was several months before I was certain that I had a true pair, although they always agreed well together, because the only sound they made was their rather hoarse sharp “chock” and they contented themselves with the hole which I had provided without boring even a roosting hole, which so often in the case of barbets is later used for breeding. They were difficult to watch in their rather densely planted aviary and extraordinarily secretive in their ways, disliking even to feed if they were aware of an onlooker. When eventually they did rear families, I had to resort to sitting in a car at the other side of the garden to watch their nesting behaviour with binoculars.

I felt they must be a pair when I saw one feeding the other, but even then they did not clearly show which was which because the food was often passed back and forth between them before finally being swallowed. However, one began to utter a rolling guttural low-pitched sound reminiscent of a person gargling for a sore throat, and I took this to be the male.

They bored a hole near the top (about 7 ft. from the ground) of an alder log which would have been too tough for smaller species and this was evidently deep—perhaps 20 inches or more—because one could hear a considerable amount of scrabbling upwards when a sitting bird was relieved by its mate or disturbed. The entrance hole made by a Double-toothed Barbet is quite unlike the usual barbets' beautifully neat and symmetrical circle, being ragged and of no particular shape (three borings observed).

Their secretive ways, the depth of the hole and the fact that most barbets spend a lot of time in the "nest" before egg-laying made it impossible to be certain of either the incubation or fledging periods, although the former was probably about 20 days and the young spent at least four weeks in the hole. Both parents took their share of incubation and feeding, the latter being done by what one might call "semi-regurgitation"; that is to say the food was not visible in the bill when carried to the nest but was taken there soon enough after being picked up by the parent (and apparently swallowed) for there to have been little time for any digestive process to have taken place.

I spent long periods in the car watching feeding operations and during the period September 2nd to 4th, food was taken into the hole at intervals of an average of 19 minutes at mid-morning and late afternoon. At many of these feeds both parents arrived at once, one waiting outside the hole until the other emerged after feeding; the figure of 19 minutes therefore gives only a rough guide as to the frequency of feeding. For the last few days before leaving the nest the youngster appeared at the entrance hole, often spending a long time there waiting and watching. Curiously enough, it was seldom seen to be fed at the entrance, the parents appearing to prefer to choose periods when the hole was clear and they could go right in.

Fledglings only differ from their parents in plumage by having the breast and belly dark in colour, the bright red appearing gradually and still not being so extensive nor so bright as an adult's at six months old. Like most young barbets, they are very strong on the wing within a day or two of leaving the nest. The only call which I heard them make was a weak, rasping form of the adult "chock." Although very quickly able to feed themselves, they seem to rely on their parents, at least to some extent, for several weeks after fledging. They have the confusing habit of returning to the nest (and appearing at the hole to be fed) for several days after first leaving it. Since incubation begins with the first egg, chicks are of different ages and this, coupled with a rather densely planted aviary and their habit of returning to the nest, made it extraordinarily difficult to be sure how many young there were. In the case of one of their three broods this was the cause of my failing to spot the fact that a fledged youngster was being neglected by the parents, who were concentrating on rearing an older, stronger chick, and this one, unfortunately, now resides in the British Museum (Natural History) at Tring.

In 1975 the only chick to survive the initial hazards was found drowned after a thunderstorm, despite the fact that it was not unfamiliar with the shelter and there was also plenty of growing cover in the flight. I had previously lost an adult male Gaudy Barbet *Megalaima mystacophanes* in the same way, and had found this mystifying since birds, which must be used to tropical rain in their natural habitat, must also have found a way to survive it. I was interested to watch, in April 1976 in Tobago, a Blue-crowned Motmot behaving in a way which gave a probable solution. This

bird was coming to a kitchen window to take pieces of cheese from my fingers when a very violent rainstorm started. Instead of remaining under cover, the bird flew out to a completely open branch and deliberately allowed itself to become so soaked that it could not fly. As so often happens in the tropics (except at the height of the rainy season), after a few moments scorching sun replaced the rain. The motmot spread its wings and tail, turning slowly this way and that until it was dry enough to begin preening, staying on the one perch in the sun for a considerable time and allowing me to take many photographs. No doubt my barbets had tried to adopt the same procedure but without the help of sunshine and probably in continuing rain, until cold and still waterlogged, they fell to the ground.

By the beginning of April 1976 the parent Double-toothed Barbets were hard at it again but, because of the long and drawn-out incubation and fledging periods it was not until June 10th that a youngster was seen at the hole, and it did not leave it for the first time until 16th. Even then it returned for most of 17th, was out again all day on 18th and was returning only to roost by the next day. Meanwhile a second chick was appearing at the hole and it became difficult to tell, without searching the bushes, just which of the two was where.

In the event only one youngster out of the three reared in 1975 and 1976 still survives, and it has now been given an unrelated mate.

As recorded above, the Double-toothed Barbet *Lybius bidentatus* has been bred by Mr. M. D. England and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland is asked to inform the Hon. Secretary.

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TAWNY OWL MALE BREEDING AT ONE YEAR OLD

By JONATHAN SMITH (Slimbridge, Glos.)

This story begins in mid-June 1975 when I received a four weeks-old Tawny Owl *Strix aluco* from the local postman, who had picked it up at the side of the road. Unable to find its nest hole in the vicinity, I decided to try and rear the owl myself.

For two months *Strix*, as I named him, had the complete run of my room, conveniently sleeping during the day while I was working, but becoming very active in the evenings and at dawn. He had a habit of waking me at four every morning by sitting on my head and squeaking in my ear to be fed! Feeding him, however, proved to be no problem. He took very quickly to training and soon learned to go through the motions of making his own 'kills'. This was achieved by attaching a piece of string to the leg of a freshly killed mouse or vole, and dragging it enticingly across the floor. *Strix* would bob excitedly from side to side, shuffling into position on his perch as he seemed to calculate the distance, and then quite suddenly he would swoop down on silent wings and, with a loud thud, pin the mouse to the ground. On average he consumed about three mice a day.

Strix soon settled into his large aviary which measured 18 feet x 9 feet x 8 feet and, fortunately, lost most of his tameness. From his small size, I was convinced that he was a male, since females, as in the case of most other raptors, tend to be the larger sex. In late March 1976, I obtained a five-year-old female from a wildlife park in Bristol, where she had lived in a large, but overcrowded, aviary. She was completely different from *Strix* in character and colour and was of the grey phase, *Strix* being of the more usual tawny or rufous-coloured phase.

I had put up a nest box (chimney type) in the corner of the aviary 'just in case', but really believed that nothing would happen, at least until the following year. However, the female soon took to roosting in the nest box during the day and when she failed to come out one evening, I put my hand underneath her and, to my great surprise, felt an egg! A second egg appeared three days later, on May 1st. From then on, the female was seen only rarely outside the box, whilst *Strix* indicated he was indeed her true mate by showing new and aggressive tendencies towards me, pouncing occasionally on my head when I entered the aviary. He had never done that before! He would also take the first vole he was given to the sitting female and would join her in the nest box—a very cosy situation as the bottom of the box was only 8 inches x 8.

On May 9th I 'candled' the eggs by holding them against a shaded light bulb and saw that both were fertile and developing well. Thus it showed *Strix* was an able, mature male at under one year old. I weighed and measured the two eggs and found that they were very similar to the average for 100 eggs measured in the wild—46.69 x 39.06 mm. (Witherby *et al.* 1940)

one measuring 48.7 x 38.6 mm. and the other 49.75 x 39.2 mm.

By May 28th, I found that the first egg had hatched; however, it is possible that it had done so a few days earlier, since the interval between the actual laying of the eggs can be from 48 hours to a week (Witherby *loc. cit.*), and so the gap between the hatchings might also be spaced, as the female, like most owls, starts to incubate the eggs as soon as they are laid. For this reason there can be great differences in size and development between the youngest and the eldest owlet. The next day, May 29th, the other egg had hatched.

Observation of the owlets' development was made through a small side door about five inches from the bottom of the nest box. At first the young were hardly recognisable as owls, and were remarkably helpless. They had at this stage a thin covering of white down beneath which their pink skin was clearly visible. Their eyes were closed (and remained so for at least another six days) but their head, bill and feet seemed abnormally large compared to the rest of their bodies. The small white 'chipping' tooth was discernible on the tip of the top mandible. It was obvious initially that one of the owlets was larger than the other, but a plentiful supply of food enabled the smaller to 'catch up', until at 16 days there appeared to be little difference between them.

At this age the parent female spent much less time in the nest box and during this period I often observed some unusual and intimate behaviour between the adults. When I put some voles on the aviary floor, *Strix* having efficiently picked one up, would fly to the female and would offer the vole to her by passing it from bill to bill. This was often followed by *Strix* nibbling ardently at the female's breast and neck feathers. However, more often than not, the female seemed uninspired by his attentions and would soon leave him to flop down in the bottom of the box to feed the young.

At 24 days old, June 20th, the owlets were able to stand up on their feet instead of sitting back on their haunches. Together they filled the bottom of the nest box, especially when they puffed out their feathers and continuously snapped their bills loudly in an attempt to frighten me away.

At 30 days the larger of the two young had made the big ascent to the top of the nest box and could be seen at the entrance observing the outside world for the first time. There was already a notable difference between the two youngsters in the colour of the plumage developing below the thick covering of buff-coloured down. The slightly larger owlet was becoming like the female—a grey phase—while the smaller was tawny-brown like *Strix*. Even the shape of their heads indicated the difference in their parents. *Strix*'s head is very round and slightly flat-topped, while the female's has a definite rounded point. These characteristics can also be seen in the young.

By feeding the owls late in the evening, I could observe the parents going about their business, taking mice to feed the young who would continu-

ously utter rasping squeaks to let the adults know exactly what they needed! The female did not hesitate to take the first two mice to her young. Occasionally she would decapitate the larger voles first and then pass the rest to an owlet, who, with a few hard gulps swallowed the remainder with relative ease. Sometimes, just the tail of a mouse continued for a moment to protrude from the owlet's bill, until that also slipped out of sight. By June 29th, when the young were 33 days old, both had made some successful attempts at flying and from then on they could be seen on any of the perches in the aviary.

I would not have believed that the saving of a young downy owl from almost certain death under the wheels of a car could have resulted, a year later, in the rearing of another two balls of down from that same small bird.

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OBSERVATIONS ON THE PURPLE-THROATED CARIB HUMMINGBIRD

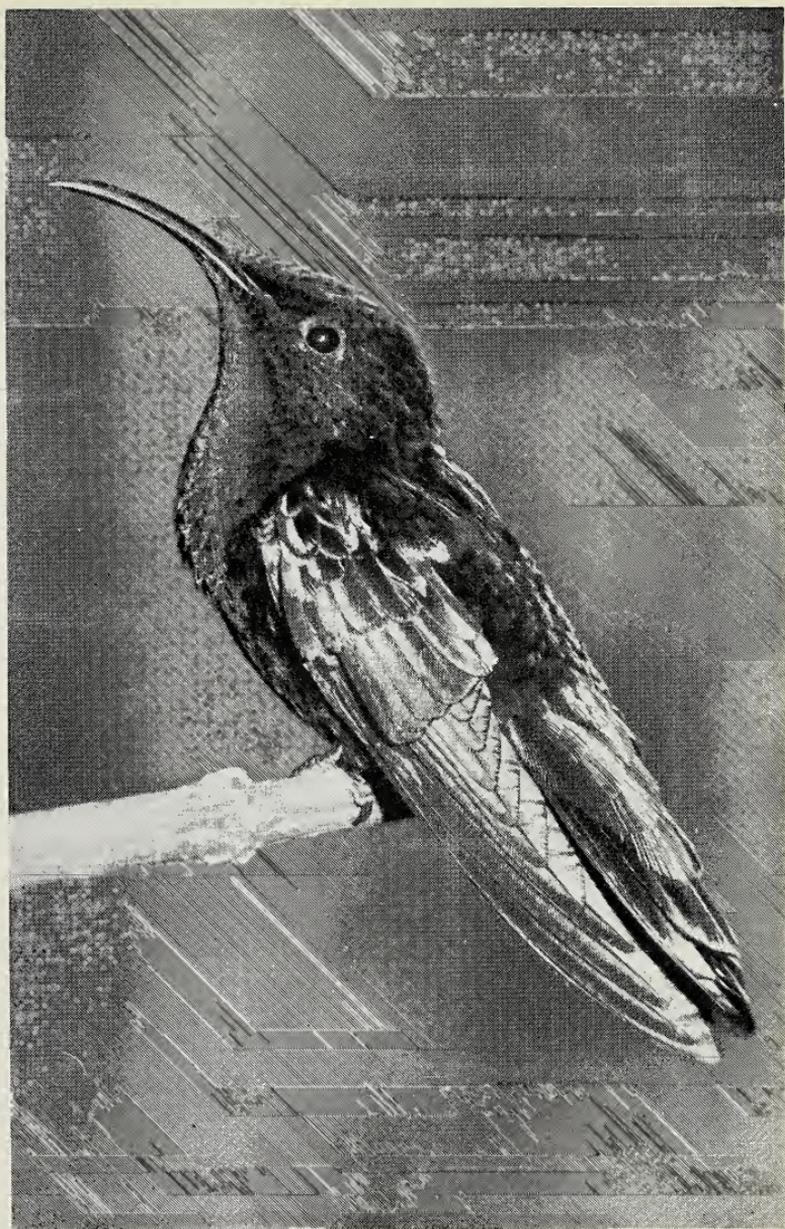
Eulampis jugularis

By A. J. MOBBS (Walsall, West Midlands)

The Purple-throated Carib can be found throughout most of, but is virtually restricted to, the Lesser Antilles (Bond 1971). It is a large hummingbird with an overall length of approximately 5 inches. Overall body colour is black (purple-black in certain lights), with a large patch from chin to lower throat iridescent purple-red. Tail and upper and under tail-coverts are iridescent bluish-green. The wings (including the primaries) are iridescent green. Sexes are similar, but females are slightly smaller than males (males average 9.9g; females 7.9g (Wolf 1975)); also females are more round-bodied than males and their beaks are longer and more decurved. Females do not appear to be so brightly coloured as the males, this being especially noticeable on the wings, tail and upper and under tail-coverts.

