BULLETIN
of the
BRITISH ORNITHOLOGISTS' CLUB

EDITED BY

Dr D. W. SNOW
& Prof C. J. FEARE

Volume 117
1997

LIST OF AUTHORS AND CONTENTS

AVIAN TAXONOMY FROM LINNAEUS TO DNA

PAPERS PRESENTED AT A JOINT MEETING BETWEEN THE BRITISH ORNITHOLOGISTS' CLUB AND THE LINNEAN SOCIETY OF LONDON HELD AT BURLINGTON HOUSE, 23 MARCH 1996.

INDEX TO SCIENTIFIC NAMES

(Compiled by Mary N. Muller)

All generic and specific names (of birds only) are indexed. New subspecific names are indexed in bold print under generic, specific and subspecific names.

CORRECTIONS TO TEXT

Page 4	Line 9	*Rynchops* not *Ryncops*
Page 26	Line 25	*sulphurea* not *sulphurata*
Page 156	Line 47	*Ardea bournei* not *Ardea purpurea bournei*
Page 156	Line 48	*Falco neglectus* not *Falco tinnunculus neglectus*
Page 156	Line 49	*Falco alexandri* not *Falco tinnunculus alexandri*
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Page 243	Line 41	*cristata* not *cristat*
Page 243	Line 45–49	See for Erratum to Prof. Richard Chander's article in Vol. 117 page 158.
Page 305	Line 4	*gigantea* not *lugens*
Page 311	Line 44	P. Gregory's present address: PO Box 168, Katherine 0851, Northern Territory, Australia.
Contents Vol. 117 No. 4	line 23	*philomelos* not *Philomelos*

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Bulletin of the

British Ornithologists' Club

Edited by
Dr D. W. SNOW

Volume 117 No. 1 March 1997

FORTHCOMING MEETINGS

Tuesday 20 May 1997. ANNUAL GENERAL MEETING AT 6 p.m., followed by a **Club Social Evening**. There will be no speaker, but Members are invited to bring along one or two slides (or a specimen!) of a bird of topical interest, and to speak **for not more than 5–10 minutes** about it. The aim will be to generate discussion, and to facilitate the exchange of information between Members.

Applications to the Hon. Secretary by ***6 May****, please, including subjects to be raised, and any special facilities required.*

Tuesday 17 June 1997. Robin Woods will speak on the **"Atlas of Breeding Birds of the Falkland Islands"** which was published in early 1997. Having been obsessed with Falkland Islands ornithology for over 40 years, Robin has produced the two popular books on the birds of the Falklands, in 1975 and 1982, and the *Guide to Birds of the Falkland Islands* (1988), which gave full treatment to all species recorded. He was the first to prove, in 1960, the breeding of the Great Shearwater in the Falklands, and to outline the importance of mature, ungrazed tussac grass to about 30 breeding species. His latest book is the result of an extensive ten-year fieldwork and census project, begun in 1983/84.

Applications to the Hon. Secretary by ***3 June****, please.*

Tuesday 15 July 1997. Tim Appleton will give a talk titled **"From Greenfields to Ramsar"**. Tim is well-known to all visitors to Rutland Water, having been Reserves Manager there for over 21 years. Arriving with the experience of working at Slimbridge, he was involved in the design and planning stages for the creation of this highly successful project, and has managed this reserve ever since; he has also been co-organiser of the British Birdwatch Fair, which enjoys a worldwide reputation.

Applications to the Hon. Secretary by ***1 July****, please.*

Meetings are held in the Sherfield Building of Imperial College, South Kensington, London SW7, at 6.15 p.m. for 7 p.m. The nearest Tube station is at South Kensington, and car parking facilities are available; a map of the area will be sent to members, on request. The cash bar is open from 6.15, and a buffet supper, of two courses followed by coffee, is served from about 7.00. (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion.

Overseas Members visiting Britain are particularly welcome at meetings. For details in advance, please contact the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants. GU31 5PA.

Tel/Fax: 01730-825280 for late bookings and cancellations.

Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

Vol. 117 No. 1 Published 21 March 1997

REPORT OF THE COMMITTEE FOR 1996

Meetings. Eight evening meetings were held in 1996, six in the Ante-room, and two in the Senior Common Room of the Sherfield Building at Imperial College, London. A total of 286 (201 members and 85 guests) attended these meetings, which represented an average attendance of 36. The programme of speakers during the year again covered a wide variety of ornithological subjects, and was presented by speakers both from Britain and from overseas. A ninth meeting, in the form of a social evening on 10 December, was cancelled due to a clash of dates. The 860th meeting of the Club was celebrated with an excursion to Selborne on Friday 31 May, attended by 17 members and 9 guests.

In addition, a symposium on "Avian taxonomy from Linnaeus to DNA" was held jointly with the Linnean Society, at Burlington House, Piccadilly, on Saturday 23 March. The total number attending, including speakers, was 101.

Committee. The Committee met eight times during the year, and the attendance was 78%. The Committee accepted the ruling from the Charity Commissioners that the Hon. Editor should cease to be a Trustee of the Club, if he was to receive an honorarium for his work, and the Rules of the Club were accordingly amended and approved at the AGM on 21 May.

Terms of reference were agreed for a sub-committee to coordinate the sponsorship, production and sales of the Club publications. The Committee is greatly indebted to Mrs Moore for her continuing work as Chairman of the Publications Sub-Committee (see below), and also to Dr R. P. Prŷs-Jones and Dr R. A. Cheke for their time and expertise as editors for these works.

The Trustees of the Herbert Stevens Trust Fund met with the Committee on two occasions to give advice on the performance of the Fund. The Committee is most grateful to Mr Nigel Crocker, Mr Richard Price and Mr Peter Oliver for their time and expertise in this matter.

Owing to increasing pressures of other work, Mr John Farnsworth tendered his resignation as Hon. Treasurer, in July, to take effect as soon as a replacement could be found. The committee is grateful to Mr David Montier for agreeing to take over as Acting Hon. Treasurer. He is now responsible for the financial aspects, whilst membership and other aspects of the post are being progressively delegated to the Hon. Secretary, and other members of the Committee.

It is with great regret that the Committee reports the deaths in the past year of the following six members: Dr D. R. Aspinwall (1981–1996), Dr G. C. Ellsworthy (1985–1996), Mr K. W. Henshall (1986–1996), Mr J. L. McKean (1978–1996), Mr J. G. Parker (1977–1996 and *Committee Member* 1979–1983), and Sir William Wilkinson (1987–1996).

Publications Sub-committee. Publication of *Occasional Publications* No. 2 (*Manuscripts and Drawings in the Ornithology and Rothschild Libraries of the Natural History Museum at Tring*, authored by Mrs F. E. Warr) has been completed; and production of No. 3 (*Avian Egg-shells: an Atlas of Scanning Electron Micrographs*, by Konstatin Mikhailov) is well advanced for publication in 1997. Work on a *Bird Atlas of Uganda* is proceeding according to plan, with the aim of publication in mid–late 1998, subject to finalisation of a Licence Agreement with the authors, and adequate sponsorship funding.

Membership. There were 567 paid-up Members at 31 December 1996—322 with addresses in the U.K., and 245 overseas. Active recruitment from the newly-elected Members of the Union continued, resulting in 38 new Members joining the Club during the year.

Bulletin. Volume 116 consisted of 272 pages, and contained 39 main papers and 9 shorter (In Brief) contributions. Two new species were described, both illustrated with colour plates: a new munia from Borneo, and a new pipit from South Africa, the latter especially remarkable as coming from an ornithologically well known area. Four new subspecies were described, and an account of some very little known birds from the Solomon Islands included field notes and figures of two forms that almost certainly represent undescribed taxa. New distributional data were published for Cameroon, Tanzania, Brazil, Ecuador, Bolivia, Solomon Islands and South Georgia. Among papers of special interest may be mentioned the description and analysis of hybrid hummingbirds of the genus *Phaethornis*; a review of the migrations of the Arctic Tern, including overland records and ocean records collected over nearly 50 years by the Royal Naval Birdwatching Society; a survey of geographical variation in sexual dichromatism in birds; and the first record of the breeding of Forbes's Plover in Central Africa. There were also substantial papers presenting new data on the status and distribution of little known Andean birds, and a fully annotated checklist of the birds of South Georgia. The 70 authors were from 15 countries and 6 continents.

Once again, the Committee is greatly indebted to Mary Muller for her compilation of the annual index of authors, contents and scientific names.

Bulletin Sales. Sales to non-member subscribers totalled 142, with 16 in the U.K. and 126 overseas (31 countries). Of the latter, 50 addressees were in the United States of America, and 16 in Germany.

Finance. Most of the income of the Club continues to come from subscriptions, both from members and non-member subscribers, and from investment income. During the year 1996, the Trustees of the Herbert Stevens Trust Fund, with the approval of the Committee, switched the investments of the Fund away from a portfolio of individual fixed interest and equity stocks into three unit trust funds designed specifically for charities. Apart from obtaining a wider spread of risk, this should allow the Club to receive income without tax being deducted, rather than having to make separate claims to recover the tax from the Inland Revenue after the end of the tax year.

The main expenditure related to the printing and distribution of the *Bulletin*, and is well in excess of the subscription income. The increase in subscription incomes applicable from 1 January 1997 will go some way towards reducing this imbalance. One major non-recurring expense during the year was the binding of the Chairman's set of copies of the *Bulletin* at a cost of £840.

Accounts for 1996, which are not yet available, will be tabled at the Annual General Meeting, and published subsequently in the *Bulletin.*

ANNUAL GENERAL MEETING

The Annual General Meeting of the British Ornithologists' Club will be held in the Ante-room of the Sherfield Building, Imperial College, London SW7 at 6.00 p.m. on Tuesday 20 May 1997.

AGENDA

1. Minutes of the 1996 Annual General Meeting (see *Bull. Brit. Orn. Cl.* 116(4): 201–202).
2. Report of the Committee and Accounts for 1996.
3. The *Bulletin.*
4. The election of Officers. The Committee proposes that:
   (i) The Reverend T. W. Gladwin be elected Chairman, *vice* Mr D. Griffin, who remains as a member of the Committee.
   (ii) Mrs A. M. Moore be elected as Vice-Chairman *vice* The Reverend T. W. Gladwin.
   (iii) Mr D. J. Montier (currently Acting Hon. Treasurer) be elected as Honorary Treasurer, *vice* Mr S. J. Farnsworth, who retires.
   (iv) Commander M. B. Casement, OBE, RN, be re-elected Hon. Secretary.
   (v) Mr N. J. Redman be elected a member of the Committee *vice* Mr R. E. F. Peal who retires by rotation, and is ineligible for re-election.
   (vi) Professor C. J. Feare be appointed Hon. Editor, in succession to Dr. D. W. Snow, with effect from about September 1997.
5. Any other business of which notice shall have been given in accordance with Rule (12).

By Order of the Committee
MICHEAL CASEMENT, *Honorary Secretary*

The eight hundred and sixty-fourth meeting of the Club was held on Tuesday 5 November 1996, at 6.15 p.m. 29 Members and 13 guests attended.

Members present were: D. GRIFFIN (*Chairman*), N. D. HUNTER (*Speaker*), M. A. ADCOCK, Miss H. BAKER, J. W. BARRINGTON, B. H. BECK, I. R. BISHOP, Mrs D. M. BRADLEY, P. BULL, D. R. CALDER, Cdr M. B. CASEMENT RN, Professor R. J. CHANDLER, Dr R. A. CHEKE, Dr R. A. F. COX, S. J. FARNSWORTH, F. M. GAUNTLETT, Rev. T. W. GLADWIN, C. A. R. HELM, B. A. E. MARR, D. J. MONTIER, Mrs A. M. MOORE, Mrs M. N. MULLER, P. J. OLIVER, Dr R. P. PRYS-JONES, N. J. REDMAN, P. J. SELLAR, Dr N. J. SELLAR, S. A. H. STATHAM, N. H. F. STONE.

Guests attending were: Mrs J. HUNTER, Mrs S. GRIFFIN, Miss G. BONHAM, R. GILBEY, Mrs J. C. BULL, Mrs J. B. CALDER, Mrs C. R. CASEMENT, Mrs M. H. GAUNTLETT, Mrs J. M. GLADWIN, Mrs M. MONTIER, P. J. MOORE, Mrs M. OLIVER, M. PALING.

After dinner, Nigel Hunter spoke on "The Birds of Botswana", illustrated by an impressive selection of photographic slides taken by Brian Bushell, coupled with species distribution maps reproduced from Huw Penry's 1994 *Bird Atlas of Botswana.*

His talk focused on providing an overview of the significance of Botswana's birds in the Sub-Saharan context. After a brief geographical and ecological background, he pointed out that Botswana has no "endemics" as such, but the Slaty Egret *Egretta vinaceigula* is currently known only to breed in the Okavango Delta. Botswana is also important for the presence of four regional endemics—Cape Vulture *Gyps coprotheres*, Bradfield's Hornbill *Tockus bradfieldi*, Short-clawed Lark *Certhilauda chuana*, and Boulder Chat *Pinarornis plumosus*. In addition, there are four species with a "*special* status" because of concern about their status elsewhere—White-backed Night Heron *Gorsachius leuconotus*, African Skimmer *Ryncops flavirostris*, Pel's Fishing Owl *Scotopelia peli* and Yellow-billed Oxpecker *Buphagus africanus*.

Due to its relatively low human poulation and general unsuitability for arable agriculture, Botswana still contains significant populations of the larger species, increasingly threatened elsewhere. Examples include Ostrich *Struthio camelus* (as a free-range wild species), Saddle-billed Stork *Ephippiorhynchus senegalensis*, both Flamingoes *Phoenicopterus ruber* and *P. minor*, seven birds of prey including the Bateleur *Terathopius ecaudatus*, Wattled Crane *Bugeranus carunculatus*, Kori Bustard *Ardeotis kori*, and Ground Hornbill *Bucorvus leadbeateri*.

Concerning migrant species, he suggested that African migrants were not especially significant in a Botswana context, though relatively little was yet known about their movements in the region during the African winter (i.e. May–September). But Botswana is important as a wintering area (October–April) for Palearctic migrants from Europe, and especially for 12 of the 28 species under this category. These are White Stork *Ciconia ciconia*, Montagu's and Pallid Harrier *Circus pygargus* and *C. macrourus*, both Red-footed Kestrels *Falco amurensis* and *F. vespertinus*, Lesser Kestrel *F. naumanni*, Black-winged Pratincole *Glareola nordmanni*, Icterine and Olive-tree Warbler *Hippolais icterina* and *H. olivetorum*, River Warbler *Locustella fluviatilis*, and Lesser Grey and Red-backed Shrikes *Lanius minor* and *L. collurio*.

Although the Okavango Delta usually receives most attention, the Kalahari region of Botswana comprises by far the greater proportion of the country. He illustrated the ornithological flavour of this ecosystem with slides of some 50 typically representative species. The strong influence rain can play in a semi-arid system, prone to drought, was shown by slides of 27 additional species which deploy real opportunism by taking short-term advantage of the periodic emergence of surface water, usually in "pans".

Proposed additions to the genus *Lonchura:* Addenda and Corrigenda

On p. 154 of the paper in *Bull. Brit. Orn. Cl.* 115(3), details of the type of *Lonchura atricapilla obscura* subsp. nov. were not included. The two specimens that were at hand when the taxon was named were AMNH specimens 447931 and 447932, both males, collected at Parit, Tjempaga, Sampit, S. Borneo, 3 July 1935. The first of these (447931) should have been designated as the holotype.

The endings of three of the new names proposed contravene the rules laid down in the International Code of Zoological Nomenclature (1985 edition), and should be amended as follows: p. 148, amend *bigilalae* to *bigilalei* (see Article 31 of the Code); p. 149, amend *moresbyae* to *moresbyi* (see Article 31); p. 155, amend *selimbaue* to *selimbauensis* (see Appendix D, iv, of the Code).

References to Paynter & Storer (1970, on p. 140 and subsequently, should be to Paynter & Storer 1968 (Peters' *Check-list*, vol. 13 not vol. 14). On p. 142, the name *Lonchura striata sumatrensis* was proposed not by Chasen & Hoogerwerf (1941) but by Chasen (1939, *Treubia* 17, p. 183), who designated as its type a specimen in the Buitenzorg Museum, no. 11249.

Ed.

Plate 1. (upper) Photograph of presumed male *Calicalicus rufocarpalis* taken by C.A.D. on 1 March 1991 approximately 22 km southeast of Toliara by road (17 km by air), on the old track to St Augustin and less than 10 km east of La Table (the type locality of *C. rufocarpalis*). (lower) Photograph of male *Calicalicus madagascariensis* taken by T. S. Schulenberg in early March 1992 near Ifaty, 32 km north of Toliara.

A new species of vanga (Vangidae, *Calicalicus*) from southwestern Madagascar

by Steven M. Goodman, A. F. A. Hawkins & Charles A. Domergue

Received 19 March 1996

The Red-tailed Vanga *Calicalicus madagascariensis* (Linnaeus, 1766) is the smallest member of the family Vangidae, all of which are forest species and endemic to the Malagasy faunal region (Madagascar and the Comoros). *C. madagascariensis*, the only previously named species of this genus, is an arboreal gleaning insectivore. Red-tailed Vangas often forage on the outer parts of canopy trees and shrubs on medium-sized insects such as caterpillars and crickets (Rand 1936, Langrand 1990, Yamagishi *et al.* 1992, Eguchi *et al.* 1993).

All members of the Vangidae except the Red-tailed Vanga and Blue Vanga *Cyanolanius madagascarinus* are either limited to one of the three major Malagasy biogeographic regions (Eastern, Western and Southern) or have populations divided into subspecies that are restricted to one or two of these regions (Rand 1936, Appert 1968, 1970, Langrand 1990). Thus in general their distributions seem closely linked with vegetational communities.

The Red-tailed Vanga is widely distributed on Madagascar (Fig. 1), though it appears to be absent from a few areas in the northwest (Hawkins 1994) and the extreme south and southwest (Langrand 1990), and it occurs patchily elsewhere in its range (Appert 1968, 1970). No geographic variation has been previously recognized in this species. It is found in all native forest types and in degraded and secondary areas adjacent to primary forest (Rand 1936, Langrand 1990, Hawkins 1994).

In mid-June 1948 Philippe Milon collected two *Calicalicus* near Tuléar (Toliara) in the extreme southwestern corner of the island. After comparison of these two specimens to material of *Calicalicus madagascariensis* from across the island held in the American Museum of Natural History (AMNH), the Natural History Museum (BMNH), the Field Museum of Natural History (FMNH), and Muséum National d'Histoire Naturelle (MNHN), Paris, we have concluded that they represent a distinct and previously undescribed species. Here we propose to call this new species

Calicalicus rufocarpalis sp. nov.

Holotype. Female, Muséum National d'Histoire Naturelle, Paris, 1974.510, Tuléar [=Toliara], Province de Toliara, Madagascar, collected 19 June 1948, by Colonel Philippe Milon; field number PM 4396. The specimen had a granular ovary, measuring 5 × 2 mm, and with small "microscopique" egg follicles.

Further details about the specimen, not written on the museum ticket, are recorded in Milon's field catalogue (MNHN). Soft part

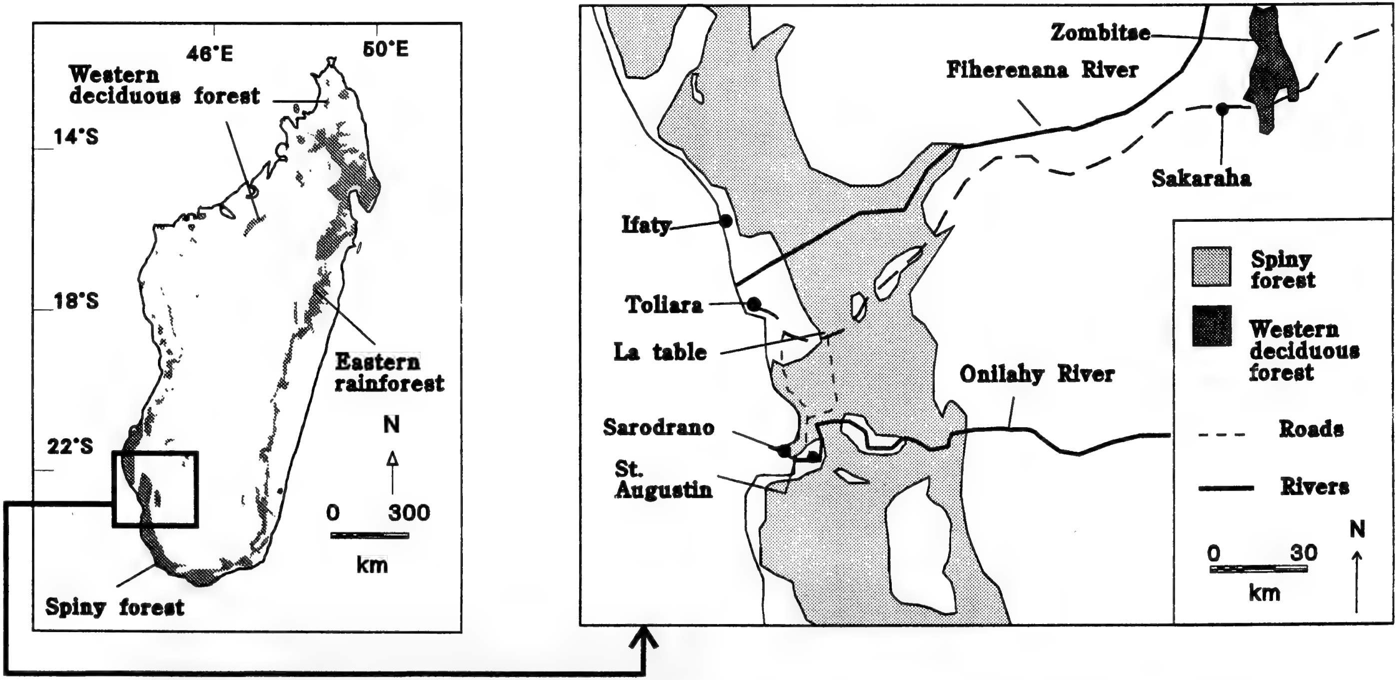

Figure 1. Map of Madagascar showing limit of eastern rainforest and spiny bush. The inset is of southwestern Madagascar.