It will be noticed I have described the iridescent areas as such and not as "glittering". This is because the iridescent plumage of this species is unlike any other I have come across. Special mention must be made of the iridescent primaries; only one other hummingbird species having this peculiarity, namely the Great Sapphirewing *Pterophanes cyanopterus*.

The Purple-throated Carib has not been brought into Europe commercially and but for the generosity of the late Guy Detry (Wavre, Belgium), I would be unable to write on the species from personal experience. M. Detry while on holiday in the West Indies during the autumn of 1972, trapped, under licence, a number of caribs of both sexes. A month after his



A. J. Mobbs

Male Purple-throated Carib Hummingbird

return, he kindly presented me with a female. The following year, he again trapped *Eulampis* and upon returning home, presented me with an outstanding male.

When I received the female, she was in rather poor feather due to being taken with bird-lime; she also had crossed mandibles and an abscess on the upper mandible. It is relatively simple to rectify crossed mandibles in a hummingbird which requires the beak trimming periodically. However, *Eulampis* does not come under this category and because of this it was some months before the mandibles grew in correctly even though I pared away a certain amount of the crossed portion every week or so. Since the bill has regained its correct shape, it has not required trimming and the beak of the male has never required trimming.

The abscess on the female's upper mandible was caused through pressure being applied when the bird fed from a feeder with a narrow spout. All of my feeding tubes have short and fairly wide spouts and because of this, the pressure ceased and the abscess sloughed off very quickly: however, it was some months before the scar finally disappeared.

It has always been my policy to provide hummingbirds with bathing facilities and to rarely, if ever, spray them. By the time the female carib came to me, she had learnt to expect to be sprayed regularly each day, rather than bathe from a receptacle and try as I may I have been unable to persuade her to bathe even though she is housed with ten other hummingbirds which all use regularly the saucers of water provided. Because of the female carib's complete refusal to even attempt to bathe, I have to spray her daily. She has learnt that when the bathing receptacles are taken from the flight for washing and refilling, she will receive her daily spray shortly afterwards. At such times she becomes most excited and will, if the opportunity arises, leave the flight and follow either my wife or I around the birdroom until one of us reaches for the hand-spray, when she will immediately return to the flight, alight on her favourite perch and fluff the body feathers and hold the wings out ready to catch the droplets of water. Of all the hummingbirds I have owned over the years, the female carib is the first which has completely refused to even attempt to bathe from a saucer of water. Ruby-topaz, *Chrysolampis mosquitus*, are notorious for their aversion to water, yet even these can usually be persuaded to at least alight on a bathing receptacle and dip the head and breast into the water.

The male carib was caged soon after capture and because of this, learnt to bathe in a saucer of water from the very beginning.

Other than the harsh rasping call used during acts of aggression (see later), the female carib was not heard to make a sound during the first 13 months she was with me, yet within seconds of the male being brought into my birdroom, the two birds were calling incessantly to each other. The male had been brought over from the Continent by a mutual friend of the late Guy Detry and I. Because of the stress experienced, I thought it preferable to cage the male carib for a couple of days. On the third day, the

bird was released into my communal hummingbird flight. Immediately the female saw the male, she went into display (a) (see later).

After completing its second moult in captivity (16 months after coming into my possession), the male carib became extremely aggressive not only to the female, but to other hummingbirds with which it was housed. Because of this, I was forced to remove the male from the flight and cage it permanently. I have attempted to re-introduce the male into the flight on several occasions, but after only a matter of hours, the carib has once again become extremely aggressive. It is sometimes possible, during the annual moult, to re-introduce an aggressive species into a communal flight of hummingbirds. Not so the male carib, as even when in very heavy moult, it began to show extreme aggression within a couple of days of being released into the flight.

Although caged, the male has continued to display; however, stages (a) and (b) have been the only procedures used; stage (c) not being used for obvious reasons (see later). When in full breeding condition, the bird has been heard to sing; however, it has become less vocal since being caged.

Mating display

The mating display observed by me in *Eulampis* can be divided into certain stages. Although Wolf (1975) states that this behaviour is usually performed sequentially, I have not found this to be so with captive birds. The display procedures most often used are as follows:

a) (performed by both sexes) The plumage is held tightly against the body, the wings although unopened, are held away from the body at an angle of 45 degrees. The bird then moves the body rapidly from side to side. During these movements, the head and body may be held in a horizontal position or at any angle up to 72 degrees, according to where the display is being directed; *i.e.* should a bird to which the display is being directed be perched higher than the carib, then the head and body will be held almost erect; should the perched bird be at the same height or less, then the carib holds the body in a horizontal position.

When a displaying *Eulampis* holds the head and body at an angle of 72 degrees, the colour of the throat patch can be readily seen. However, should the bird be viewed from beneath, the colour cannot be seen and the carib appears all-black. It appears therefore that the described stance is not taken up solely to display coloration.

b) (performed by male only) The carib, using exaggerated wing movements, flies from perch to perch; *i.e.* the wings are moved more slowly than in normal flight and a cracking sound like that of a whip can be heard. The body feathers are fluffed out and the bird holds itself erect throughout. After moving from perch to perch a number of times (average 4), the carib, while perched, will go through the actions of mating. During this procedure the bird leans backwards bringing the vent area and the tail well under the perch; the head is held slightly backward and to one side.

During the described procedure, the wings are held open and moved so as to enable the bird to maintain its balance. I can only presume that these actions are for a (false) ventral mating (see Wolf 1975). Throughout the described procedure, the bird can be heard to utter a low churring note.

c) (performed by both sexes) The bird hovers either directly in front or slightly below a perched *Eulampis*. The tail is fanned and depressed and the head is raised slightly thus highlighting the iridescent throat feathers. Should the hovering bird be male, the female may ignore him, when he will then either attack her, forcing her to leave the perch, or cease to display and alight nearby and commence displacement preening. On rare occasions the female will leave the perch and, taking up the same stance as the displaying male, hover directly in front of him. This combined aerial display may last for 30 seconds, rarely longer, after which the birds alight on a perch and commence to preen.

Should the hovering bird be female, the perched male will usually carry out the actions described in stage (a), after which he will leave the perch and either chase the female, or carry out the aerial display already described. During the aerial display both birds utter loud call-notes.

At certain times of the year when only the female is in breeding condition, she will perform in front of the perched male. However, this display is always totally ignored by the male and after a few moments the female returns to a perch and commences to preen.

None of the display stages described are performed to anything other than another *Eulampis*. I have, on occasions seen the male begin stage (a) when a hummingbird has alighted nearby, but the former has ceased to display after a second or so (certainly no longer).

Aggressive behaviour

Unlike other species of hummingbirds which I have studied, I have not found the aggressive behaviour of *Eulampis* to revert to mating display if a willing partner has been found. Although Wolf and Wolf (1971) suggest that the 'arc' flight described by them (see later) could with a further deepening of the 'arc' become similar to the dive display of the Anna Hummingbird *Calypte anna*; they do not go so far as to suggest the display could become sexual rather than aggressive.

The aggressive behaviour I have witnessed is as follows:

a) The carib (either sex) moves back and forth either in front or slightly above the bird to which aggression is being directed. At such times the tail feathers may be fanned and usually the carib utters a harsh rasping call-note. Should it be the female carib which is displaying and should she fail to rout the bird to which aggression is being shown, she usually ceases to show aggression, alights on a nearby perch and commences to preen. However, should it be the male carib showing aggression, he does not give up so easily and more often than not succeeds in routing the bird to which aggression is being directed.

Vocalisations

It is interesting to note (see earlier) that other than uttering the harsh rasping note used by both sexes when showing aggression, the female carib was silent up until the time when the male was brought into my bird-room. At first the male was housed in a cage; even so within a matter of seconds of it beginning to call, it was being answered by the female. This calling was kept up almost incessantly until the male was released into my communal hummingbird flight, whereupon the female went immediately into display sequence (a).

I have mentioned earlier the harsh rasping call given by *Eulampis* when showing aggression; also the soft calls made by the male when going through the actions of mating. Although I can find no record of male *Eulampis* being attributed with a song, I am certain that the series of notes which on occasions are uttered by the male in my collection, can be classed as such. These vocalisations are little more than single notes run together; nevertheless a distinct pattern can be determined. This song appears to be used only at certain times of the year, mainly just after the moulting period when the bird is at its fittest (sexually). Females do not appear to have a song.

Discussion

From observations made on the pair of *Eulampis* in my collection, and from the exchange of correspondence with other enthusiasts who also own this species, it appears that *Eulampis* is one of the few hummingbird species (in fact maybe the only one?) which perform the mating display solely to one of their own kind. All other hummingbird species I have studied have, if a member of the same species has not been available, directed their mating display to other hummingbirds with which they were housed. Admittedly such displays have usually been directed towards a species similar to the displaying bird; however, this has not always been the case.

There are a number of records of hybrids being taken in the wild, perhaps one of the most notable being the progeny from a mating between *Lesbia victoriae* (Black-tailed Trainbearer) and *Ramphomicron microrhynchum* (Purple-backed Thornbill) (de Schauensee 1966) (see also Mannering 1964, plate 21). However, as unusual as such a mating may appear, if one has seen the display of the species concerned (see Mobbs 1970 and 1971), and noted that females of both species are superficially alike, such a mating need not seem as unusual as it would first appear.

It is possible that, as the sexes in *Eulampis* are very much alike and as there is no other species remotely like it, the mating display in this species can be triggered off only by another *Eulampis*.

As mentioned earlier, the male carib has on occasions, performed part of the mating display when another hummingbird has alighted nearby. However, for this to occur, the latter has to be a dark coloured species;

otherwise there is no reaction from the carib.

Wolf (1975) describes in detail, a form of soliciting by a female *Eulampis* in the wild. It appears to obtain food from a male's territory; a female was seen to encourage the former to mate with her (out of the breeding season), solely to enable her to sip nectar from flowers in its territory. Due to the abundance of food always available, captive female *Eulampis* have no reason to solicit; nevertheless, as can be seen from my observations, females will display to a male, even when the need for food is not the stimulant.

Although further study is required before definite conclusions can be reached, I feel there is a possibility that with certain hummingbird species in which the sexes are monomorphic in colour, both male and female perform mating displays and, what is perhaps more important, females can instigate the display.

The Purple-throated Carib is without doubt one of the most robust of the Trochilidae I have owned. Being extremely beautiful, easily cared for and suited to life in a cage, aviary or indoor flight, the species would no doubt be a most popular one with aviculturists were it available commercially. It appears that the species is also extremely long-lived in captivity, the New York Zoological Park having kept a female alive for 10 years, 8 months and 6 days (Schuchmann 1972; see also Conway 1962).

Although my pair have come into full breeding condition each year, the female has never attempted to go to nest. I find this somewhat surprising as most female hummingbirds (even those of the more delicate species) once established, at least attempt to go to nest. Were I not so limited for room (living in a flat does limit one's birdkeeping activities), I would give the caribs a flight to themselves. I feel certain such birds would prove suitable for housing in an aviary all the year round if a heated shelter were provided during the colder months.

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THE CAYMAN BRAC AMAZON PARROT

Amazona leucocephala hesterna

By RAMON NOEGEL (Seffner, Florida, U.S.A.)