TABLE 1

Measurements (in mm) and mass (g) of *Calicalicus madagascariensis* and *C. rufocarpalis*

	wing chord	tail	exposed culmen	bill length from anterior edge of nostril	tarsus	weight
rufocarpalis nov. sp.						
MNHN 1974.510♀	64	57	11.9	9.1	23.6	17.4
MNHN 1974.508♀	62	57	11.6	8.5	24.7	16.1
mean	63.0	57.0	11.8	8.8	24.2	16.8
madagascariensis[1]	67.4, 1.88 65–72 (n=53)	48.4, 2.04 45–54 (n=52)	10.5, 0.52 9.4–11.6 (n=53)	7.8, 0.40 7.0–8.7 (n=52)	20.4, 0.83 18.5–22.4 (n=43)	15.5, 1.5 14.0–18.0 (n=6)
statistical comparison (ANOVA)	F=10.9 p=0.002	F=34.5 p=0.0001	F=10.3 p=0.002	F=12.1 p=0.0001	F=38.8 p=0.0001	F=1.1 p=0.34

[1] Sexes combined. Presented as mean, standard deviation, minimum-maximum (number of specimens).

colours: iris lemon with a slight tawny wash, beak brownish-black with greyish-blue near base. Weight: 17.4 g. The bird was collected near La Table [approximately 20 km southeast of Toliara], which is here designated as the type locality. An analysis of its stomach contents conducted by R. Paulian identified one cerambycid beetle and a large grasshopper, almost certainly *Locusta*.

Diagnosis. Calicalicus rufocarpalis is distinguished from *C. madagascariensis* by differences in external measurements and plumage characters. Colour names and numbers are after Smithe (1975).

The sample of *C. madagascariensis* (n=53) showed no sexual dimorphism in external measurements and in all analyses presented herein sexes of adult specimens are combined. *C. rufocarpalis* has distinctly shorter wings and longer tail, bill and tarsus than *C. madagascariensis* (Table 1). In all cases there is no to little overlap in measurements between these two species and the differences are all statistically significant. There is considerable overlap in weight.

The crown and mantle of female *rufocarpalis* are generally a continuous near Brownish-olive (29) or Olive (30), while in *madagascariensis* the Plumbeous (78) crown contrasts sharply with the Brownish-olive or Olive mantle. The upper wing-coverts of *rufocarpalis* are distinctly Brick-red (132a) which contrasts with the Brownish-olive wing-coverts with Clay-color (26) fringes in female *C. madagascariensis*. The Brick-red pigment on the tail in *rufocarpalis* tends to be restricted to the area bordering the central shaft and absent from the tip, while in *madagascariensis* all the tail feathers, except the central pair, are almost entirely Brick-red. No specimen of male *C. rufocarpalis* is known (see Discussion section).

Measurements of the holotype (mm). Wing (chord) 64, tail 57, exposed culmen 11.9, bill length from anterior edge of nostril 9.1, tarsus 23.6.

Paratype. Female, Muséum National d'Histoire Naturelle, Paris, 1974.508, Tuléar (Toliara), Province de Toliara, Madagascar, collected 17 June 1948, by Colonel Philippe Milon; field number PM 4391 (see Table 1 for measurements).

Other information on this specimen was found in Milon's field catalogue (MNHN). The specimen was collected near a stone quarry at La Table, 13 km southeast of Toliara, and was part of a mixed species foraging flock composed of four or five *Thamnornis chloropetoides*, four or five *Newtonia*, and one *Neomixis striatigula*. The iris was light yellowish-brown and the bill brownish-black with a slightly bluish wash, and greyish-blue at the base. The bird weighed 16.1 g.

Etymology. The name *rufocarpalis* is derived from the Latin and refers to the distinct Brick-red wing converts of females of the new species.

English name. We suggest Red-shouldered Vanga.

Range. Only known from Toliara region of southwestern Madagascar.

Specimens examined. *C. rufocarpalis*, 2♀♀, Tuléar (Toliara) (MNHN). *C. madagascariensis*, 63♂♂, 52♀♀, 3 unsexed: Anaborano 1♂ (AMNH); Andapa 1♀ (AMNH); Bejofo 1♂, 1♀ (AMNH); Bezona 1♂ (AMNH); Col Pierre Radama 1♂ (AMNH); Eminiminy 1♂ (AMNH); Fanovana 1♂ (BMNH); Fito 2♂♂, 2♀♀ (AMNH), 1♂ (MNHN); Forêt de Vohibasia 1♂ (FMNH); Forêt Sihanaka 4♀♀ (BMNH); Fort Dauphin (Tolagnaro) 1♂, 1♀ (MNHN); Iampasika 1♀ (AMNH), 1♂, 2♀♀ (BMNH), 1♀ (MNHN); Ivohibe 2♂♂, 2♀♀ (AMNH), 1♂ (BMNH), 1♀ (MNHN); Lac Iotry 1♀ (AMNH); Manombo 2♂♂, 2♀♀ (BMNH), 1♂, 1♀ (MNHN); Maroantsetra region 11♂♂, 6♀♀, 2 unsexed (AMNH), 3♂♂, 2♀♀ (MNHN); Maromandia 1♂ (AMNH), 1♂, 1♀ (MNHN); Marotony 2♂♂, 1♀ (AMNH); Montagne d'Ambre 2♂♂, 1♀ (MNHN); Nosy Be 3♂♂ (MNHN); Périnet 2♂♂, 1♀ (MNHN); Sakaraha 1♀ (MNHN); Tabiky 2♂♂, 1♀ (AMNH), 2♂♂ (BMNH), 1♀ (MNHN); Tsarakibany 1♀ (MNHN); Tsiandro 4♂♂, 6♀♀ (AMNH), 4♂♂, 1♀, 1 unsexed (BMNH), 2♂♂, 2♀♀ (MNHN); Vondrozo 4♂♂, 6♀♀ (AMNH), 2♂♂, 1♀ (BMNH), 1♂ (MNHN).

Discussion

The only known material of *C. rufocarpalis* is the holotype and paratype, both females. In both cases, they have Brick-red upperwing-converts, a character in *C. madagascariensis* restricted to males (Langrand 1990). Milon, the collector of both *rufocarpalis* specimens, was clearly aware of the unusual circumstances of a female *Calicalicus* having Brick-red wing-coverts. On the original specimen label, of the holotype, with hand writing in the distinct style of Milon, he underlined the female sex symbol and wrote "ov. [aire] g. [ranulaire] assez important," thus removing any doubt associated with the proper sexing of the specimen. No mention was made of the two Toliara birds in his book on Malagasy birds (Milon *et al.* 1973). In examination of

C. madagascariensis specimens we found a few sub-adult males in female plumage. In all cases, males seem to obtain simultaneously Brick-red wing-coverts and other aspects of the adult male plumage (e.g. black throat feathers). Examples of males in this plumage include individuals taken at Tabiky on 17 November 1929 (AMNH 413072), at Bezona, near Ambanja, on 25 November 1930 (AMNH 413078), and at Vondrozo on 6 July 1929 (BMNH 1931.8.18.1516).

Calicalicus rufocarpalis is only known from the Toliara region, while *C. madagascariensis* occurs in much of the remaining forested areas of the island (Langrand 1990). The nearest known sites to La Table for *C. madagascariensis* are 110 km northeast of Toliara near Sakaraha (MNHN 1973.553), 59 km northeast of Sakaraha in the Forêt de Vohibasia (FMNH 380006), and 32 km north of Toliara near Ifaty (photographed by T. S. Schulenberg). These sites are shown in Figure 1.

A male *Calicalicus* attending a nest was photographed by C.A.D. on 1 March 1991, approximately 22 km southeast of Toliara by road (17 km by air), on the old track to St Augustin. The site (23°26′S, 43°48′E) was located about 500 m south of the turn-off towards Ambohimahavelona, which lies on the Onilahy River, and less than 10 km east of La Table. This individual had a plumage pattern different from typical *C. madagascariensis* (Plate 1). The most noticeable differences of the male in the photograph are the completely rufous upperwing-coverts as well as rufous on the mantle and lower nape as compared to typical *C. madagascariensis* in which the rufous feathers are restricted to the marginal, lesser and some median wing-coverts, and the mantle and upperparts are grey. The photographed bird has a yellow iris and *C. madagascariensis* possesses a dark brown iris. Further, the bird also has a distinctly paler tail and more heavily washed rufous underparts than *C. madagascariensis*. Given the combination of characters, in particular the iris colour, we conclude that the bird photographed by C.A.D. is referable to *C. rufocarpalis*.

Given the limited number of records of *Calicalicus* from the southwest, it is unclear if *C. madagascariensis* and *C. rufocarpalis* are sympatric. The closest known sites of their occurrence are Ifaty (*C. madagascariensis*) and Toliara (*C. rufocarpalis*) which were until recently part of the same forest block, separated only by the seasonal Fiherenana River. Further research is needed to clarify the distribution of these two species in southwestern Madagascar.

C. rufocarpalis has a shorter wing and tail and longer bill and tarsus than *C. madagascariensis*. The forest stature of the spiny bush in the Toliara region is distinctly shorter than that of the dry deciduous forest and humid forest, the latter types being the domain of *C. madagascariensis*. The differences in the measurements of the two species are presumably related to these ecological variables.

The current status of *C. rufocarpalis* is unknown. With the exception of the photo from southeast of Toliara, we are unaware of any recent records of it from the region between the Fiherenana River (north of Toliara and south of Ifaty) south to the Onilahy River (Fig. 1). Within a few kilometres of the Toliara city centre there still remains some forested areas, although generally degraded. Further, the forests of southwestern Madagascar are under heavy human pressure associated with exploitation of trees for charcoal and timber. Recent fieldwork in the region of Toliara and St Augustin has failed to reveal further records of *C. rufocarpalis* and it is presumed to be rare or sparsely distributed. We strongly suspect that *C. rufocarpalis* has a broader geographic range than currently known. It might be a species associated with the coastal plain and plateau of the calcareous Mahafaly Plateau, which runs from near Toliara south to Androka. This region of Madagascar is ornithologically poorly known and has not been the focus of any thorough inventory. Other species of vertebrates, such as the recently described carnivore *Galidictis grandidieri* (Wozencraft 1986, Goodman 1996), are known to have a parallel geographic distribution.

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Observations on the ecology of *Tauraco ruspolii* and *T. leucotis* in southern Ethiopia

by L. Borghesio

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Two species of the genus *Tauraco* are endemic to the Abyssinian plateau: Prince Ruspoli's Turaco *T. ruspolii* and the White-cheeked Turaco *T. leucotis*, the latter with two subspecies, the nominate and *donaldsoni*. They form a superspecies with *T. hartlaubi* of the Kenyan plateau. *T. leucotis* is widely distributed across most of Ethiopia, and even penetrates marginally into Eritrea and south-eastern Sudan, while *T. ruspolii* has a very restricted distribution in the southern part of the country (Fig. 1).

Following the theory first proposed by Moreau (1958), the ancestor of the two turacos was cut into two by the Rift Valley during a dry period, giving rise to *leucotis* on the western and *ruspolii* on the eastern side. When the climate ameliorated, *leucotis* crossed the Rift, differentiated there into the subspecies *donaldsoni*, and pushed *ruspolii* southwards. Still later, *leucotis* crossed the barrier again, driving *ruspolii* into its last refuge on the southern margin of the highlands. According to this view, *T. ruspolii* would be a relict species, competitively inferior to *T. leucotis* and gradually disappearing. Owing to this and to habitat alteration within its extremely restricted range, *T. ruspolii* is therefore now considered an endangered species (Ash & Gullick 1989, Dellelegn 1991, Collar *et al.* 1994) and is listed in the African Red Data Book (Collar & Stuart 1985).