About 150 miles south to south-west of central Cuba, in the clear waters of the Caribbean, there are two mountain tops that rise just above sea-level. These tiny islands are Little Cayman and Cayman Brac and the sea about them drops off to a depth of three to four thousand metres. As the waters receded or the floor of the ocean rose, these two mountain tops became dry enough for vegetation to form on them and today they are rather unusual as Caribbean islands go—not at all what one would picture in a tourist guide; they have often been referred to as the islands time passed by.

It has only been in the last decade that any tourism has come to these two lesser of the three islands that comprise the Caymans. Grand Cayman, the largest of the three, is located approximately 90 miles south-west of the lesser two. Since the advent of an airfield on Grand Cayman in 1954, this island has become a Mecca for divers and sportsmen who wish to try their luck with the many fishes that abound in these waters. To the diver the visibility and beauty of the coral reefs are enough to warrant a trip half-way around the world and many do go that far: others go to enjoy the beautiful beaches. Now, however, changes are taking place and soon these isles will be so tourist orientated that one might just as well visit Miami Beach or the Bahamas.

My interest was not in the emerald waters and excellent climate, but rather in the rare Cayman Brac Amazon Parrot. This subspecies inhabits the smallest land mass of any of the Amazons, for Cayman Brac covers less than 20 square miles. There are no parrots on Little Cayman which is separated from Cayman Brac by only seven miles of sea. After chartering a small plane from Cayman Brac and landing on a field used as an air strip, Patsy and Clarke Carraway and I spent some of the hottest and most uncomfortable days imaginable there, and we can say with authority there are no specimens of *A. l. hesterna* on Little Cayman.

None of its 18 inhabitants could ever remember seeing any parrots there. In the early part of this century there was phosphate mining on Little Cayman and as a result the centre of the island has been lowered to the extent that the greater part of it is now a salt marsh. Only along the coast-line are there suitable trees for parrots to nest in or from which to obtain food and there just are not enough of such trees to support a colony of the parrots: also the island, being so low, has often in recent times been covered by the sea during hurricanes. A 1932 storm even swept away the last crocodile which was found a few days later at Spot Bay on the east end of Cayman Brac. The local people found it near a fishing hole near the beach and killed it. These islands derived their name from the Caribe Indian

word Caymanas, meaning crocodile, but there are none left on Little Cayman. Cayman Brac, being ten miles long and two wide differs from Little Cayman in having a rock bluff roughly 150 feet high at the eastern end and gradually slopes to sea-level at the western end. Though Little Cayman has a low bluff about 20 feet in height, it is confined for the most part to the coastal area. Most of the 1200 inhabitants of Cayman Brac live in the coastal area of the northern side, for the south side is bleak, dry and suffers the worst of the southern winds; also there are no wells on the south side due to the area not being high enough and far enough from the sea to make fresh water wells possible.

The top of the bluff is relatively flat, though rough and jagged with rocks: here there is a thick growth of trees, cacti and orchids. The only entrance is by footpaths difficult for the uninitiated to traverse, for it is easy to slip into one of the many fissures in the rock and thus sustain injury. This rugged area is the habitat of the Cayman Brac Amazon, but these parrots may often leave the bluff to visit the local people's gardens and fruit trees, but always return to the safety of the bluff to roost. The local people clear small areas atop the bluff in order to grow papayas, bananas, cassava, sweet potatoes, mangos and beans, and it is in these small clearings, reached only by a steep climb and the footpaths that one might see the parrots in any numbers, for here they feast on the fruit of the gardeners' labour. It was in such a plantation that we were able to see 28 of these lovely birds busily working over papaya fruit and alighting on the ground to feed off some seed-bearing plants. Hanging by the stems of the papaya leaves, these parrots cut a hole in the ripened fruit just large enough to admit the head and by this opening completely clean out the black seeds and most of the flesh of the fruit. At this time the white crowns and red cheeks and throats are so covered with the stain from the fruit that the birds in no way resemble their usual selves. They have no aversion to eating into the green fruits if no ripe ones are present and when the mangos begin to ripen in April, the same performance is repeated, but green fruits are often partly eaten and dropped in a most wasteful manner, so that a whole tree of mangos may be stripped in two days by a dozen of the parrots. Fortunately for them the people do not seem to care and take it all in their stride as they do most other matters and their attitude toward the parrots is one of indifference.

The nesting season begins in April and thereby coincides with that of the Grand Cayman subspecies *A.I.caymanensis* as well as that of the Cuban race. Usually a "cedar" tree is selected, though not a true cedar as we know it, but the wood has the aroma of the true cedar. The opening in such trees is often high up, but the actual hollow may extend down into the trunk from a branch so that the nest itself may be almost at ground level. It was from such a tree that Mr Kendall Ryan took two chicks in 1972 and I purchased them from him in December 1974. He told me that he was drawn to the tree by the noise made by the young birds and he cut his way

from the uppermost branch where the entrance was only to discover that the nest was near the ground and it was so small a cavity that he could only extricate the two chicks by means of a stick. Other trees used by the parrots for nesting are the mahogany and the "birch" whenever a suitable hollow can be found in them. The "cedar", however, appears to have a natural tendency to be hollow even in its branches and it thereby provides better nesting accommodation for these parrots.

Judging from the four trips I have made to Cayman Brac and the three months spent there by Patsy and Clarke Carraway, who I sent there to study these Amazons, there seems to be one large flock of them, numbering about 30 to 40 that forage from one end of the island to the other. We concluded that this movement takes about three to four weeks to complete and then they begin working their way back in the opposite direction. As a result of this constant movement, one may never see a large flock unless informed of their whereabouts. Since no one on the island pays any attention to them, it was by sheer accident that we stumbled on this occurrence. Once observed, we could predict where the flock would be: thereby we would simply follow their movements on a daily basis which necessitated rising before dawn (about 4.30 a.m.) and scaling the bluff to the next plantation in their pathway and we were usually rewarded.

If we failed to intercept them we knew that tomorrow they would probably be there: however, we almost always managed to see a pair or two that had left the flock and were preparing to nest on their own. As well as I could tell, this large flock seems to have been mostly of young of three years old and under. On several occasions we noticed an adult pair with two or three young still with them from last year's nest. Our time of observation covered from the end of December 1974 to May 1975.

Only after the first year do the young make their drastic change in colour from a drab green body, dull red cheeks and a dirty grey forehead to the striking vivid colours of the adults. The transformation is the most pronounced I recall seeing among any Amazons I have had as juveniles passing their first year. Even the four Grand Cayman Amazons we hatched here and hand-raised in 1974 feathered out in almost adult plumage and even though they have increased in vividness since their first year, it was nothing to compare with the young one I purchased on Cayman Brac in December of 1974, which would have made it about eight months old at the time.

Since previous descriptions of *hesterna* have been rather misleading and were no doubt based on skins rather than live birds of various ages, I think it wise to give a comparison between it and *A. l. leucocephala* of Cuba, the latter being familiar to many of the older generation of aviculturists.

The Cayman Brac Amazon is smaller than the Cuban and considerably smaller than its stockier relative the Grand Cayman subspecies, thus making it the smallest of this species group. There are several differences

that set it apart, although they may appear slight to the casual observer. The head is narrow in proportion to the broad head of the Cuban, and this is especially true in the hens whose overall size is smaller than the cocks'; also, the white of the head is generally confined to the forehead, making them easy to sight-sex in the wild. The culmen is large in proportion to the bird's body and extends from the head in a manner so as to resemble the beak of the Canary-winged Parrakeet. The two mandibles seem never to completely close so that one gets the impression that the lower mandible needs trimming. In the cocks the larger head and beak give the bird a slightly top heavy appearance: the tail is short.

The basic colour of this parrot is almost that of the nominate race with these exceptions: the vinaceous on the belly is more of a mauve which, in most specimens, extends up onto the breast and is "solid", thereby giving an apron appearance. These feathers are heavily accented with black edging which sets them off even more. In all the Cubans I have seen to date there has been a wedge shape of green feathers extending from the breast into the vinaceous, causing a jagged displacement of this colouring. Where this parrot gains in its belly colouring it loses with regard to the extent of the pink or scarlet on its head which in most specimens, especially the hens, is confined to the cheeks extending back to the black ear-coverts and with just a touch on the chin right under the beak. Those specimens that have any of this colouring on their throats usually have it modified by a cut in of green feathers which remains in adulthood, whereas in the Cuban this collar gradually disappears with age.

While I have seen, in the wild, specimens with as much red on them as any Cuban, they are indeed rare and so pronounced that they were readily distinguishable from the flock they were in. The two oldest specimens we have, both taken from the same nest, have extensive red on the throat and cheeks with a cut in of green feathers that separates the chin and throat with the exception of a line of red running down directly under the beak. These are exceptions and some of the Brac people, when seeing these exceptions, have thought they were strays from Cuba, but I assured them they were not, it being next to impossible for any parrot not borne by a storm to have flown the distance between Cuba and the Brac. The small size of these individuals would also preclude them being Cuban specimens, but these exceptions would seem to indicate a stronger link with the nominate race than in the case of *A. l. caymanensis* that seems to differ the most from it.

The eye ring is white or bluish and, while it is small, it is more pronounced than in the Grand Cayman Parrot and, like the Cuban, has an accompaniment of white feather edging around it. The green or basic colour is light to dark, depending on the specimen, with heavy black edging. The hens in general have, due to the smaller size of the head and neck feathers, a proportionately heavier edging of this black, thus giving them a darker appearance than most cocks. As a result the hens appear to

have a black mantilla (head covering) that follows the white on the crown and extends down over the ear-coverts, causing the head and back of the neck to be dark in contrast to the lighter appearance of the green back and tail. The primaries have the outer webs coloured with a beautiful shade of blue, the inner webs being black. The rectrices have the same shades of red, orange and yellow splashes on them, concealed by the tail-coverts, as the Cubans have and the two outer tail feathers have only a faint bluish tinge on the outer webs, whereas in the Cuban it is pronounced.

It is interesting to note the change that comes to these parrots after their first year is completed. The one I purchased on the island in December 1974 was so drab I was doubtful whether it was a native specimen. It had a dirty grey forehead, no more than a line above the culmen, dark maroon cheeks and a dull green overall colour, with only a trace of dull red on its belly. By the fall of 1975, however, it had turned into as beautifully coloured a specimen as any adult we saw and the mauve has completely covered the belly and lower portion of the breast.

The general changing of colours in the adult birds no doubt accounts for so many varied descriptions on record, for in the spring the cheeks are a bright scarlet; as summer approaches this may fade to almost orange and finally in the fall to rosy pink. This shade of pink is more discernible in the hens, the cocks tending toward a bright crimson. The forehead and crown are pure white, as the Cuban, with an occasional few pink, yellow or orange feathers among the white but in general specimens exhibit pure white crowns and foreheads.

The personality of this parrot differs considerably from others of the genus and from its near relatives in that even adults captured in the wild will readily tame. The close proximity with which they have been associated with people no doubt accounts for this. Those we saw that frequented fruit trees seemed totally to ignore the people who were often right under such trees.

Some of the island lore with regard to *hesterna* might be of interest. The islanders believe that only parrots with black tongues make good talkers and that the Grand Cayman Parrot is a better talker than the Brac Amazon. If you wish to get close enough to noose a parrot in a tree you have to remove all your clothing, as the bird fears the clothing and not the man. Patsy and Clarke Carraway disproved this last belief and were only rewarded with numerous mosquito bites. To my surprise some of the Brac people were not even aware that a native parrot was on their island although all these folk had been born and reared on the Brac: this again shows the lack of interest in the natural fauna.

Due to the islanders' belief in the talking ability of the Grand Cayman subspecies, there were about eight of these parrots kept as pets by different people, and I might say often kept at liberty which makes their escape and interbreeding with the local Amazon a possibility. Other parrots kept as pets there were, as I recall, one Yellow-billed Amazon, three Yellow-

naped Amazons, two Scarlet Macaws, six conures and about five of the Brac Amazon. The people, being extremely friendly and willing not only to talk about parrots but often to take you to a friend's house in order to see their bird, it was easy to locate the pet parrots on the island.

While we were there a giant project was in progress; that of putting the first real road across the bluff in the centre of the island to connect the south side with the north: at present it can be reached only by going to the west end and then along a dirt road on the south coast. The intention after this project was to run a road in the centre of the bluff from this cross road, thereby opening up the bluff for homes to be built. Such an invasion of the parrots' habitat will, I fear, be disastrous. There is a threat of the Brac becoming more of a tourist attraction; also future plans to put an oil refinery on Little Cayman which will bring many outsiders to the Brac.

I had the New Age Assembly Church sponsor Patsy and Clarke Carraway to spend three months on the island to learn as much as they could about the habits, nesting and foods of this Amazon and to bring home two pairs of them in addition to the brother-sister pair I already had. All these birds would be kept here in Central Florida at the Church-owned New Age Ranch in the hope of captive breeding, which we have been successful in doing with the Grand Cayman subspecies.