In order to evaluate the status of *T. ruspolii*, a survey was undertaken between 23 March and 5 June 1995. Some data on its habitat requirements and those of *T. leucotis* were collected, providing new insight into the competition between and evolution of the two species. This new information is reported in this paper.

The area surveyed extends over about 35,000 km^2 in the Ethiopian administrative regions of Sidamo, Borana and Bale, and lies at the southern margin of the Abyssinian plateau. Elevation reaches over 2000 m in the northern sections, descending southwards to about 800 m. Habitats comprise *Podocarpus gracilior* montane forests in the wetter areas (mainly in the north); in drier localities, but still receiving a good amount of water, often in the form of mist, another kind of montane forest develops, dominated by *Juniperus procera*. The forests gradually merge into increasingly dry *Acacia* woodlands where elevation and rainfall decrease.

During the survey, 49 sites were visited (Fig. 2) within and around the known range of *T. ruspolii*. The species was found in all the previously known localities, including Genale (5°40′N, 30°32′E), where it was thought to have disappeared in recent times (Ash & Gullick 1989), and in numerous previously unreported sites. The habitats frequented ranged from *Podocarpus* and *Juniperus* forests and forest

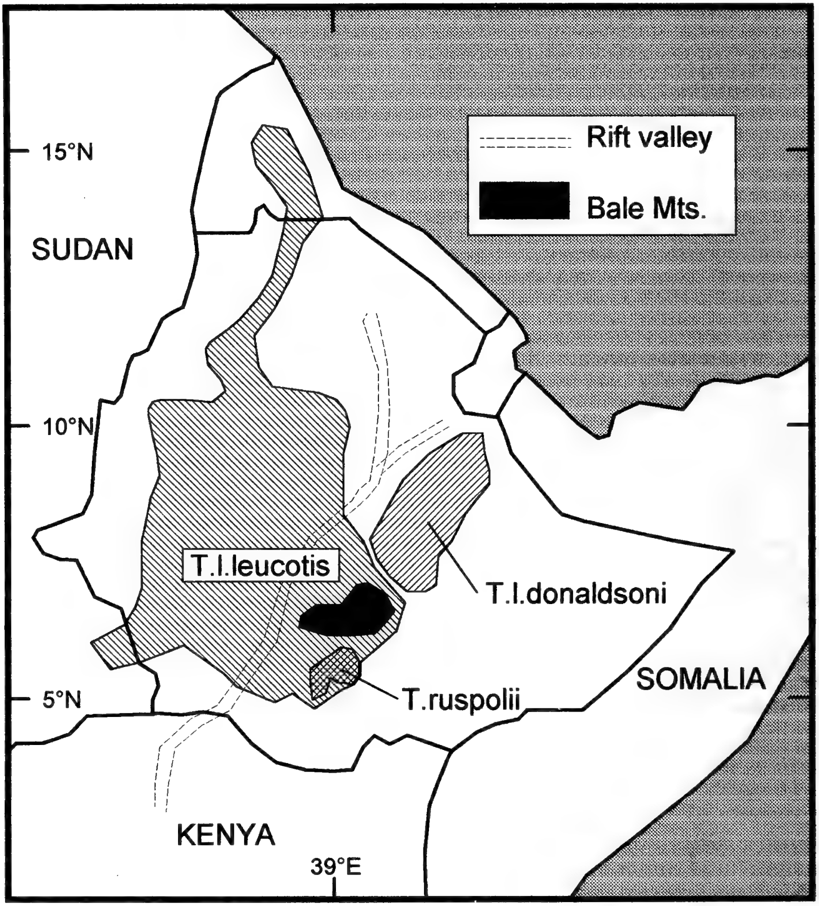

Figure 1. Distribution of the Ethiopian turacos.

margins up to *Acacia*-dominated woodlands, in the latter only as long as the preferred food plants, especially figs (*Ficus sycomorus*, *F. thonningii*, *F. vasta*), were present. Densities in *Podocarpus* forests were very low and only four individuals were met with there during over 90 hours of search in different localities; since the fruits of isolated *Podocarpus* trees growing outside forests were readily eaten by *T. ruspolii*, *Podocarpus* forests should not in themselves represent a hostile environment for the species; in fact the main reason for its absence is probably related to competition from *T. leucotis* (see below). In summary, the preferred habitats of *T. ruspolii* were forest margins and woodlands, where 10 to 20 individuals were regularly observed in a single day. Also *Juniperus* forests, the habitat where the species was initially re-found by Benson (1942, 1945), held good numbers.

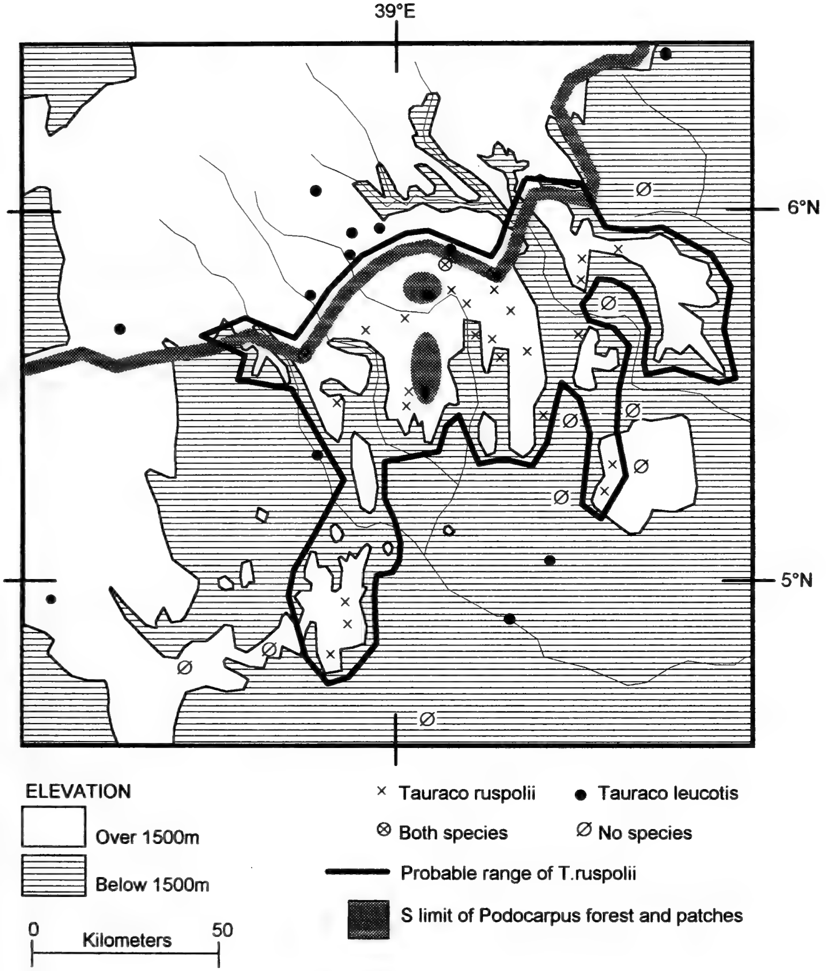

Figure 2. Map of the survey area.

Figure 3 shows the altitudinal distribution of the observations of *T. ruspolii*, which ranged from 1250 to 1860 m a.s.l. The upper limit roughly coincides with that of the most elevated localities in the study area; the lower one, which is reached after descending steeply from about 1500 m, appears to form an altitudinal limit to the species' distribution. As can be seen in Figure 2, the localities where *T. ruspolii* occurred were all within, or very near to, the 1500 m contour line.

The geographic distribution of *T. ruspolii*, inferred from present information, is recorded in Figure 2. In this map the northern limit of the species is seen to coincide with the southern limit of *Podocarpus*

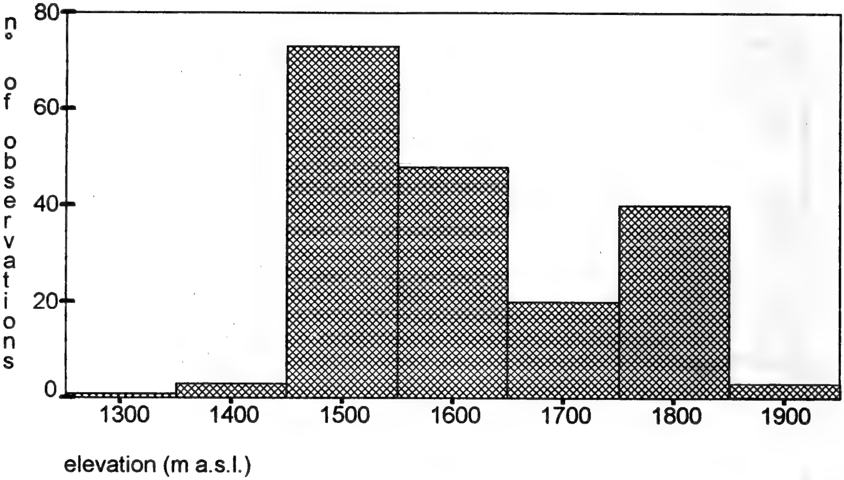

Figure 3. Altitudinal distribution of observations of *Tauraco ruspolii*.

forests, marked by a shaded line in the map, while elsewhere the range approximately follows the 1500 m contour line. This results in a surface area extending over about 7740 km^2. It was suggested by Collar & Stuart (1985) that the range of the species could extend outside the area represented in Figure 2, towards the town of Ginir (7°08′N, 40°43′E), in a northeastward direction; but this seems unlikely, as it would imply a range extension of over 150 km in an area mostly lying below 1300 m.

T. leucotis was also observed in the study area (Fig. 2). In contrast to *T. ruspolii*, highest densities occurred in *Podocarpus*. The two species often occurred within a few kilometres of each other, but they were found together in the same habitat in only three places (Fig. 2): at Wadera (5°48′N, 39°20′E), in a *Podocarpus* forest where *leucotis* greatly outnumbered *ruspolii*, at Zembaba (5°53′N, 39°10′E), and at Bore (5°38′N, 38°48′E), both in *Podocarpus* forest margins. Within the range of *ruspolii*, *leucotis* was never found in woodlands, and it was less common in *Podocarpus* forest margins; thus, it was almost exclusively present in *Podocarpus* forests. Erard & Prévost (1970) found that at Wadera *ruspolii* occurred inside and *leucotis* outside the forest, but this was not the case in 1995. Outside the range of *ruspolii*, *leucotis* occurred commonly in habitats drier than forests (i.e. forest margins, riverine vegetation and woodlands) that were similar to those occupied by *ruspolii* alone in the area of their co-existence. Elsewhere in Ethiopia, *T. leucotis* is not considered a specialised species of *Podocarpus* forests, but is seen to exploit a relatively wider range of habitats than its congener (Urban & Brown 1971, pers. obs.), and is reported to occur at elevations as low as 850 m in the Omo Valley (Fry *et al.* 1988).

The present observations suggest that the two Ethiopian turacos are largely separated by habitat in the areas where they come in contact. This was particularly evident in some localities, such as Wadera and Sede (5°31′N, 39°08′E) where *Podocarpus* forest abutted onto mixed *Acacia*-conifer woodland. There the two species replaced each other along the habitat transition, with little or no overlap. This pattern, in which different species replace each other very sharply in different habitats, is common in the Musophagidae (Fry *et al.* 1988, Dillingham & Moreau 1961).