Having already obtained one young Brac Amazon, we set out to trap three more. All efforts proved futile, for regardless of this Amazon's tameness we could neither trap nor noose any. Unexpected aid came from an article printed in "The Bluff", a monthly news letter, which was entitled "The Parrot People". This article explained the reason for Patsy and Clarke's quest of parrots and the reason we wished to obtain them. With this added help we soon were able to purchase three young specimens from the local children who knocked them out of trees with rocks. Fortunately, none was seriously hurt, apparently being stunned or shocked, rather than injured. Few were ever taken from nests, as in Grand Cayman.

With this added publicity some of the more influential citizenry, some of whom live in the States as well as having homes on the island, came forward and offered assistance because they shared with us the concern for the plight of the island's wildlife. Without their influence we would no doubt have not been allowed to bring the parrots back, for more and more often the officials at Grand Cayman Airport are taking parrots from those wishing to leave with them, for fear they would be confiscated on arrival in the U.S. and put to death. A wise decision, but without a captive breeding programme it is almost certain that both subspecies will disappear from the local scene as civilisation encroaches on their already limited habitat.

It is my belief that we may have the only Cayman Brac specimens outside their habitat. None of the local people could give me any information regarding others coming to their island in recent times with any interest in parrots. It is hoped that our quest will not stir up any such interest or every child on the island will be stoning parrots in an attempt to catch them for

sale. Also, adults wishing to catch a parrot told me they used a gun which sometimes proved fatal. We told them we would not pay for any specimen so obtained and thereby put a stop to these birds being shot while we were there.

In January 1975 when I returned to Grand Cayman from Cayman Brac, I had the pleasure of meeting Dr. Alexander Wetmore and showing him the first specimens of *A. l. hesterna* he had ever seen. Dr. Wetmore had just returned from hacking his way through the mangrove swamp with his famous large knife which has travelled with him for so many years, in order to see some of the many birds that winter on Grand Cayman. Dr. Wetmore, at 89 years, is still very much involved with the Smithsonian Institute and in his travels and writings. His writings, from the early twenties to the present time, have given us so much of our present knowledge on birds of the Caribbean, Central and South America.

We have three pairs of the Cayman Brac Amazon and since our first brother-sister pair are four years old, we hope for a first breeding from them. They showed much interest in their nest box this spring past and have steadily become more aggressive as breeding pairs tend to do. Placing these specimens beside our five adult Cubans and twelve Grand Cayman Amazons one is better able to get a true picture of the difference that exists between these three parrots, as well as seeing the noticeable similarity. There is as much difference between the nominate race and that of Grand Cayman (*A. l. caymanensis*) as there is between a Blue-fronted Amazon *A. aestiva* and the Orange-winged Amazon *A. amazonica*.

It has always fascinated me how the early ancestors of these Amazons must have "island hopped", possibly borne by hurricanes, to span so wide a range from the Caymans, Isle of Pines, Cuba and the Bahamas. Consider the close relationship of the San Domingo Amazon (*A. ventralis*) of Hispaniola and Gonave Island and the Yellow-billed Amazon (*A. collaria*) of Jamaica, all of which must have had, due to the similarity, a common ancestor. Many believe *A. albifrons* to have shared this common ancestor. However, recent studies on St. Vincent and Dominica seem to indicate that some of the island Amazons may be older than those on the mainland. This would throw an entirely different complexion on the situation, for one might speculate whether the original birds came from Central and South America and worked their way north-eastward or whether they originated from some bygone larger land mass in the Atlantic and worked their way south-westward. We know that bones of *A. l. bahamensis* found in caves date back three thousand years, showing the early Amer-Indians used them for food and possibly kept them for pets. While these few years are but a drop in the ocean of time who knows what might yet be uncovered if we persist with an open mind?

On Cayman Brac there are an estimated 200 caves, and many on the bluff that have yet to be discovered. The floor of Great Cave on the south-east end of the island is littered with fossilized bones of a long extinct

rodent as well as bird and bat bones washed down into the cave from the bluff top above. It would prove interesting to have this carbon-dated but unfortunately little work of this kind had been done on the Brac. Many speculate that these islands were never visited by any Amer-Indians, but this seems unlikely and merely means that there might not have been a permanent settlement on them due to their lack of fresh water, though wells can be dug and water often collects in deep holes on the bluff. At any rate, as well travelled as these first Americans were, it is doubtful that they were not aware of the Cayman Islands and landed on them. What telltale marks they left in caves could have easily been destroyed by early pirates and early settlers. During any future visit to Cayman Brac I intend to spend more time in the caves in the hope of finding some indication of such visitations or of the Brac Amazon.

The last four Cayman Brac specimens obtained from the wild have proved fussy feeders and have taken longer to adjust to seeds, preferring fruits and vegetables; however, once accustomed to this new diet, they have all but refused other foods in preference to seeds. The two hand-raised by Mr. Kendall Ryan make no such distinction but readily eat anything offered them. I must here remark that among the parrot's favourite foods on the island is the West Indian almond. The pulp surrounding the nut is eaten when green or when it ripens to a rich orange or red. The islanders all vouch for the parrots' love of this fruit and give it to their pets as a supplement to seeds. Interestingly enough, the kernel of the nut is seldom eaten.

These are indeed delightful Amazons, being active to the point of nervousness. Add to this their vivid colouring and you have an adorable bird. Let us hope that captive breeding proves successful so we can place the offspring with other breeders to help ensure this beautiful Amazon for posterity.

* * *

NEW BRITISH REGULATIONS ON IMPORT AND QUARANTINE OF BIRDS

By JANET KEAR (Slimbridge, Gloucestershire)

Restrictions on the import of birds into Britain have altered dramatically in the past year. The Convention on International Trade in Endangered Species of Wild Fauna and Flora was signed in Washington, USA in 1973. It was implemented by the UK Government on January 1st 1976 (under the Import, Export and Customs Powers (Defence) Act 1939) and ratified on August 2nd 1976. The earlier Wild Birds Importation Order (1970) which had already restricted the import of birds of prey and owls was incorporated, and the full implementation of the Washington Convention was completed by the passage through Parliament of the Endangered Species (Import and Export) Act 1976. At the same time, the Ministry of Agriculture has imposed new import restrictions on *all* captive birds.

1. The Washington Convention lists numerous birds in two appendices and licences to import or export any of these species have to be obtained from the Department of the Environment. Appendix 1 (Endangered) contains animals that were considered, by delegates at the original Convention, to be threatened by extinction and which are or may be threatened by trade. Appendix 11 (Vulnerable) contains those that, although not at the moment threatened with extinction, might become so unless trade is subject to regulation. Appendix 11 also contains the so-called "look-alike" species, those not threatened themselves but are so similar to a threatened species that they are included to aid enforcement.

1a. Lists A & B.

The British legislation follows the Convention closely with certain variations and, to avoid confusion, the appendices are called List A and List B. Licences for birds on List A are issued by the DOE only on the advice of a Scientific Authority and they will not be issued for primarily commercial purposes. All birds of prey and owls have been treated as List A species. Permits are also required by contracting states to export List A birds. Licences for the import of species on List B will normally be issued readily on presentation of a permit to export from the country of origin. Here the aim is merely to keep a check on what is being brought in and out, and the DOE will publish statements of its findings at intervals. Licences are required for listed species, whether the individual concerned was taken from the wild or hatched in captivity: however, a licence to import or export a List A bird is obviously more likely to be granted if it can be shown to have been captive-bred.

1b. Possible Future Changes in the Listings.

It has been obvious to many persons that the original schedules in the

Washington Convention were ill thought out and required modification. To take some waterfowl examples—the Comb Duck, which is widespread and locally a pest in Africa, S.E. Asia and India, is listed, apparently at the request of a South American country where another race of the species also occurs; Jankowski's Swan, the postulated eastern race, but barely distinguishable from the much rarer western Bewick's Swan, is listed, while the Bewick's is not; *Anas oustaleti* from the Marianas Islands which, according to most authorities, is not even a species but a hybrid, is listed. The Chilean Flamingo, of which there are thought to be approximately 500,000 in the wild, is listed, while the much more sought-after Caribbean Flamingo, with only 60,000 individuals, is not. At the moment, not even all the IUCN Red Data Book species are included. Some of these discrepancies were to have been sorted out at an international meeting of the parties to the original Convention held in Berne, Switzerland, in November 1976. However, time was too short, and the bird lists are still in a state of some confusion. In general, it is likely that species will be added to the lists rather than removed.

1c Import and Export by Air.

Incidentally, Washington Convention animals shipped by air must now travel in crates that conform to IATA regulations, and this is specified on the licence.

2. An additional restriction that has affected UK aviculturists is the Importation of Captive Birds Order (1976) which came into operation on March 1st 1976, primarily to limit the spread of Newcastle disease. It extends the Live Poultry and Hatching Eggs (Importation) Order (1972), which had already subjected fowls, turkeys, geese, ducks, guineafowl, pheasants, partridges and quail to control. The conditions for import of these exotic poultry (for example, all wildfowl except swans, screamers and flamingos) are now tightened so as to be similar to the conditions for the import of parrots. Exotic poultry and parrots are thought to be more likely to introduce Newcastle disease to the UK's domestic poultry flocks than other bird groups. The new order prohibits, except under licence from the Ministry of Agriculture, Fisheries and Food, the importation of all captive birds or hatching eggs, and these normally have to be retained in quarantine or isolation, for 35 days at premises approved by MAFF.

2a Concessions.

At the moment, a "non-psittacine concession" (which, remember, does not apply to exotic poultry) is in operation until importers are able to establish their own quarantine premises, and this concession is to be continued indefinitely. There is also a concession under which up to 12 parrots or exotic poultry (or eggs) can be imported from a country of low disease risk (currently Western Europe, North America, Iceland, South Africa, Australia and New Zealand). But these birds, or the females laying the

eggs, must have been captive for 28 days and be accompanied by a health certificate from a veterinary officer.

2b Isolation.

Such "concessionary" birds need only be "isolated" for 35 days and visited by a local Veterinary Inspector. Isolation premises can be within the owner's home or establishment, and must be approved by a Veterinary Officer at a normal cost of £35. In the case of isolated imports, staff may tend both imported and resident birds, but are advised to take hygienic precautions.

2c Quarantine.

Full quarantine, on the other hand, is required for shipments of more than 12 parrots or exotic poultry (or eggs), or for any number from a high risk area (currently including the Near and Far East and most of Africa and South America), or for any birds or their eggs that have not been in captivity for 28 days. Quarantine premises have to be $\frac{1}{2}$ mile from the nearest concentration of birds, including domestic poultry. "Control" birds, unvaccinated domestic chicks between four and eight weeks old, must be held in the same air space as the imported ones. The controls will be tested for Newcastle disease at the beginning and end of the quarantine period. Even with "isolated" imported birds, the Ministry retains the option to require controls. Any birds that die while in quarantine or isolation will be examined *post mortem* by MAFF.

Quarantine or isolation extends for 35 days from the date of the *last* import, or when the last imported egg hatches, and the minimum interval between quarantines or isolations is seven days. Staff tending birds in full quarantine must not be involved in the care of other resident birds. To ensure responsible supervision, owners or managers may visit imports in quarantine after undergoing strict disinfection procedures and undertaking that they will not have contact with other birds for the next 12 hours.

2d Airports and Vehicles.

The carrier and actual vehicle moving the animals between the port and quarantine or isolation premises must be specified in the licence (and the vehicle will need disinfection between trips). Eventually, only a few airports and ports will be able to handle birds entering and leaving the country—probably the same ones used in rabies control.

3. *Where to obtain Licences.*

Memoranda on Control of Imports of Captive Birds into Great Britain, and Scale of Charges (Statutory Fees), and licences can be obtained from:

MAFF
Hook Rise South
Tolworth
Surbiton, Surrey

Your local MAFF Office will be glad to advise.

Applications for licences and any enquiries about Washington Convention species should be sent to:

DOE
Wildlife Conservation Licensing Section
17-19 Rochester Row
London, SW1P 1LN

4. Suggested reading:

Endangered Species (Import & Export) Act 1976. From: HMSO, 49 High Holborn, London, WC1V 6HB, and regional branches.

Live Animal Regulations. From: IATA, PO Box 160, 1216 Cointrin-Geneva. Switzerland.

Airborne Birds. A further study of Importation of Wild Birds into the United Kingdom. From: The RSPB, The Lodge, Sandy, Bedfordshire. Price £1.

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ADDENDUM

The Government has now subjected the majority of bird species to licence. List A in the British Endangered Species Act 1976 is still equivalent to Appendix 1 of the Washington Convention, but most other species are now on list B. There are one or two exceptions; in the case of waterfowl for instance, domestic forms of the Mallard, Muscovy Duck, Greylag and Chinese Goose are excepted kinds.