Since their habitat overlap is restricted, the hypothesis of strong interaction between the two species no longer seems to hold. *T. ruspolii* is probably prevented from extending its range into the *Podocarpus* forest by the presence of the related species, but since in sympatric situations *T. leucotis* occupies a more restricted range of habitats than it does in allopatry, competition is not likely to be a severe threat for *ruspolii*, which seems to be better adapted than its relative to its non-forest habitat. As there is no evidence that the range of *T. ruspolii* is presently declining owing to competition, it is also unlikely that this happened in the past; hence the species should probably not be considered a gradually disappearing relict as was proposed by Moreau (1958), but rather as a stenoecious species showing preference for middle altitude habitats of intermediate dryness between montane forest and thorn-bush.

In the light of these conclusions, the conservation status of *T. ruspolii* should probably be considered in a less dramatic way than it has been in the past. The range of the species is very small, but competition is clearly not a threat to its survival, and, even more important than this, *T. ruspolii* is clearly not dependent on forests. Its preferred habitats, owing to their greater dryness, usually have to stand a much lower pressure from the expanding human population, and are not as severely threatened as are most Ethiopian forests.

Three other species of birds, also with very restricted altitudinal distributions, are found in the same area in the southern Ethiopian highlands (Ethiopian Bush-crow *Zavattariornis stresemanni*, White-tailed Swallow *Hirundo megaensis*, Sidamo Long-clawed Lark *Heteromirafra sidamoensis*). Taking this into consideration, it would seem that this region in the past, probably during a dry period, became separated from the rest of the Ethiopian highlands by the barriers formed by the Rift Valley to the west and by the huge block of the Bale mountains (reaching over 4200 m; Fig. 1) to the north; this isolation provided the conditions for the evolution of the four restricted-range bird species.

T. ruspolii seems therefore to have evolved *in situ* in the southern highlands of Ethiopia and, owing to its restricted altitudinal distribution, which certainly reduces its chances of dispersion, it may have never occupied a much wider range than today. On the other hand *T. leucotis*, which, as Moreau (1958) correctly pointed out, was initially restricted to the western side of the Rift valley, thanks to its ability to colonise localities at lower elevations, was able to cross the barrier and occupy a much wider area, which at present almost completely encircles *T. ruspolii*.

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Further observations on the nesting of the Azure-rumped Tanager

by Héctor Gómez de Silva Garza

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This paper describes observations on a nest of the Azure-rumped Tanager *Tangara cabanisi* in the El Triunfo Biosphere Reserve, southeastern Chiapas, Mexico. The nest was discovered by Angie Tyner on 26 April 1993, while the birds were still building it, and from 1 to 17 May the author was able to make occasional visits while conducting observations on the natural history of the Horned Guan *Oreophasis derbianus* and censusing the birds in the upper montane forest of El Triunfo.

TABLE 1

Data on nest sites of *Tangara cabanisi*; measurements in metres. All nests were at a point where the branch forked

	Height of tree	Height of nest	Distance from edge of crown	Distance to trunk	Branch
Data from Long & Heath (1994)	15.4–36.1	9.7–32.5	0.5–2	3–14	horizontal
1993 nest	*c.* 25	15.5	1.5–2	*c.* 4	horizontal

The Azure-rumped Tanager is a little known species with an extremely small range (Collar *et al.* 1992). Long & Heath (1994) presented the most detailed account of the breeding biology of this species, including data from 9 nests discovered between 1983 and 1990. They concluded that Azure-rumped Tanagers breed between mid-April and mid-June, nest in trees over 15 m tall with "a wide canopy of spreading branches", and place their nests "in the top half of the tree, some distance from the main trunk, approaching the end of a long-horizontal branch, at a point where the branch forked."

Not surprisingly, the 1993 nest fits this description well (Table 1). A noteworthy difference, however, is that the nest was not in the "humid evergreen broadleaf forest" that is the tanagers' typical habitat (and where all of Long & Heath's nests were found), but in a pine tree in the adjacent "*Cupressus-Pinus* community" at higher elevations (habitats as described in Long & Heath 1991). Heath & Long (1991: 227) reported that they occasionally saw the tanager up to 1700 m above sea level, where some plant species from the humid evergreen broadleaf forest follow the river valleys up into the lower slopes of the conifer belt. The 1993 nest was very near such a valley, and indeed the incubating bird nearly always flew toward the valley to forage, but it is significant that the bird searched for similar characteristics for a nest site even within vegetation of very different structure and composition from its typical habitat. This suggests that the choice of the above-mentioned nest-site characteristics may be a fixed "species-specific" pattern.

The average duration of incubation recesses (8.00 min, s.d. 4.12, $n=45$) was slightly higher than the averages for two nests (6.7, s.d. 3.4; 5.7, s.d. 3.2) reported in Long & Heath (1994). This is not surprising, since the 1993 nest was not surrounded on all sides by the proper habitat and the birds would have been expected to require longer periods of time to find enough of the fruits which form the main part of their diet.

Long & Heath (1994) reported that the incubation period is "around 14 days". It is typically 13–14 days in the genus *Tangara* (Isler & Isler 1987). Unfortunately, the bird may have already been incubating for one or more days by the time that my observations of the 1993 nest began, but the young had not yet hatched by 13.00 hr on the 15th day of observation; they had already hatched by 13.00 hr of day 16. The incubation period, therefore, was at least 15 days. Long & Heath (1994) report that the incubation constancies for two nests observed were 73.9 and 81.7%, calculated using the formula of Skutch (1976). From my data, I calculated a constancy of 67.4%. The range falls within the 60–80% of daylight hours reported for most tanagers (Skutch 1989) but is lower than that recorded in the previous Azure-rumped Tanager nests, probably owing to the longer average duration of recesses. It is important to note that it was necessary to modify Skutch's formula for calculating incubation constancy owing to the different number of incubation recesses and sessions observed in full (45 and 35); the average duration was used instead of the sums of all recesses and sessions. This calculation includes very brief recesses of 3 min (when a *Cathartes* vulture soared low overhead), 1 min (in order to catch an insect in flight) and a few seconds (in order to chase a pair of Blue-hooded Euphonias *Euphonia elegantissima* which began to build their nest in an adjacent tree).

Eggs of the genus *Tangara* are usually "whitish (sometimes tinged with colour), and speckled brown or lavender, especially about the large end" (Isler & Isler 1987). The eggs of the Azure-rumped Tanager were previously unknown, but in the 1993 nest could be seen to be whitish, with a very pale pink wash and heavy red-brown speckling.

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Swedish records of the eastern Palearctic Hoopoe subspecies *Upupa epops saturata*

by P. G. P. Ericson

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Southern Sweden is at the northwestern extreme of the European breeding distribution of the Hoopoe *Upupa epops*. The Hoopoe breeds in Sweden in very low numbers, mainly on Öland (Pettersson 1994). Besides this small breeding population, a significant number of vagrant individuals are observed outside the breeding areas, most often in spring and autumn (SOF 1990). Very rarely, Hoopoes winter in Sweden.

It is commonly assumed that all Hoopoes breeding or migrating through Sweden belong to the European subspecies *Upupa epops epops* (SOF 1990), of which Sweden is actually the type locality. *U. e. epops* is a typically pale subspecies inhabiting Europe, northwestern Africa, northwest India, Sinkiang in China, and Russia east to the Ob–Yenisey watershed (Cramp 1985). Most of the other subspecies occurring in, or near, the Palearctic are very similar to *U. e. epops*, differing only in being smaller and deeper rufous or duller in coloration with a longer bill. The different subspecies also have varying amounts of white on the wing and crest feathers. Only the east Palearctic subspecies *U. e. saturata* differs from *U. e. epops* in being distinctly darker, especially on the mantle and breast (Lönnberg 1909, Vaurle 1959). Except for a possible intergrading zone between nominate *epops* and *saturata* in the upper Yenisey watershed and in Tibet (Cramp 1985), there is no tendency towards darker birds anywhere within the breeding range of *U. e. epops*.

This paper evaluates the hypothesis that the subspecies *U. e. saturata* occurs regularly in Sweden. The work was initiated by the finding of a very dark individual in the province Blekinge in southern Sweden in December 1993, which obviously tried to winter there (Strömberg 1994). This bird is similar to other Swedish specimens in the collections of the Swedish Museum of Natural History which closely match the description of *U. e. saturata*. The difference in coloration of typical *U. e. epops* and typical *U. e. saturata* is obvious and subspecific determinations can fairly easily be done in the hand, and probably also in the field. However, as in most cases of this kind of geographical variation, individuals exhibiting intermediate characters occur. In such cases the subspecific allocation is often dependent on the personal judgement of the observer. With the application of modern optical techniques to quantify colours, this subjectivity can be reduced.

Materials and methods

A total of 17 adult specimens of *Upupa e. epops* and 16 of *U. e. saturata* (including the type and two paratypes) were studied. All specimens (listed in Appendix) are kept in the collections of the Swedish Museum of Natural History (NRM).

The mantle and breast of each individual were illuminated by tungsten-halogen light through a fibre-optic probe and the reflectance spectra were obtained by an Ocean Optics S1000 diode array spectrometer. From the spectrogram, the CIELAB (CIE 1986) colour parameters a (red–green scale), b (yellow–blue scale) and L (grey scale) were calculated. a, b and L are orthogonal axes producing a three-dimensional colour space designed to fit the human perception of colour hues. The degree to which the measured colour was saturated, the "colourfulness", was estimated by calculating *chroma* as $(a^2+b^2)^{1/2}$. In a bivariate plot of a and b, the hues can be expressed as the angle of the vector from the origin to the coordinates (a^1, b^1). The hues of different individuals, expressed as arctan (b/a), were then compared.

Ideally, for fully comparable results readings should be taken at homologous points of each individual in order, but this goal is very difficult to achieve in practice. Early in the work it proved that the repeatability of the readings was low, and that it is critical to standardise both the angle between the probe and the surface, and the pressure with which it is attached. In order to minimise the intra-observer variation, nine readings were taken from each specimen and the median value was used in the statistical analyses.

Statistical difference between samples were tested by a two-tailed Student's t-test.

Results

Sexual dimorphism

The difference between the sexes in plumage coloration was assessed in order to determine whether the sexes could be pooled in the analyses of the difference between the two subspecies. Although there is no obvious way to determine the sex of a Hoopoe in the field, sexual dimorphism involving general size (significant) and colour of throat and breast (slight) has been reported in the subspecies *U. e. epops* (Cramp 1985). The overlap in both size and plumage colour between the sexes is considerable, however, and the differences become apparent only when a series of specimens is studied. No sexual dimorphism has been described in the subspecies *U. e. saturata*.

In the subspecies *U. e. epops*, significant differences between the sexes were detected in the colours of the mantle and breast (Table 1). The males are significantly paler on the mantle and breast, and more yellowish-red on the mantle. Also in the subspecies *U. e. saturata* the males are generally paler and more yellowish-red. This result makes it obvious that in an analysis of differences between the subspecies the sexes must be treated separately.