The Notice to Importers and Exporters dated January 17th 1977 should be obtained from the Department of the Environment.

* * *

NOTES FROM FLORIDA

By J. DELACOUR (Clères, Seine Maritime)

During a recent visit to Orlando, Florida, on the occasion of the annual meeting of the International Wild Waterfowl Association, I had the pleasure of visiting the fine collection of birds that Dr. and Mrs. Michael Dam maintain in the neighbourhood with the enthusiastic assistance of their two young daughters. The grounds are extensive, with large ponds: the almost tropical climate is excellent for birds from warm countries and very wisely, none from the colder areas are tried there. There are several hundreds of birds ranging from Ostriches, rheas and Emus to waterfowl and game birds housed in roomy, well built and well planted aviaries, and the breeding results are highly satisfactory. The pheasantry contains such rare species as Bulwer's and all the different firebacks, Argus and peacock pheasants, Horsfield's and Edwards's, the last named in some numbers. There are many swans, particularly Black Swans which live and breed in a large colony: they are literally resting in a thick bed of duckweed, which covers the waters. These most useful and nourishing floating plants grow so fast there that the birds cannot eat them all as they do in less favourable places. Great success is met with Radjah Shelducks, of which I saw well over a hundred—Orinoco and Maned Geese, and a number of tropical and subtropical ducks: tame Sandhill Cranes roam the grounds.

There is in the vicinity of Orlando an excellent replica of the Sea World of San Diego, and it also displays a beautiful collection of waterfowl, flamingos and penguins under the supervision of Mr. Frank Todd and the care of Mr. E. Asper. Many species breed there and the grounds are beautifully landscaped, planted and kept.

The very large Disneyland, also in the area, includes a vast freshwater lake with, in the middle of it, a "Treasure Island", most cleverly landscaped and planted, which is a dream of a tropical jungle. There are several big, well camouflaged flights, with macaws and other parrots, birds of prey, waterfowl, game birds and, particularly, a huge one which visitors enter and cross on a long rustic, winding bridge—Scarlet and Sacred Ibises, Argus, Palawan Peacock Pheasants, hornbills, toucans, Crowned Pigeons, whistling ducks and a few other suitable species are discovered here and there, just as they would be in their natural habitats, and it is a most successful exhibit. A flamingo lagoon follows before you reach the sandy beach and board a boat to leave that enchanted island.

NEWS FROM THE BERLIN ZOO

(October – December 1976)

By HEINZ-GEORG KLÖS (Scientific Director)

Birds hatched:

1 Swan Goose *Anser cygnoides*, 8 Ring-necked Pheasants *Phasianus colchicus*, 1 Crowned Pigeon *Goura cristata*, 3 Collared Turtle Doves *Streptopelia decaocto*, 1 Laughing Dove *Streptopelia senegalensis*, 2 Peach-faced Lovebirds *Agapornis roseicollis*.

New arrivals:

1 Southern Black-backed Gull *Larus dominicanus*, 1 Black-throated Diver *Gavia arctica*, 2 White-faced Tree Ducks *Dendrocygna viduata*, 2 Canada Geese *Branta c. canadensis*, 2 Abyssinian Blue-winged Geese *Cyanochen cyanopterus*, 2 Magellan Geese *Chloephaga picta*, 4 European Green-winged Teal *Anas crecca*, 4 Falcated Teal *Anas falcata*, 10 Chiloe Wigeon *Anas sibilatrix*, 6 Northern Pintails *Anas acuta*, 4 Common Shovelers *Anas clypeata*, 4 Lesser Scaup *Aythya affinis*, 8 Barrow's Golden-eye *Bucephala islandica*, 2 Red and White Crakes *Laterallus leucopyrrhus*, 1 Crested Serpent Eagle *Spilornis cheela*, 1 Kestrel *Falco tinnunculus*, 1 Grey Parrot *Psittacus erithacus*, 1 Blue-fronted Amazon Parrot *Amazona aestiva*, 1 Panama Amazon Parrot *Amazona panamensis*, 2 Blue-crested or Hartlaub's Turacos *Tauraco hartlaubi*, 3 Lilac-breasted Rollers *Coracias caudatus*, 1 Indian Shama *Copsychus malabaricus*, 2 Golden-fronted Chloropsis *Chloropsis aurifrons*, 2 Coppery Sunbirds *Cinnyris cupreus*, 2 Collared Sunbirds *Anthreptes collaris*, 2 Long-tailed Grassfinches *Poephila acuticauda*, 2 Zebra Waxbills *Amandava subflava*, 4 Orange-cheeked Waxbills *Estrilda melpada*, 2 Red-cheeked Cordon Bleus *Uraeginthus bengalus*, 2 Jameson's Firefinches *Lagonosticta rhodopareia*, 2 Peters's Twinspots *Hypargos niveoguttatus*, 2 Coletto Mynahs *Sarcops calvus*, 2 Indian White-eyes *Zosterops palpebrosa*, 1 Hooded Crow *Corvus corone cornix*.

THE REARING OF TWO EAST AFRICAN CROWNED CRANES

Balearica regulorum gibbericeps

In our zoo we keep 11 East African Crowned Cranes in two groups which inhabit two wide enclosures with grass and bushes. In 1976 two birds suddenly became intolerant towards the others which, therefore, had to be removed and at the end of June the pair had built a large nest of branches, leaves, and grass and on July 3rd and 5th two eggs were laid. As this species had never before bred in our zoo, we took the eggs away and put them into an incubator. On July 9th and 12th the third and fourth eggs were laid which we also took to the incubator, and in exchange we put a goose egg into the nest: after three days the cranes stopped brooding. On

July 29th and 31st she laid the fifth and sixth eggs. While the last four eggs were infertile, two chicks hatched on August 4th and 5th after an incubation period of 30 and 31 days. The nestlings were tawny and pale chestnut, darkest on the crowns of their heads and down the centre of their backs. They were hand-reared successfully by the head keeper of our bird section and fed a special diet consisting of insects, young mice, etc. Since then the young birds have changed their appearance very much. Now they have the top of their heads buff and black and a short crest: their cheeks are covered in buff-coloured down and their mantles and scapulars are tipped with dark tawny. This year the breeding pair will occupy the same enclosure in the hope that nesting will again be successful.

NOTES ON CLÈRES—1976

By J. DELACOUR

Once again freak weather played havoc with the birds in 1976: we had a very hard frost at the end of May, when many waterfowl were ready to nest, and it just stopped them. Many species simply did not lay, not even usually reliable breeders such as Black Brant and Ross's Geese; we had no eggs from Red-breasted and very few young from Emperor, Greenland White-fronted, Bar-headed and Swan Geese. Unfortunate hybrids cropped up in the broods, Emperor x Bar-headed, Barnacle x Emperor, Barnacle x Bar-headed and Black Brant x Cackling. It is inadvisable to rear together chicks of different species, as they may become imprinted to each other and pair badly.

Sarus, Demoiselle and Crowned Cranes never nested at all, but a pair of Wattled Cranes laid seven eggs, all of them infertile. A fair number of ducks were reared, none particularly rare. Among the young pheasants were seven Edwards's, four being females. Our collection has been much improved thanks to the generosity of Mr. C. Sivelle, Mr. K. Howman and Major I. Grahame, who sent us pairs of Bornean and Malay Firebacks, Ijima's Copper, Cheer and other pheasants; also Germain's Peacock Pheasants. We also acquired Bronze-tailed Peacock Pheasants, a species recorded breeding in captivity for the first time at Clères before the war.

A number of doves were reared, particularly Mountain Witch and Bleeding Heart. It was a good year for touracous and we raised four Senegal, three Knysna and one White-cheeked; the latter was produced by a pair living at Clères for more than 20 years. They had never nested successfully before and they are of such a murderous disposition that they have to be kept strictly by themselves in a separate aviary, as they attack even large pheasants.

The flamingos settled down to breed on the southern bank of the lake in May, building their own nests without any help, the Caribbean seven,

Greater one and Chilean five, a little farther away. They all incubated their eggs normally, but only one (Caribbean) hatched and was reared without any special care.

NEWS AND VIEWS

A male Citron-crested Cockatoo belonging to S. B. Kendall has reared young every year since 1956, although he is now with a different female. In 1976 a single chick was reared by two pairs of Citron-crests in Dr. Kendall's collection.

* * *

Writing from Ljungbyhed, Sweden, Mats Tell says, "It seems that my birds enjoyed the drought and heat during the 1976 summer, but the breeding results were poor. I bred five Virginian Cardinals, five Green Avadavats, four Silver-eared Mesias, five Sun Conures, and one Bourke's Parrakeet. My two pairs of *Eclectus (vosmaeri)* had eggs, but these did not hatch; the Lesser Patagonian Conures did not go to nest and there were no young Aymara Parrakeets. The old hen hatched some chicks, but did not feed them and the young pair had infertile eggs".

* * *

Four Philippine Night Herons *Nycticorax caledonicus manillensis* have been hand-reared at Cologne Zoo, the eggs being artificially incubated. Two of the chicks developed deformed toes, due, it is thought to the surface on which they were reared, and in future this would be twigs, like the natural nest, and not a flat surface.

* * *

Parrakeet or parakeet? The latter is increasingly being used, but for what reason? It can hardly be derived from the French 'peroquet'=parrot, 'perruche' being parrakeet. Is it change for the sake of change or one of those short cuts like 'paleartic' or 'behavior'?

* * *

Notable breedings of birds listed in the Royal Zoological Society of South Australia's 98th Annual Report (1975-76) are "five species of cormorant, two Razor-billed Curassows, a Rock Pigeon, three Cloncurry

Parrots, a Gang-Gang Cockatoo, four Major Mitchell Cockatoos, three Regent Bower-birds, three Eastern Whipbirds and a White-browed Scrub-wren". The most noteworthy success was, however, the hand-rearing of six Scarlet Macaws, especially valuable since no importation of birds is allowed.

* * *

A pair of Sharp-tailed Conures *Aratinga acuticauda* belonging to Mr. K. Bastien bred three young in 1971, possibly a first British breeding of this species. Mr. Bastien, now curator of the Tropical Bird Park at St Lawrence, near Ventnor, Isle of Wight has informed us that the pair has reared young each year since then, three or four being raised on each occasion except for 1976 when only two were reared. To date every chick hatched has left the nest and nine of the young birds have been retained to fly in a large aviary with other conures. Some have been sold as pets and have compared favourably with macaws, becoming tame and affectionate and learning to talk a little. The young birds which fly together have not attempted to breed, probably, as Mr. Bastien points out, because they will not nest in the company of others. When the young birds were left with the original pair, the adults made no attempt to breed, but the hen would be inside the nest within three or four days of their removal.

A few of the young birds have very brightly coloured red spots on the shoulder or leading edge of the wing, a feature which is not present in the adults.

* * *

It is recorded in BRITISH BIRDS that the number of breeding pairs of Avocets in England in 1975 (c. 158) was probably a few more than in any previous year and the young reared at least 142-149; Minsmere, where the population was the highest ever recorded there, and Havergate Island accounting for most of them.

* * *

The notes on the Blakiston's Fish Owl published in the April-June edition of the Magazine prompted Mats Tell to send details of another example of this rarely exhibited species. Mr. Sten Bergman, writing in his book DJUR (Animals), states that in 1930 he encountered a hand-reared Blakiston's Fish Owl being kept as a pet by a Japanese gentleman named Hirose who lived in the town of Nemuro on the island of Jesso. This owl had been captured, as a baby, the previous year on the island of Kunashiri and was reportedly reared on an unlikely diet of condensed milk and when older, it was fed entirely on fish. This bird was subsequently given to

Dr. Bergman who took it back to Sweden with him. Initially it was retained by Dr. Bergman who attempted to pair it to a Great Eagle Owl *Bubo b. bubo* but the two birds proved to be incompatible and after four years the Blakiston's was transferred to Skansen, Stockholm. It apparently lived for more than twenty years in captivity.

* * *

Mats Tell also reports that about 40 Great Eagle Owls were bred in captivity in Sweden during 1976. Most of these birds will be released as part of a reintroduction programme.

* * *

The White-tailed Sea Eagle *Haliaeetus albicilla* also enjoyed quite a successful breeding season in Sweden last year with about 15 young safely reared. Swedish conservationists think that this improved result may partly be attributable to the fact that food is now laid out for resident pairs during the difficult months of winter. It is believed that, in winter, the Swedish population of White-tailed Sea Eagles obtained much of their food by scavenging wolf kills and now that wolves are almost extinct this source of food is no longer available. It is therefore reasoned that this factor might account for the decline of this species in inland areas and as a result the feeding programme was instigated.

* * *

The December edition of the BULLETIN OF THE B.O.C. contains what is believed to be the first written description of the nest and egg of the Fischer's Turaco *Tauraco fischeri*. P. L. and H. A. Britton report that a nest was located at a height of 25 ft. in the canopy of a msambarau *Syzygium cumini* tree at Mombasa, Kenya. The nest was inspected after it had been deserted and was found to consist of an unlined, loosely constructed platform of twigs. The single egg that it contained was greyish-white and almost spherical, measuring 36.1 x 34.6 mm and weighed 22.6 g (about 8-11 per cent of body weight).

* * *

Further to the notes in Vol. 82 part 2 of the Magazine, the unusually coloured female Kestrel *Falco tinnunculus* at Banham Zoo has now conclusively proved that it is a breeding bird, as it successfully reared five eyasses last summer. Also two further specimens of the Milky or Verreaux's Eagle Owl have been imported, bringing the known total in Britain up to four. One has joined the single bird in Phillip Dugmore's collection and

the other specimen is being exhibited at Harewood Bird Gardens. It is to be hoped that a viable population of this magnificent species can be established from this nucleus.

* * *

Dr. Peter Richards reports the hatching, in his aviaries, of two unusual hybrids between the Jay *Garrulus glandarius* and the Lanceolated Jay *Garrulus lanceolatus*. Unfortunately, the two chicks were not reared.

* * *

Derrick England was most unfortunate to lose two young of the rarely bred Blue-backed Manakin *Chiroxiphia pareola*. This occurred as a result of the parents unexpectedly deserting their chicks.

* * *

Bernard Sayers' Rusty-barred Owls laid again on December 19th 1976 and it is hoped that they will repeat their previous success.

* * *

Cees Stapel the manager of Daws Hall Wildfowl Farm returned from Nepal in November with ten pairs of Blood Pheasants *Ithaginis cruentus*. This collection, owned by Major Iain Grahame, has the distinction of being the first to breed this species in captivity. Aviculturally, this pheasant seems to require similar treatment to grouse.

* * *

A new book, RARE PHEASANTS OF THE WORLD, has been released by Spur Publications. In this D. Grenville Roles, the author, describes the progress to date that aviculturists have made in establishing the less commonly kept species. The book measures 8½ in. x 12 in., contains 106 pages and includes two coloured and 27 black and white plates. All illustrations were drawn by the author and occupy a full page. This book can be obtained from:- The Secretary, W. P. A., Daws Hall, Lamarsh, Bures, Suffolk for £8.25.

* * *

In the 1976 stock inventory of the Highland Wildlife Park two interesting hybrids between the Lesser White-fronted Goose *Anser erythropus* and the Barnacle Goose *Branta leucopsis* are listed. This hybrid was, according

to Yarrell, bred in the early 1840's by Lord Derby and a specimen was presented to London Zoo in 1844.

* * *

The R.S.P.B. has released a new report entitled AIRBORNE BIRDS. This booklet gives an account of the birds imported into Britain during 1975/1976 together with details of packing, mortality etc. It is reported that about 371,000 birds were imported into Britain during 1975. In addition, about 323,500 birds passed through Heathrow Airport en route to other countries. The mortality rate of birds passing through the R.S.P.C.A. hostel at Heathrow during 1975 is shown to be 3.9 per cent in the case of imported birds and 2.2 per cent in the case of birds in transit.

M. H. H.

CORRESPONDENCE

MATING DISPLAY IN THE STRIPE-BREADED STARThROAT HUMMINGBIRD

As far as I am aware, the brief description by R. J. Elgar (A.M. 1976 pp 83-84) of the display in the Stripe-breasted Starthroat *Helimaster squamosus*, is the first time anything has been written (in English) on the subject. I would therefore like to enlarge a little on the actual display.

Many species of hummingbirds, even when from a different genus, perform displays which are similar; however, of the species I have studied, none has a display remotely like that of the *Helimaster*. As Mr. Elgar states, when displaying the Stripe-breasted (usually) hovers in front and a little below the bird to which the display is being directed. I have found, however, that should the starthroat display to a bird which is perched near to the ground, it will hover above the latter, with the head and beak directed downwards. The movements described by Elgar as "jerky" are in fact caused through the bird folding the wings against the body, thus causing it to drop approximately 4 or 5 inches, when it will open the wings and rise again to its original position. The opening and closing of the wings causes the bird to rise and fall extremely rapidly, each position being held for only a matter of a second. During the performance, the wing-beats are so rapid, they make a "zumming" sound and throughout the display one can hear an intermittent "zum - zum - zum" etc. The tail feathers are fanned during the downward movement and closed during the upward.

Elgar describes the song as "chr chr chr tss". I always find great difficulty in putting bird-song down on paper; however, I consider the advertising

song of the Stripe-breasted Starthroat to be much more drawn out than Elgar's description would suggest, with the "chr" note lasting approximately $1\frac{1}{2}$ seconds. There appear to be two forms of "chr-ing" notes, one slightly higher pitched than the other, the former being used as the bird inhales and the latter as the bird exhales.

The Stripe-breasted Starthroat in Mr. Elgar's collection was in fact acquired for him by me and during the few days it spent in my birdroom awaiting collection, I was able to compare its song with that of my bird. Although basically much alike, there is a recognisable difference between the two songs; that of Elgar's bird having the more usual drawn-out notes, whereas my bird has a stuttering-type song. There is also difference in plumage coloration, my bird being lighter than Elgar's. Differences in song patterns from the same hummingbird species have been recorded when the birds in question have been taken from different areas: however, I have not heard of differences in plumage coloration when the species concerned has no known races.

The taking hold of a bird's throat or breast feathers by a displaying Stripe-breasted is, in my opinion, a form of "vent-pecking". I believe this to be so as my Stripe-breasted can be seen to take hold of a bird's vent feathers rather than those of the throat or breast. I described this activity in the Andean Emerald Hummingbird *Amazilia franciae* (A.M. 1972 pp 173-176). Little appears to be known with regard to this activity in hummingbirds. Skead (1967) in *SUNBIRDS OF SOUTHERN AFRICA; (ALSO SUGARBIRDS, WHITE-EYES AND THE SPOTTED CREEPER)*, describes it as "common to all sunbirds" and as having "a place in the courtship display" and believes it to be a form of copulatory stimulation practised by the male. As "vent-pecking" in the Trochilidae appears to be used only during or immediately after mating display, it is possible the same applies to this family.

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A. J. MOBBS

RARE AUSTRALIAN PARROTS

There are certainly many species which, for one reason or another, aviculturists should not attempt to maintain in captivity. However, Alastair Morrison's suggestion (*AVICULTURAL MAGAZINE*, April-June 1976, page 117) that the Avicultural Society should draw up a list of such species is impractical and his opinion that Hooded and Golden-shouldered Parrots should be prominent on the list is preposterous. No one will deny that aviculture has an important part to play in the conservation of species which are in danger of extinction, and the establishment of strains of

species which adapt themselves particularly well to conditions in captivity is an equally fascinating and important aspect of aviculture.

It is reassuring to learn that the status in the wild of Hooded and Golden-shouldered Parrots is not threatened despite the fact that their geographical distribution is so limited: however, the inaccessibility of the parts of Australia which they inhabit is so great that few ornithologists will ever be lucky enough to enjoy the excitement and privilege of seeing them in the field. I have not been fortunate enough to possess the Golden-shouldered, but I have had Hooded Parrots which, with their charm and incredible beauty, were the most delightful birds I have ever kept. I have visited many aviaries in Europe and Australia where the two are kept and bred successfully and their owners are unanimous about their many attributes. Many more would probably be bred in Europe if it were not for their tendency to moult in the summer but, in this respect, they represent a challenge to the aviculturist and provide opportunity for the scientific study of unusual breeding behaviour.

The fact that some European aviculturists are willing to pay very high prices for them is only a reflection of their desirability. They are valuable because they do well in captivity and are likely to breed and give their owners some return for their money. Considerably more rare species unlikely to become domesticated will never become so valuable.

It is a tragedy that large numbers of Hooded and Golden-shouldered have perished as a result of the deplorable activities of parrot smugglers; however, aviary-bred birds were probably more readily obtainable for illegal export than wild-caught specimens. On the other hand, smuggling activities have resulted in a regrettable reduction in the aviary population. If only the Australian authorities would permit the licensed export of limited numbers of Hooded and Golden-shouldered Parrots, a domesticated strain of both would surely be developed rapidly in Europe, as has been done in Australia, for the delight of us all. There can be few species more suitable for aviculture.

Craignair, Cuckoo Hill,
Pinner, Middlesex.

J. R. HODGES

With reference to Mr. Morrison's letter in the April/June issue of the Magazine. I feel that certain basic inaccuracies cannot be allowed to pass unchallenged, as the above letter considerably underestimates the role of aviculture in conservation.

I have no quarrel with Mr. Morrison's views on the two rare parrakeets mentioned, as I have had few dealings with this group of birds. Possibly these *are* too small in number to warrant the taking of individuals to add to a captive population. However, it must be advantageous for any species to have a captive self-sustaining population in addition to the natural one.

With a common species this provides research material without unduly disturbing the wild population; the more that is known about a species, the better it can be conserved in the light of such knowledge. Where endangered species are concerned, in addition to the above research facility, a captive stock provides an insurance against the species becoming extinct altogether. This is especially the case with island species such as the Laysan Teal; disease or introduced predators could wipe out the wild population of this duck with ease. However, the island could be swiftly restocked with captive-bred birds once the cause of extinction had gone.

It is perhaps as well to remember that certain species—notably Imperial *Lophura imperialis* and Edwards's *L. edwardsi* Pheasants will certainly owe their long-term survival, if any, to captive propagation. Mr. Morrison's sweeping condemnation of all those possessing rare animals is ill advised. Had M. Jean Delacour not collected the original pair of Imperial Pheasants and taken them to Normandy in 1923, the species would almost certainly not exist today.

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PHILIP G. SCHOFIELD

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 1973 OSIS, LAIMONS; Rt. 2, Box 90, Seal Rock, Ore. 97376, U.S.A.
 1947 OVEREND, Miss EUNICE; Winterset, Hoopers Pool, Southwick,
 Trowbridge, Wilts.
- 1975 OWEN, RONALD E.; 13 Dunsmore Ride, Monks Risborough, Nr.
 Aylesbury, Bucks.
- 1976 OWENS, D. A.; 14 Tavistock Close, Tamworth, Staffs.
 1960* OXLEY, R. E.; 2 Sutton Avenue, Hornchurch, Essex.

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- 1974 PACER, K.; 1796 Hamilton Street, Toledo, Ohio 43607, U.S.A.
 1975 PADGETT, JOHN R.; 7 Round Oak Road, Weybridge, Surrey, KT13 8HT.
 1975 PAINE, R. F.; Brean Down Bird Garden, Brean Down, Nr. Burnham-on-Sea, Somerset.
 1965 PALIN, ALAN DAVID; 17 Nichol Road, Eccleston, St. Helens, Merseyside, WA10 5LN.
 1975 PALMER, CLIFFORD C.; "Langdale", Southend Road, Sandon, Nr. Chelmsford, Essex.
 1976 PAPE, B. M. B.; Ravensden Farm, Bedford Road, Rushden, Northants., NN10 0SQ.
 1954 PARIS, PETER G.; Boskenna Nurseries, St. Buryan, Nr. Penzance, Cornwall.
 1975 PARKER, R.; Church House, Kingswood Common, Nr. Albrighton, Wolverhampton.
 1956 PARKES, Dr. K. C., Ph.D., M.B.O.U.; Carnegie Museum, Pittsburgh, Pennsylvania 15213, U.S.A.
 1969 PARSONS, Mrs. JAMES K.; 15519 Densmore N., Seattle, Washington 98133, U.S.A.
 1969 PARTRIDGE, Mrs. A. B.; Lower Haselor, Evesham, Worcs.
 1952 PARTRIDGE, PETER B.; 164 Waverley Avenue, Twickenham, Middlesex.
 1975 PASCOE, H.; 12 Trafalgar Row, Truro, Cornwall.
 1960 PASLEY-TYLER, Comdr. H., R.N.(Retd.), C.B.E.; Coton Manor, Guilsborough, Northants.
 1968 PATEL, Dr. M. B.; 15 Tring Road, Edlesborough, Nr. Dunstable, Beds., LU6 2PX.
 1950 PAYNE, C. M., F.Z.S., O.B.E.; The Wren's Nest, Little Shrewley, Warwickshire.
 1965 PEAK, LIONEL; Country Side Bird Gardens, 9 Droitwich Road, Feckenham, Redditch, Worcs.
 1976 PEARCE, NEIL A.; 3628 Califon Drive, Columbus, GA 31906, U.S.A.
 1972 PEDERSON, BENT; Alleen 22, 4736 Karrebacksminde, Denmark.
 1960* PENWARDEN, K. L.; (Address Unknown).
 1975 PERRY, K. A.; 16 Highfield Avenue, Erith, Kent, DA8 1EL.
 1965 PETERS, ROBERT; 8301 Mirskofen 52, Nr. Landshut, Ahornstr. 12, W. Germany.
 1969 PHIPPS, G. R.; 40 Hebe Street, Greenacre, N.S.W. 2190, Australia.
 1968 PHIPPS, R. W.; The Garden House, Battlemead Close, Maidenhead, Berks.
 1971 PINKOWSKI, BEN; 15738 Millar Road, Fraser, Mich. 48026, U.S.A.
 1934 PITT, W. S.; Wildwood, Silverdale Avenue, Walton-on-Thames, Surrey.
 1969 PLAYER, PETER VAL; The Rectory, Beeford, Driffield, Yorks.
 1969 POCOCK, LLOYD FRANK; 2 East Lodge, Epsom Road, Leatherhead, Surrey.
 1958 POE, Mrs. FRANCES M.; 147 Linden Avenue, Wilmette, Illinois 60091, U.S.A.
 1973 POWELL, JEFFREY; Silver Birches, Hermitage Lane, Goostry, Cheshire, CW4 8HB.
 1928† PRESTWICH, ARTHUR A.; Galley's Wood, Edenbridge, Kent.
 1949† PRESTWICH, Mrs. A. A.; Galley's Wood, Edenbridge, Kent.
 1975 PRIOR, L. J.; Windleaves, South End, Snetterton, Norfolk, NR16 2LG.
 1975 PYPER, STEWART; 21 Primrose Hill, Nunney, Nr. Frome, Somerset.
 1973 RAASTAD, JAN E.; GML, Drammensuei 103. 1322 Høvik, Norway.
 1976 RAIKES, Mrs. J. M.; The Ridge, Coleman's Hatch, Nr. Hartfield, Sussex.
 1961 RAETHEL, Dr. HEINZ-SIGURD; Xantener Strasse 7, 1 Berlin 15, Germany.
 1962 RAINES, RICHARD M.; 541 East 53rd Street, Savannah, Georgia 31405, U.S.A.
 1972 RANCE, LESLIE A.; Arizona, Northchurch Common, Berkhamsted.
 1962 RATCLIFFE, JOHN ERIC; "Wayside", 23 Victoria Avenue, Ilkley, Yorkshire, LS29 9BW.