Seasonal variation

It is unknown to what degree sunlight may affect plumage colour in the Hoopoe; and seasonal variation in the plumage colour, if large, would obscure the statistical analyses. In the present samples, no

TABLE 1

Descriptive statistics for the samples studied and a test of sexual dimorphism in mantle and breast colours in the Hoopoe subspecies *Upupa e. epops* and *U. e. saturata*. L is the position on the grey scale (larger values mean darker individuals). The saturation ("colourfulness") is estimated by calculating *chroma* as $(a^2+b^2)^{\frac{1}{2}}$, where a is the position on the red–green scale and b on the yellow-blue scale, and the hue of the colour by calculating arctan (b/a)

	Males				Females						
	n	range	mean	s.d.	n	range	mean	s.d.	t	d.f.	P
U. e. epops											
Mantle											
L	9	48.5–58.7	53.7	3.76	8	46.5–51.4	49.0	1.79	3.241	15	<0.01
chroma	9	15.9–19.1	19.1	2.35	8	14.6–17.9	16.0	1.09	3.442	15	<0.01
arctan(b/a)	9	1.1–1.1	1.1	0.02	8	1.1–1.1	1.1	0.02	0.147	15	ns
Breast											
L	9	57.6–68.1	62.7	3.87	8	56.0–63.0	59.2	2.40	2.228	15	<0.05
chroma	9	19.4–27.7	21.7	2.84	8	17.2–24.6	20.8	2.46	0.777	15	ns
arctan(b/a)	9	1.0–1.1	1.0	0.05	8	1.0–1.1	1.1	0.05	0.038	15	ns
U. e. saturata											
Mantle											
L	10	43.2–52.7	47.3	3.00	6	43.8–47.4	46.3	1.35	0.817	14	ns
chroma	10	12.9–17.4	14.9	1.58	6	10.8–13.8	12.8	1.16	2.799	14	<0.05
arctan(b/a)	10	1.1–1.1	1.1	0.02	6	1.1–1.1	1.1	0.01	0.638	14	ns
Breast											
L	10	52.4–62.6	57.2	3.43	6	52.3–57.5	54.8	1.97	1.539	14	ns
chroma	10	16.2–21.4	18.8	1.58	6	15.1–20.0	17.9	1.78	1.154	14	ns
arctan(b/a)	10	1.0–1.1	1.0	0.03	6	1.1–1.1	1.1	0.01	3.410	14	<0.05

statistically significant seasonal variation, measured as the correlation between the collecting month and the different colour variables, was detected. A tendency towards paler coloration later in the year seems to exist in male *U. e. epops*, but not in females nor in any sex of *U. e. saturata*.

Differences between subspecies U. e. epops *and* U. e. saturata

Males. Highly significant differences between the subspecies *epops* and *saturata* were found in all variables, except the arctan calculations for the mantle and breast (meaning that the hues are identical). As was to be expected, the males of *U. e. epops* proved to be much paler and more yellowish-red than those of *U. e. saturata* (Table 2), and a bivariate plot of the *chroma*-variables expressing the saturation provides a very good separation between the samples (Fig. 1).

Females. The females of the two subspecies also differ significantly in many variables. The most significant differences were found in the mantle, *U. e. epops* being on average the palest and most yellowish-red (Table 2).

The Swedish Hoopoes

The Swedish Hoopoes are very heterogeneous in regard to their general coloration. By adding the sex-determined Swedish individuals

TABLE 2
Differences in the colour of the mantle and breast between the Hoopoe subspecies *Upupa e. epops* and *U. e. saturata*. Descriptive statistics and colour parameters as in Table 1.

	t	d.f.	P
Males			
Mantle			
L	4.103	17	<0.01
chroma	4.627	17	<0.001
arctan(b/a)	1.111	17	ns
Breast			
L	3.282	17	<0.01
chroma	2.900	17	<0.01
arctan(b/a)	1.047	17	ns
Females			
Mantle			
L	3.079	12	<0.05
chroma	5.241	12	<0.001
arctan(b/a)	0.257	12	ns
Breast			
L	3.598	12	<0.01
chroma	1.777	12	<0.05
arctan(b/a)	1.102	12	ns

(two males and three females) to the bivariate *chroma*-plots it becomes obvious that both the subspecies *U. e. epops* and *saturata* are represented (Figs 1 and 2). Three unsexed Swedish birds are also dark enough to merit allocation to the subspecies *U. e. saturata* (see Appendix). The palest and most yellowish-red individuals (*U. e. epops*) are found in the spring while the darker (*U. e. saturata*) are generally found in the autumn. One individual (NRM 760184) that is definitely *U. e. saturata* was found in May 1975 and may well constitute the third known case of a Hoopoe surviving a winter in Sweden. Interestingly, one of the two previous records is from the same winter, 1974–75 (Risberg 1979).

Discussion

Two points are fundamental to the following discussion. (1) The validity of *U. e. saturata* as a distinctive subspecies, which has sometimes been questioned (Kozlova 1932, Dement'ev *et al.* 1951) although recognised by most authors, can be confirmed. (2) Neither the material studied, nor any published information, suggests that individuals approaching *U. e. saturata* in plumage darkness occur anywhere within the range of *U. e. epops*, except for in the Ob–Yenisey watershed where the two forms intergrade.

Hoopoes occurring in Scandinavia in the spring are likely to be mostly southeastern European birds that have prolonged their northward migration from the winter quarters slightly too far north

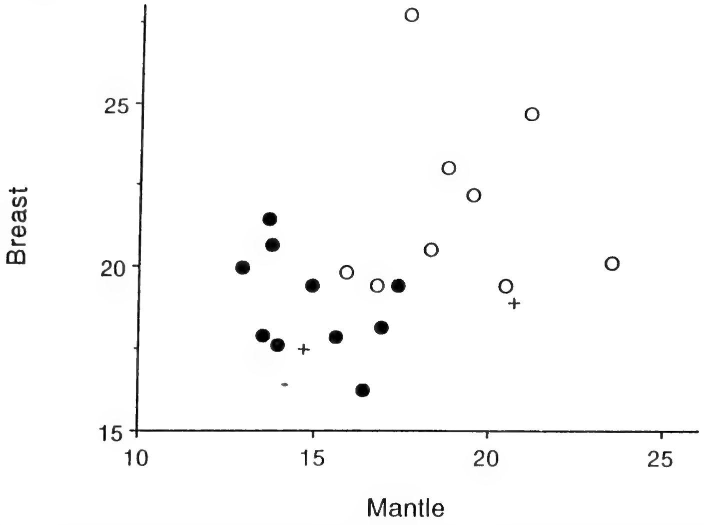

Figure 1. Plot of the *chroma*-values calculated for the mantle and breast, respectively, in male Hoopoes. A high score along the x-axis indicates that the individual has a more reddish plumage, and along the y-axis that the plumage is more yellowish. Open circles denote *Upupa epops epops*, filled circles *U. e. saturata*, crosses Swedish male Hoopoes.

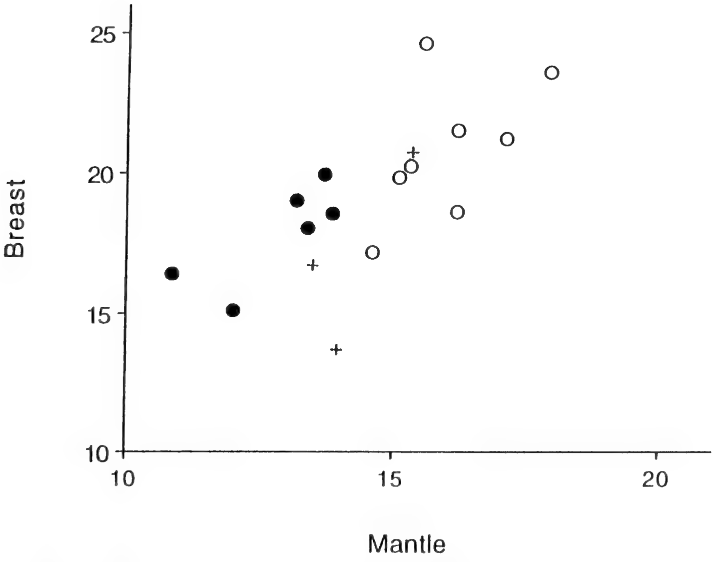

Figure 2. Plot of the *chroma*-values calculated for the mantle and breast, respectively, in female Hoopoes. A high score along the x-axis indicates that the individual has a more reddish plumage, and along the y-axis that the plumage is more yellowish. Open circles denote *Upupa epops epops*, filled circles *U. e. saturata*, crosses Swedish female Hoopoes.

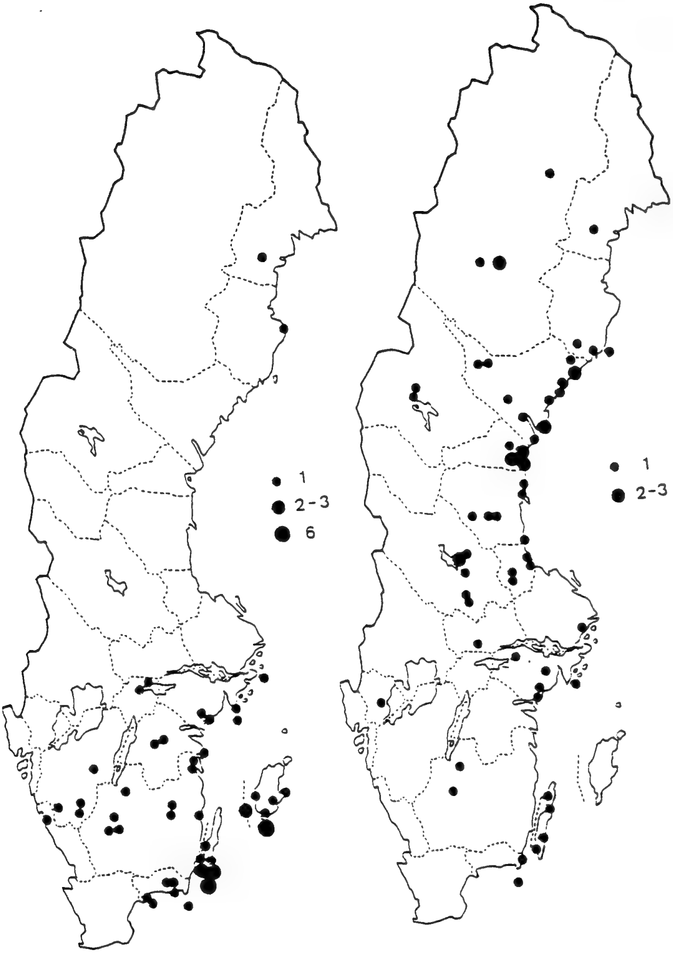

Figure 3. Spring (left-hand) and autumn (right-hand) records of Hoopoes in Sweden in 1984 (from Risberg 1985).

(Otterlind 1954). As predicted by this theory, most Hoopoes collected in spring in the NRM collection are typical nominate *epops*. The autumn records of Hoopoes in Sweden show a distributional pattern very different from that of the spring records (Fig. 3). This observation led Risberg (1979) to assume that the autumn birds have a different geographical origin from that of the spring birds. He suggested that they may derive from a population breeding north of the Caspian and Aral Seas from which some individuals reach Sweden due to reversed migration. Hoopoes of this population normally winter in India but some birds might unintentionally migrate on a reciprocal course. What

Risberg did not know is that some (many?) autumn Hoopoes are morphologically different from nominate *U. e. epops*, to which the population north of the Caspian and Aral Seas belongs. In this part of its range, as in all other parts, *U. e. epops* is rather pale and yellowish-reddish (Vaurie 1965). The two individuals from this population in the collection of the Swedish Museum of Natural History (NRM 566782 and 566783) confirm this by being among the palest of all *U. e. epops* individuals studied. In their mantle colour they both fall clearly outside the range of *U. e. saturata*. The occurrence of the subspecies *U. e. saturata* in Sweden can thus not be explained by reversed migration from the population north of the Caspian and Aral Seas.