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 1975 REDHEAD, W. F.; 34 Pepys Way, Girton, Cambridge, CB3 0PA.
 1964 REED, BRYAN E.; 46 The Oval, Park Lane Estate, Wednesbury, S. Staffs.
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 1964 RESTALL, ROBIN L., F.Z.S., M.I.P.A., M.B.O.U.; J. Walter Thompson Venezuela CA, Apartado 952, Av. La Estancia 10, Chuao, Caracas, Venezuela.
 1969 REYNOLDS, MICHAEL W.; Glanmor, Hayle, Cornwall.
 1971 RHYS, G. D. B.; Gether Cottage, Kings Ride, Ascot, Berkshire, SL5 7JW.
 1950 RICH, JOSEPH W.; 1073 West 11th Street, San Pedro, California 90731, U.S.A.
 1967 RICHARDS, Miss MYRTLE C.; 14157 Van Owen Street, Van Nuys, Calif. 91405, U.S.A.
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 1973 RIGNAULT, JEAN-CLAUDE; 35 rue Leon Gambetta, 76210 Bolbec, France.
 1963 RILEY, WILLIAM; Bates Green Cottage, Dicketts Lane, Lathom, Nr. Skelmersdale, Lancs.
 1937† RIPLEY, SIDNEY DILLON, Ph.D., M.B.O.U.; Kilravock, Litchfield, Conn., U.S.A.
 1974 RIPPER, DONALD J.; Private Bag, 16, Airly, Via Sale, Victoria 3850, Australia.
 1935† RISDON, D. H. S., A.Z.S.; The Tropical Bird Gardens, Rode, Nr. Bath, Somerset, BA3 6QW.
 1976 RISING, K. A.; 169 Centenary Road, Melton 3337, Victoria, Australia.
 1970 ROBERTSON, J. E. R.; Brickwall Farm, Maldon Road, Shrub End, Stanway, Colchester, Essex.
 1947 ROBINSON, B. E.; Field House, Blackborough Road, Reigate, Surrey.
 1969 ROBINSON, DONALD WILLIAM; "Heron Hill", Beech Close, Dunsley, Kinver, Nr. Stourbridge.
 1957 ROER, BERNARD; 6553 N. 27th Avenue, Phoenix, Arizona 85017, U.S.A.
 1956 ROGER, ALAN S.; 37 Egerton Crescent, London, S.W.3.
 1976 ROGERS, A. J.; The Handy Store, High Street, Medstead, Nr. Alton, Hants., GU34 5LW.
 1962 ROHR, WOLFGANG; Lerchenweg 15, 65 Mainz 31, Germany.
 1970 ROLES, D. G.; "Green Acres", Penscynor Wildlife Park, Cilfrew Neath, Glamorgan, S. Wales.
 1945 ROONEY, JAMES P., M.B.O.U.; 1514 South 12th Avenue, Yakima, Washington 98902, U.S.A.
 1965 ROOTS, CLIVE G.; Director, Assiniboine Park Zoo, 2355 Croydon Avenue, Winnipeg, Manitoba, R3P 0R5, Canada.
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 1974 RUNNALS, M.; 220 Pine Street, Holyoke, Mass. 01040, U.S.A.
 1973 RUSHTON, D. K.; CSIRO, Division of Wildlife Research, P.O. Box 84, Lyneham, ACT. 2602, Australia.
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 1954* RUTGERS, A.; "De Oelehof", Joppelaan 60, Gorssel, Holland.
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 1961 RYMIL, ROBERT R.; P.O. Box 42, Penola, South Australia 5277.
- 1976 St. JOHN, DENNIS R.; President, Advanced Pet Products, Box 1492, El Cajon, Ca. 92020, U.S.A.
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 1975 SANDERS, T. G.; 35 Alwyn Gardens, Upton by Chester, Cheshire.
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- 1958* SANE, SHARAD R.; Prospect Chambers Annexe, Dr. Dadabhoy Naoroji Road, Fort, Bombay 1., India.
- 1975 SAVIDGE, J. M.; P.O. Box 30559, Nairobi, Kenya, E. Africa.
- 1976 SAWYER, CLIVE; Lower Stonehouse Farm, Staplegrove, Taunton, Somerset.
- 1949* SAWYER, R. C. J.; Chestnut Lodge, Old Common, Cobham, Surrey.
- 1968 SAYERS, BERNARD CHARLES; 164 Chelmer Road, Chelmsford, Essex.
- 1954 SCAMELL, K. M., O.B.E.; "Wayside", Rosenithon Road, St. Keverne, Nr. Helston, Cornwall.
- 1953 SCAMELL, Mrs. K. M.; "Wayside", Rosenithon Road, St. Keverne, Nr. Helston, Cornwall.
- 1973 SCHOFIELD, PHILIP GEOFFREY; 36 Tasmania Road, Ipswich, Suffolk.
- 1954* SCHOOTEN, ULLENS De, C. A., F.Z.S.; Les Bouleaux, Quatre-Bras, Crainheim, Brabant, Belgium.
- 1974 SCHUCHMANN, KARL L.; 6101 Werterstadt, Freiherr v. Steinstr. 1., W. Germany.
- 1973 SCHULTE, E. G. B.; Floralaan West 272, Eindhoven, Holland.
- 1967 SCHULTZ, HAROLD M.; 5950 N. Camino Escalante, Tucson, Arizona 85718, U.S.A.
- 1975 SCHULZE, Frau I.; 86 Bamberg, Am Kranan 10, W. Germany.
- 1938* SCOTT, Sir PETER, C.B.E., D.S.C., M.A., LL.D., F.Z.S., M.B.O.U.; The New Grounds, Slimbridge, Glos.
- 1963 SCOTT, TIMOTHY; Verandah Cottage, 58 Bath Road, Calcot Row, Reading, Berks.
- 1954 SEARLE, Dr. K. C., M.B.E., M.B., B.S., C.M.Z.S.; 235, Hong Kong Shanghai Bank Building, Queen's Road Central, Hong Kong.
- 1961 SEARLES, GEORGE; 115 Mt. Vernon Avenue, Patchogue, New York 11772, U.S.A.
- 1974 SEDERSTRÖM, B.; Zoological Research Group, Idrottsgaram 50, S-603, 63 Norrikoping, Sweden.
- 1976 SEIFFART-MULLER, Mrs. ROSALIA; Talackerstr, 65. CH-8152 Glattbrugg, Switzerland.
- 1970 SEITZ, Dr. ALFRED; Jochensteinstr. 8, D-8500 Nürnberg, West Germany.
- 1959 SELWYN, WILLIAM; Clifton Villa, Station Crescent, Llandridnod Wells, Powys.
- 1969 SEMPLE, K. R.; 77 Park Avenue, Thorpe Lea Road, Egham, Surrey, TW20 8HL.
- 1964† SETH-SMITH, Mrs. C. H.; 20 Halfpenny Close, Chilworth, Nr. Guildford, Surrey.
- 1966 SEYMOUR, ALAN W.; 16 Fern Drive, Taplow, Nr. Maidenhead, Berks.
- 1960 SHAPIRO, Dr. S.; B.D.S.(RAND); 512-513 Harley Chambers, 187 Jeppe Street, Johannesburg, 2001, South Africa.
- 1967 SHARMAN, Dr. D. F.; Agricultural Research Council, Institute of Animal Physiology, Babraham, Cambridge.
- 1970 SHEARING, DANIEL P.; 17 Lockhart Road, Cobham, Surrey, KT11 2AX.
- 1969 SHELTON, L. C.; 305 West 13th Street, New York 10014, U.S.A.
- 1973 SHERBORNE, J. A.; 12 Tackley Road, Eastville, Bristol, BS5 6VQ.
- 1975 SHERMAN, RICHARD; 2033 Fargo, Chicago, Illinois 60645, U.S.A.
- 1953 SHOLAR, Dr. NORMAN P., D.D.S.; P.O. Box 180, Mooresville, N.C. 28115, U.S.A.
- 1975 SHUPERT, DAVID; 2157 Vestal Avenue, Los Angeles, California 90026, U.S.A.
- 1974 SIMMONS, JOHN; "Pear Tree Cottage", Bridge Street, Bampton, Oxon.
- 1955 SIMMONS, Dr. K. E. L., M.B.O.U., M.Sc.; Dept. of Psychology, The University, Leicester, LE1 7RH.
- 1971 SIVELLE, CHARLES; 41 Westcliff Drive, Dix Hills, L.I., N.Y. 11743, U.S.A.
- 1976 SIX, CHARLES GEORGE; Box 9500, Dar es Salaam, Tanzania.
- 1954* SLOTER, Mrs. C. F.; Hopewell, New Jersey, U.S.A.
- 1964 SMALL, RALPH C.; 8544 Rockefeller Avenue, Brookfield, Illinois 60513, U.S.A.