If the Swedish occurrence of *U. e. saturata* is to be explained by reversed migration a much more easterly population, well east of the Yenisey river, must be involved. It is possible that Hoopoes with a reversed migration from such a population migrate west through the extensive forest-steppe of southern Russia and neighbouring countries when confronted by the clearly unfavourable habitat of the forested Siberian taiga to the north.

Acknowledgements

The impetus to this work came from Mr. Gunnar Strömberg who forwarded a Hoopoe dead in Blekinge in November 1993 to the Swedish Museum of Natural History with a note concerning its unusually dark plumage. This excellent observation is here gratefully acknowledged. I have benefitted greatly from the knowledge and skill of Dr. Staffan Andersson, who taught me how to use the spectrometer and to avoid many pitfalls. Mr. Francisco Hernández Carrasquilla helped me during the long measuring sessions. I also thank Dr. Staffan Andersson and Mr. Göran Frisk for commenting on the manuscript.

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Appendix

List of Hoopoes *Upupa epops* examined

NRM no.	Subspecies	Sex	Locality	Coll. date	Remarks
566788	*epops*	m	Algeria, Quargla	5 Sep. 1912	
566802	*epops*	m	Canary, Fuertaventura Isl.	Mar. 1912	
566803	*epops*	m	Canary, Fuertaventura Isl., Oliva	Feb. 1910	
690176	*epops*	m	Hungary, Csomad	4 Jul. 1965	
690175	*epops*	m	Hungary, Dunakeszi	10 Aug. 1965	
566784	*epops*	m	Hungary, Moina Azecröd		
690177	*epops*	m	Hungary, Urbö	29 Aug. 1965	
566782	*epops*	m	S.E. Russia	4 Mar. 1909	
566789	*epops*	m	W. Russia, Slonim	12 Jul. 1916	
566790	*epops*	f	Algeria, Lambèse	7 May 1910	
566804	*epops*	f	Canary, Fuertaventura Isl., Oliva	Feb. 1910	
566781	*epops*	f	Romania	20 May 1906	
566780	*epops*	f	Russ. Turkestan, Baimgol	10 May 1902	
566783	*epops*	f	S.E. Russia	4 May 1909	
566786	*epops*	f	Tunisia, Bir Mrabot	28 Mar. 1906	
566787	*epops*	f	Tunisia, El Bered	4 Mar. 1909	
566785	*epops*	f	Tunisia, Sidi Mansour	28 Mar. 1903	
566797	*saturata*	m	China, W. Shansi Prov.	24 May 1921	
566798	*saturata*	m	China, W. Shansi Prov.	16 May 1921	
566800	*saturata*	m	China, W. Shansi Prov.	27 May 1921	
556443	*saturata*	m	Korea, Riuganpo	13 May 1936	
556445	*saturata*	m	Korea, Shuotsu	1 Jul. 1935	
556447	*saturata*	m	Korea, Shuotsu	5 Jul. 1935	
566795	*saturata*	m	Mongolia, Tabool	30 Jul. 1919	
566796	*saturata*	m	Mongolia, Tabool	30 Jul. 1919	
566791	*saturata*	m	S. Transbaicalia, Kjachta	15 May 1908	Type
566792	*saturata*	m	S. Transbaicalia, Kjachta	20 May 1908	Paratype
566801	*saturata*	f	China, Richthofen Mts.	2 May 1932	
566799	*saturata*	f	China, W. Shansi Prov.	16 Apr. 1921	
556444	*saturata*	f	Korea, Riuganpo	23 Apr. 1936	
556446	*saturata*	f	Korea, Shuotsu	4 Jul. 1935	
566794	*saturata*	f	Mongolia, Tabool	21 Jul. 1919	
566793	*saturata*	f	S. Transbaicalia, Kjachta	13 May 1908	Paratype
760184	*saturata**	f	Sweden, Västmanland, Lindesberg	12 May 1975	
786231	*epops**	f	Sweden, Värmland, Svaneholm	18 May 1978	
760006	*saturata**	f	Sweden, Skåne, Helsingborg	4 Jan. 1976	
906010	*saturata**	m	Sweden, Dalarna, Rättvik	16 Dec. 1990	
786154	*epops**	m	Sweden, Södermanland, Dunker	23 Apr. 1978	
740041	*saturata***	?	Sweden, Småland, Västervik	20 Oct. 1973	
763077	*saturata***	?	Sweden, Småland, Vetlanda	25 Jan. 1976	
936991	*saturata***	?	Sweden, Blekinge, Sturkö	25 Nov. 1993	

*Allocation to this subspecies based on the spectrometry measurements in this study
**not measured by the spectrometer but tentatively allocated to this subspecies

Records of Harpy and Crested Eagles in the Brazilian Atlantic forest

by Mauro Galetti, Paulo Martuscelli, Marco Aurélio Pizo & Isaac Simão

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Forest raptor populations are declining throughout the world, and information on the ecology and even the distribution of most species is still lacking (Bierregaard 1995; see also del Hoyo *et al.* 1994). The main threats for raptors are deforestation, hunting and competition with humans for prey (Thiollay 1984, Redford 1992). The Atlantic forest of Brazil once covered 1 million km^2, of which only about 5% now remains; it holds a vast diversity of endemic birds and mammals and is considered one of the most endangered ecosystems of the world (SOS Mata Atlântica & INPE 1992).

The Harpy Eagle *Harpia harpyja* is the largest raptor in America and one of the largest in the world. It occurs from México to Bolivia and Argentina, and in a large part of Brazil (Sick 1993). Its ecology and distribution is very poorly known and most studies have been located in the Amazon region (Rettig 1978, Izor 1985). Harpy Eagles are considered scarce in the Atlantic forest and recent records are few (Chebez *et al.* 1990, Albuquerque 1995).

The Crested Eagle *Morphnus guianensis* is similar to an immature Harpy Eagle but the crest is not divided into two 'horns' (Sick 1993). It occurs from Guatemala to Bolivia and Argentina (Misiones), and there are records from most of Brazil (Sick 1993). Very little is known about its ecology and distribution (Bierregaard 1984).

This paper presents six recent records of Harpy Eagle and four of Crested Eagle in the Atlantic forest of Brazil, and suggests a possible migratory population of Harpy Eagles in the south of its range.

Observations

Harpy Eagle

On 25 July 1991 a Harpy Eagle was observed around 15.00 h at Estação Experimental Pau-Brasil, Porto Seguro, south of Bahia (16°19'S, 39°11'W). The area is a reserve of 1145 ha covered mainly by mature forest and secondary vegetation (Mori *et al.* 1983). The eagle was a mature individual perched in a dead tree in logged secondary vegetation. Possible prey for large eagles that occur in this area are the monkeys *Callithrix geoffroyi* and *Cebus apella*, and the sloth *Bradypus variegatus* (Oliver & Santos 1991).

On 11 August 1992, an adult Harpy Eagle was observed just after it killed a sloth (*Bradypus variegatus*) in the Companía Vale do Rio Doce Reserve (CVRD), Linhares, Espirito Santo (19°06'S, 39°45'W). The eagle was perched only 5 m up and flew away on being observed. On 18 December 1992 probably the same individual was observed, perched

TABLE 1

Comparative density, expressed as no. of groups/km^2, of arboreal prey of large raptors in two localities of the Atlantic forest

Area (State)	Forested area (km^2)	Density *Bradypus*	*Cebus*	*Alouatta*	*Callicebus*	*Callithrix*	*Potos*
Linhares* (E.S.[1])	157	?	2.19	+	1.15	10.46	?
Intervales** (S.P.[2])	490	—	0.16	+	—	—	—

*data from Chiarello (1995); **data from M. Galetti in prep.

[1] Total forested area in the state is 4,023 km^2.

[2] Total forested area in the state is 17,314 km^2

Abundance: +=occurs but extremely rare; —=does not occur; ?=occurs but density unknown.

at a height of 20 m. In 1995 a Harpy Eagle nest was found in a lecythidaceous tree in CVRD (R. Jesus pers. comm.). Faunal surveys in other areas of Espirito Santo state have not recorded Harpy Eagles (A. G. Chiarello pers. comm.). The CVRD reserve holds a high density and diversity of prey for large predators (both mammalian and avian), including agoutis, pacas and monkeys, as well as large birds (Chiarello 1995, Scott & Brooke 1985; see Table 1).

On 29 January 1990 a claw of a Harpy Eagle was confiscated from a hunter. The hunter stated that the eagle was killed in July 1989 at Varadouro, Cananéia, São Paulo (25°15′S, 48°05′W). On 1 July 1990 two adult Harpy Eagles were observed soaring at Ariri, on the south coast of São Paulo state (25°03′S, 48°07′W). In July 1991 and 1993 two Harpy Eagles were observed further north in the Cananéia region within 45 km^2 of continuous forest. The eagles were observed there during the entire month. This region is covered by pristine Atlantic forest, mangroves and *restinga*, ranging from sea level to 1350 m altitude.

Crested Eagle

On 25 May 1990 an adult Crested Eagle was observed soaring over Parque Estadual Jacupiranga at 750 m a.s.l. (24°53′S, 48°22′W). Also in the same park but at 50 m a.s.l. an eagle was observed on 14 December 1992. This park covers 1100 km^2 of Atlantic forest ranging from lowland to montane forest.

On 14 December 1992 another adult Crested Eagle was observed in Parque Estadual do Morro do Diabo (see Valladares-Padua & Cullen 1994 for site description), in semideciduous forest close to the Rio Paranapanema. This area contains 320 km^2 of semideciduous and riverine forest and is the largest fragment of forest remaining in the hinterland of São Paulo.

At 17.05 h on 24 February 1995, a Crested Eagle was observed perched 20 m up at Carmo station (700 m a.s.l.), Parque Estadual Intervales (24°14′S, 48°04′W), near Capão Bonito, São Paulo. This reserve covers 490 km^2 of secondary and primary Atlantic forest, which is continuous with the Parque Estadual Carlos Botelho and Petar (see Pizo *et al.* 1995). Large prey species (monkeys, agoutis, deer) for large predators are very scarce in this area (M. Galetti unpubl. data; Table 1).

Discussion

Both Harpy and Crested Eagles need large areas for survival. Thiollay (1989) estimated that a pair of either species may have a home range more than 100 km^2. The Harpy Eagle's diet usually includes game species, such as monkeys (*Alouatta*, *Cebus*), sloths (*Bradypus*), deer (*Mazama*) and also large birds (cracids, macaws, seriemas) (Rettig 1978, Izor 1985, Sick 1993). Crested Eagles prey mainly on snakes, large birds (trumpeters, cock-of-the-rock) and occasionally arboreal mammals such as kinkajous and young spider monkeys (Bierregaard 1984, Julliot 1994; see also del Hoyo *et al.* 1994).

The remaining, highly fragmented Atlantic forest covers *c.* 60 000 km^2 (SOS Mata Atlântica & INPE 1992). The size of this area suggests there is still suitable habitat for large raptors, but the area *per se* cannot predict the abundance of large raptors in this forest. Thiollay (1984) suggests that the human impact of hunting on game animals can reduce the prey availability for large raptors, and the Harpy Eagle would be the first species to disappear in hunted forests. In fact, hunting pressure in Neotropical forests can extirpate most game species in a few years (Peres 1990).