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- 1971 SMITH, D. D.; 1301 West Prune, Lompoc, California 93436, U.S.A.
- 1960 SMITH, FRANCIS L.; Bramblings, Alexandra Road, Illogan, Redruth, Cornwall.
- 1960 SMITH, GEORGE A., B.Vet.Med., M.R.C.V.S.; 158 Broadway, Peterborough, PE1 4DG.
- 1960 SMITH, J. O., F.Z.S.; Church Road, Freiston, Boston, Lincs.
- 1947 SMITH, KENNETH J., F.Z.S.; Exmouth Zoo, Exmouth, Devon.
- 1971 SMITH, P. J. M.; Auchinhan Dock, Glass, Huntly, Aberdeenshire.
- 1967 SMITH, ROGER OWEN; 359 Aldridge Road, Penny Barr, Birmingham 22B.
- 1976 SMITHSON, M.; 3 South View, Littlethorpe, Nr. Ripon, N. Yorks.
- 1948 SMYTH, H. C.; 4/24 Quinton Road, Manly 2095, N.S.W., Australia.
- 1959* SNID-VONGS, DANAI, M.D.; 132 Soy Soonvijai 8, Bangkok 10, Thailand.
- 1974 SOELEN, Van, J. L.; Vryburgstraat 49, Souburg (Zld.), The Netherlands.
- 1959* SOMERS, Col. KENNETH; 2115 Salisbury Road, Silver Spring, Md. U.S.A.
- 1973 SOYER, JEAN PIERRE; rue Jean Moulin, Cinq Cantons, 64600 Anglet, France.
- 1971 SPARROW, G. M., M.B.E.; Shawlands, Potten End, Berkhamsted, Herts., HP4 2SH.
- 1953 SPILSBURY, D. T.; Solitaire, Danemoor Cross, Welland, Worcs.
- 1958 SPOFFORD, Dr. WALTER R.; "Aguila-Rancho", Portal, Arizona 85632, U.S.A.
- 1975 SPROULE, Dr. BRIAN J.; Ladiesfield, Coldstream, Berwickshire.
- 1939 SQUIRE, E. O.; Staploe, St. Neots, Hunts.
- 1976 SQUYRES, Mr. and Mrs. T.; Animal World, 6305 Camp Bowie Boulevard, Fort Worth, Texas 76116, U.S.A.
- 1976 STARK, ROY and DOROTHY; 4964 Tesla Road, Livermore, Calif. 94550, U.S.A.
- 1956 STEEL, NEWTON R., N.D.A.; Farwell House, Stoke Fleming, Nr. Dartmouth, South Devon.
- 1954* STEPHAN, H. C.; "Hathersage", Gordons Road, Somerset West, C.P., S. Africa.
- 1961 STERN, MAXIMILIAN G.; Laurel Cottage, Church Street, Ropley, Hants.
- 1976 STEVENSON, John V.; 4070s 870e Apt. 58d, Murray, Utah 84107, U.S.A.
- 1976 STEWART, ALEXANDER; 10 Whiteside, Mountain Road, Newtownards, Co. Down, N. Ireland.
- 1976 STEWART, K.; Alpenrosen, 25 The Ridgeway, Farnsfield, Newark, Notts.
- 1964 STEWART, RICHARD B.; R.F.D. 1, Goffstown, N.H. 03045, U.S.A.
- 1975 STIDOLPH, NEVILLE E.; Powerscourt, 101 Marsh Lane, Mill Hill, London NW7 2LG.
- 1958 STILWELL, Major M. W., O.B.E., M.C.; 122 Rua S. Sebastiao Da Pedreira, Lisbon 1, Portugal.
- 1959 STODDART, F. W.; West Minley Farm, Blackwater, Camberley, Surrey.
- 1973 STODDART, R. W.; 163 Flatts Lane, Normanby Middlesbrough, Teesside, TS6 0DD.
- 1922† STOKES, Capt. H. S., M.C., F.Z.S.; 66 Dartmouth Road, Paignton, South Devon.
- 1929 STONEY, Miss IRENE; The Old Rectory, Mellis, Eye, Suffolk.
- 1976 STOODLEY, A. A. J.; Down House, Lovedean, Nr. Portsmouth, Hants.
- 1958† STRATTON, G. B., M.B.E., F.Z.S., A.L.S.; 24 Wyatts Close, Chorleywood, Rickmansworth, Herts.
- 1948 STRETCH, H.; 38 Coniston Crescent, Humberston, South Humberside.
- 1949 STRUTT, Hon. PETER A.; Stutton Hall, Ipswich, Suffolk.
- 1975 SURREY, DONALD; 34 Peartree Road, Enfield, Middlesex.
- 1966 SWAENEPOEL, Mrs. G.; 25 Steenweg op Hondzocht, Lembeek, (Bt.), Belgium.
- 1958 SWAIN, A. J.; 45 New Road, Bromham, Bedford.
- 1958 SWIFT, JOHN H.; "Green Hills", Evesham Road, Dodwell, Stratford-upon-Avon, Warwickshire.

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- 1956 TALBOT-KELLY, Miss C. E., M.S.I.A.O., M.B.O.U.; 69 Evington Lane, Leicester, LE5 5PR.
- 1976 TAUNTON, Mrs. AUDREY; 63 Bellingham Road, Kendal, Cumbria, LA9 5JY.
- 1956 TAYLOR, B. P.; Croust Farm, Five Ashes, Mayfield, Sussex.
- 1974 TAYLOR, G.; 33 Dryden Avenue, Hanwell, London, W7 1ES.
- 1964 TAYLOR, G. W. M.; Ballygarvey House, Ballymena, Co. Antrim, N. Ireland.
- 1974 TAYLOR, J. E., M.B.O.U.; Alstone Lawns, Alstone, Tewkesbury, Glos.
- 1949 TAYLOR, LAWRENCE; P.O. Box 1056, Venice, Florida 33595, U.S.A.
- 1976 TAYLOR, MALCOLM R.; Police House, Lasham, Alton, Hants., CU34 5SL.
- 1973 TAYLOR, TOM; 11 Mill Close, Waltham, Grimsby, Lincs.
- 1945 TAYLOR, T. G., M.A., Ph.D.; 12 Russell Place, Southampton, SO2 1NU.
- 1969 TELL, MATS E. M.; Box 69, S-260 70 Ljungbyhed, Sweden.
- 1972 THOMAS, Prof. Dr. ERHARD; Institut fur Physiologische Zoologie, University D-65, Mainz, Sagrstr. 21, Germany.
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- 1975 THOMPSON, Mrs. LEE E.; Rock Ledge Farm, Union Valley Road, Macopac, N.Y., 10541, U.S.A.
- 1957 THOMSON, T. R.; 20 Warrender Park Crescent, Edinburgh, EH9 1EA, Scotland.
- 1975 TILGHMAN, L.; 1305 E. 127th Avenue, Apt. T, Florida 33612, U.S.A.
- 1956 TILLEY, RICHARD G. L.; "Niltava", 243 Avenue du Chene, Heusy 4802, Belgium.
- 1975 TIMLICK, S.; Pine Lodge, Rhydargean Road, Carmarthen, Dyfed.
- 1954 TIMMIS, WILLIAM H., F.Z.S.; The Zoological Gardens, Chester.
- 1946* TINSLEY, PATRICK C.; Hurn Hall, Holbeach, Spalding, Lincs.
- 1968 TOBIN, JOHN R.; 867 East Howard Street, Pasadena, Calif. 91104, U.S.A.
- 1973 TODD, FRANK S.; Corporate Curator of Birds for Sea World, Inc., 720s Shores Road, San Diego, Calif. 92109, U.S.A.
- 1976 TODD, WILLIAM; 10203 Charter Ridge, San Antonio, Texas 78230, U.S.A.
- 1957 TONNESEN, A. RYDER; 4 Norddalsvej, 2840 Holte, Denmark.
- 1961 TRANTER, Dr. J. V., M.B., Ch.B., M.R.C.S., L.R.C.P.; 14 Willow Road, Finchfield, Wolverhampton, Staffs.
- 1974 TREBBAU, Dr. PEDRO; Direccion de Parques Zoológicos, Parque Caricuao, Apo. 28058, Caracas 102, Venezuela.
- 1951 TREVISICK, CHARLES, F.Z.S.; Ilfracombe Zoo Park, Harbour View, Ilfracombe, Devon.
- 1960* TREWBY, Colonel H. F., M.I.Mech.E., R.E.M.E.; No. 42, Binixica, San Clemente, Menorca, Balearic Islands, Spain.
- 1976 TRIMAKAS, M/s DONNA; Little Mermaid, 338½ N.E. Northgate Way, Seattle, Washington 98125, U.S.A.
- 1961 TROLLOPE, JEFFREY, M.B.O.U.; 37 Station Road, Hounslow, Middlesex.
- 1947* TUCKWELL, DAVID; Asliesk, Alves by Forres, Morayshire.
- 1974 TURK, A.; Keepers Cottage, Lilford Village, Nr. Oundle, Peterborough, PE8 5SG.
- 1934 TYEBJEE, ABDE AMIRUDIN SHALEBHOY; 'Shale Building', 2832 Bank Street, Fort, Bombay 1, India.
- 1966 TYLER, ARTHUR L.; 32 Walnut Street, Oakland, New Jersey 07436, U.S.A.
- 1955 UPTON, Mrs. P. V., M.B.O.U.; Park Lodge, Margaretting, Ingatestone, Essex.
- 1958 VAN CLEVE, GEORGE BERNARD, M.B.O.U.; 304 So. Winebiddle Street, Apt. 2, Pittsburgh, Pa. 15224, U.S.A.
- 1953 VAN DER MARK, R. R. P.; De Kweekhoeve, v. Helvoortlaan 31, Woerden, Holland.
- 1976 VAN DER ZEE, Mrs. M. A.; Dorpsplein 19, Serooskerke 3660, Post Zierikzee, Netherlands.

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- 1974 VARGHA, BELA; 1191 Budapest, Kossuthter 2314, Hungary.
- 1968 VERGEYLEN, FRANS; Heidestraat 52, 9330 Dendermonde, Belgium.
- 1974 VIDLER, D.; 26 Kneeler Road, New Malden, Surrey.
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- 1974 VOSS, T. A.; Post Office, Matapu, Hawera, Taranak, New Zealand.
- 1969 VRIENDS, M. M. C.; Schout Offermanstraat 59, Roermond/Maasniel (L.), Holland.
- 1974 VRIES, J. De; Baarloseweg 3, Marknessa, Netherlands.
- 1957* WADE, OTIS; 1806 Redesdale Avenue, Los Angeles, Calif. 90026, U.S.A.
- 1968 WADLAND, BASIL DALE; 85 Hilton Street, Mount Waverley, Melbourne, Victoria 3149, Australia.
- 1947 WAIT, FRANK R., F.Z.S.; "Seagulls", 1 The Promenade, Scratby, Nr. Great Yarmouth, Norfolk.
- 1966 WALKER, G. R.; "Cedar Lodge", 27 East Avenue, Talbot Woods, Bournemouth, Hants.
- 1964 WALLER, Col. G., M.B.E., M.C.; Administrator, The National Trust, Waddesdon Manor, Waddesdon, Aylesbury, Bucks.
- 1963 WALTON, JOHN TREVOR; "Lyndhurst", Wynnstay Lane, Marford, Nr. Wrexham, Denbighshire.
- 1963 WALRAVEN, C.; Prof. Dr. J. H. VAN'T; Hoffweg 13, De Bilt, Holland.
- 1969 WARD, B. S.; Curator, Winged World, Heysham, Morecambe, Lancs.
- 1973 WARD, Mrs. CECILE L. C.; Chantry House, Grays Close, Haslemere, Surrey, GU27 2LJ.
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- 1971 WATSON, J. K.; 27 Manor Road, Brampton Bierlow, Wath-upon-Dearne, Rotherham, Yorks.
- 1955 WAYRE, P. L., F.Z.S., M.B.O.U., F.L.S.; Hawks Hill, Great Witchingham, Norwich, NOR 65X.
- 1971 WEATHERBY, RICHARD; Woolongoon, Mortlake, Victoria 3272, Australia.
- 1965 WEBSTER, CHARLES D., St. Marks Lane, Islip. Long Island, N.Y. 11751, U.S.A.
- 1975 WEISE, THOMAS; Stampferstresse 3, 46 Dortmund 41, Germany.
- 1970 WERNITZ, WILLIAM J.; 422 W. Orange Street, Lancaster, Pa. 17603, U.S.A.
- 1947 WEST, DAVID; 209 N. 18th Street, Montebello, California 90640, U.S.A.
- 1959 WESTON, Capt. H.; "Mandarin", Churchill Road, Chipping Norton, Oxon.
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- 1970 WHITE, ARTHUR STANLEY JOHN; 96 Cornwallis Road, Cowley, Oxford, OX4 3NL.
- 1965 WHITE, Mrs. J. K. M. HOLDEN-; 10 Lowndes Court, London, S.W.1.
- 1965 WHITE, FRANK; Greystones, 57 Kimberley Road, Nuthall, Notts.
- 1955* WHITE, Dr. LAWRENCE F.; 2125 Ocean Way, Laguna Beach, California, U.S.A.
- 1976 WHITE, C. P. O. S.; Falconry Unit, R.N.A.S. Yeovilton, Yeovil, Somerset, BA22 8HT.
- 1935 WHITMORE, G. E.; 40 Charlemont Avenue, West Bromwich, West Midlands, B71 3BZ.

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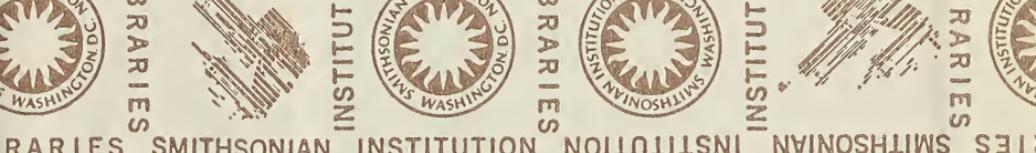
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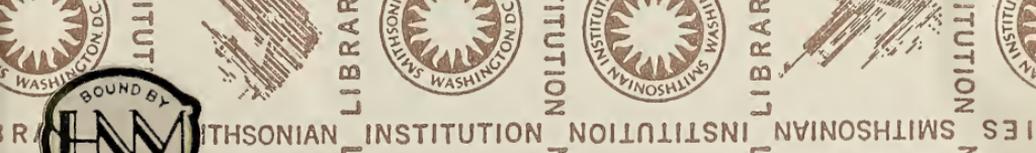
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