The remaining forested area in São Paulo (*c.* 17 314 km^2) is much greater than in Espirito Santo (*c.* 4023 km^2, data from SOS Mata Atlântica & INPE 1992). Harpy Eagles have been recorded recently in São Paulo only during the winter (June, July and August), suggesting migratory movements (see Sick 1993). Migratory movement is also suggested by the date of collection of earlier specimens of Harpy Eagles in São Paulo (MZUSP, two eagles collected in August, one in Ituverava and another in Juquiá). Albuquerque (1995) also recorded the Harpy Eagle only in the winter (or after the passage of a cold air mass) in Serra do Tabuleiro, Santa Catarina. Straube (1989) suggests that the Atlantic avifauna colonized Misiones via riverine forest of the Iguaçu river. Harpy Eagles might be expected to migrate along the forests fringing the Paranapanema river.

Harpy Eagles are known to breed in Misiones, Argentina (Chebez *et al.* 1990), and have been recorded there as recently as January 1996 (E. R. Krauczuck *in litt.*). Three nests in Argentina were located in sites protected from cold winds from the south, and the eagles probably migrate during cold winters (E. R. Krauczuck *in litt.*). Chebez (1994) suggests that Parque Provincial Urugua-í and Yabotí are the only places that still have Harpy Eagles in Argentina.

The rarity of Harpy Eagles in the Atlantic forests of São Paulo (and probably Santa Catarina and Paraná) can be explained not only by habitat loss but also by the density of their prey. Large mammal prey (mainly primates and sloths) have low densities in most large reserves in southeastern Brazil (Chiarello & Galetti 1994, M. Galetti unpubl. data; Table 1). The exceptions are the north of Espirito Santo and south of Bahia where the density of monkeys, agoutis and other possible prey of Harpy Eagles is high (Oliver & Santos 1991, Chiarello 1995, A. Chiarello unpubl. data). It is not known why the density of arboreal mammals in Espirito Santo and Bahia is so different from São Paulo; both areas are affected heavily by hunting. In CVRD, Espirito Santo, Harpy Eagles have been observed since the 1970s, and it is one of the few places in the whole Brazilian Atlantic forest where this eagle is known to breed. Houston (1987) found a high correlation between the density of mammals and vultures in Neotropical forests, and the same is probably true for large raptors as well (see also Thiollay 1984).

The data presented here suggest that there are at least two populations of Harpy Eagles in the Atlantic forest: sedentary individuals in the north of Espirito Santo and south of Bahia, and migratory ones in the south of Brazil (São Paulo, Paraná and Santa Catarina), breeding in Misiones, Argentina.

The Crested Eagle is considered naturally rare (Sick 1993), and the only previous record of this species for São Paulo was in 1900 (MZUSP 2417 from Apiaí). There has been a recent report from Barrolândia, near Porto Seguro Bahia (Anon. 1995). It is difficult to know why the Crested Eagle is so rare in southeastern Brazil, but arboreal snakes (boas), their main prey, are extremely rare in the Atlantic forest of São Paulo (pers. obs.).

To sum up, the status of Harpy and Crested Eagles in the Atlantic forest is highly endangered. Large raptors need more than large areas to survive; it is also necessary to maintain high levels of their prey (see Redford 1992). Most reserves in the Brazilian Atlantic forests are 'empty forests' where hunting is still a common practice (Oliver & Santos 1991, Galetti & Chivers 1995). Several reserves still have a high human population, hunting and logging in the forest, and the boundaries of many reserves are just virtual.

The conservation of Harpy Eagles should be given special attention if migratory movements are confirmed (probably possible by radio-telemetry only). Also it is paramount to protect the forests in northern Espirito Santo and southern Bahia where Harpy Eagles are resident. Oliver & Santos (1991) suggest several areas where new reserves could be established. Harpy and Crested Eagles may also occur in other remaining large forest blocks (e.g. Parque Nacional de Monte Pascoal), and these should be investigated.

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Twenty-nine new island records of birds from the Philippines

by Thomas Brooks & Guy Dutson

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We spent 21 July to 19 August 1994 birdwatching on the Philippine islands of Bohol, Cebu, Panay, Sanga-Sanga, Bongao, Tawi-Tawi, Mindanao and Mindoro. During this period, we obtained sight records of a number of bird species not previously known from these islands, according to the distributional information given in Dickinson *et al.* (1991). Field-notes supporting the identification of these birds are available from the authors.

LITTLE GREBE *Tachybaptus ruficollis*

Twelve birds, including several immatures, were seen on a small lake just east of Sanga-Sanga town, **Sanga-Sanga**, on 10 August. The species has not previously been recorded in the Sulu Archipelago, although it is known from Mindanao, and from Borneo (MacKinnon & Phillipps 1993).

WHISTLING-DUCK SP. *Dendrocygna* sp.

A single bird, almost certainly Wandering Whistling-Duck *Dendrocygna arcuata*, was seen in flight at dusk in Barangay Magsagaw, **Tawi-Tawi**, on 8 August. The species is common on Sanga-Sanga, but is otherwise known from elsewhere in the Sulu Archipelago only from the sight records of duPont & Rabor (1973). The possible confusion species, Spotted Whistling-Duck *D. guttata*, is known from the south-west Philippines (Mindanao, Basilan and Jolo) from a few historical specimens.

HAWK SP. *Accipiter* sp.

A small *Accipiter* sp. was flushed from secondary forest in Barangay Alojipan, at the base of Mt Madja-as, **Panay**, on 2 August. Our views were insufficient to identify the bird, but no *Accipiter* spp. are previously known from Panay.

PEREGRINE FALCON *Falco peregrinus*

One bird, probably a female, of the dark resident race *F. p. ernesti* was watched fiercely mobbing a White-bellied Sea-Eagle *Haliaeetus leucogaster* on **Bongao** peak on 6 August. The species is not listed for the Sulu Archipelago by Dickinson *et al.* (1991), although it was recorded on Tawi-Tawi on 23 March 1987 by Hornskov (1995). Birds are known to be resident on Mindanao and Cagayan Sulu, and in northern Borneo (MacKinnon & Phillipps 1993).

TABON SCRUBFOWL *Megapodius cumingii*

A single bird was seen in dense forest on **Bongao** peak at dawn on 6 August. Although not listed for the island by Dickinson *et al.* (1991), the species was seen here by I. Gardner (*in litt.* 1993). It is known from most islands in the Sulu Archipelago.

BUTTONQUAIL SP. *Turnix* sp.

One *Turnix* sp. was flushed from grass on **Sanga-Sanga** on 10 August, but the views obtained were insufficient for specific identification. The only *Turnix* sp. known from the Sulu Archipelago is Small Buttonquail *T. sylvatica*, which is itself only known from the type of *T. s. suluensis*, collected on Jolo in 1903 (Mearns 1905). *T. sylvatica* is also the only *Turnix* sp. known from Mindanao, and no species occurs on Borneo (MacKinnon & Phillipps 1993).

RUDDY-BREASTED CRAKE *Porzana fusca*

A single bird was seen in dense secondary riverine forest undergrowth at *c.* 100 m altitude in the Sampulong Bolo Natural Sanctuary, Sara, **Panay**, on 31 July. The species is known from most of the large Philippine islands.

COMMON SANDPIPER *Actitis hypoleucos*

Three birds were seen flying along the beach in Sanga-Sanga town, **Sanga-Sanga**, on 5 August. The species is a common passage migrant throughout the Philippines. It is not listed for Sanga-Sanga by Dickinson *et al.* (1991) although six were recorded here in October 1971 by duPont & Rabor (1973) and three on 24 March 1987 by S. Jensen and J. Hornskov (*in litt.* 1992).

WOOD SANDPIPER *Tringa glareola*

One bird was seen on the northern shore of **Bongao** on 13 August. The species is a common passge migrant to most Philippine islands.

ORIENTAL PRATINCOLE *Glareola maldivarum*

A single bird was seen hawking over paddyfields near Concepcion, **Mindoro**, on 18 August. Although not listed in Dickinson *et al.* (1991), I. Gardner (*in litt.* 1988) recorded a single bird near San José in March 1988 and Evans *et al.* (1993) recorded two birds near Malpalon on 24 September 1991. The species has not previously been recorded in the Philippines in August.

COMMON TERN *Sterna hirundo*

Two birds were seen just off the east coast of **Tawi-Tawi** on 12 August. The species is an uncommon passage migrant throughout the Philippines, and although not listed for Tawi-Tawi by Dickinson *et al.* (1991), about 50 were recorded off the east coast on 28 March 1987 by S. Jensen and J. Hornskov (*in litt.* 1992).

BLACK-NAPED TERN *Sterna sumatrana*

Three adult birds were seen just offshore from Cebu City, **Cebu**, from the Tagbilaran to Cebu ferry, on 27 July. The species is likely to be an uncommon resident throughout the Philippines, although

Hornskov (1995) suggests that a recent range extension may have taken place.

SPOTTED DOVE *Streptopelia chinensis*

This species was commonly seen in agricultural land at and near the Sablayan Penal Colony, **Mindoro**, 15–18 August. Although not listed for the island in Dickinson *et al.* (1991) it was commonly recorded in 1988 by I. Gardner (*in litt.* 1988) and in 1991 by Evans *et al.* (1993).

ZEBRA DOVE *Geopelia striata*

The distinctive calls of this species were heard on **Sanga-Sanga** on 12 August. Escaped cagebirds are known to have colonised a number of Philippine islands (Dickinson *et al.* 1991, Hornskov 1995), and this may be the case on Sanga-Sanga. Four individuals were also seen on **Bongao** on 5 August.

COMMON KOEL *Eudynamys scolopacea*

Three individuals were seen and heard on **Sanga-Sanga** on 12 August. The species is already known from many of the islands of the Sulu Archipelago, and was reported from Sanga-Sanga by duPont & Rabor (1973).

PHILIPPINE EAGLE-OWL *Bubo philippensis*

One bird was flushed at *c.* 15 m range in deep forest at midday on 26 July, in Rajah Sikatuna National Park, **Bohol**. It was a huge owl, about twice the bulk of a Tawny Owl *Strix aluco* with similar short-winged proportions. The plumage was warm brown with prominently barred tail and remiges, paler primary bases and a dark carpal patch. This is the only large owl in the Philippines other than the Spotted Wood-Owl *Strix seloputo* of Palawan, which is considerably smaller and has large pale spots on its upperparts. A large owl probably of this species was also seen in Rajah Sikatuna National Park on 28 January 1994 (J. Hornbuckle & P. Morris *in litt.*). The species is endemic to the eastern Philippines (known from Luzon, Catanduanes, Samar, Leyte and Mindanao) and is thus not unexpected on Bohol.

GREY-RUMPED TREESWIFT *Hemiprocne longipennis*

G.D., who is familiar with the species, saw two birds on 10 August and three (which were photographed) at close range on 11 August, all in Barangay Buan, **Tawi-Tawi**. This is only the second Philippine record, the other being of two collected on Sibutu on 2 November 1971 (duPont & Rabor 1973). The species is common on Borneo (MacKinnon & Phillipps 1993), and its range seems to be expanding, for it has also recently been recorded for the first time on Lombok, Indonesia (Johnstone *et al.* 1993).

SWIFTLET SP. *Collocalia* sp.

A number of large, dark swiftlets seen between 700 and 1000 m on Mt Madja-as, **Panay**, on 2 August seem likely to have been Philippine Swiftlets *Collocalia mearnsi.* Although the species is dubiously separable from Island Swiftlet *C. [vanikorensis] amelis* in the field, *C. mearnsi* occurs on the adjacent island of Negros (*C. [vanikorensis] amelis* is apparently absent from both Negros and Panay), and is largely an upland species while *C. [vanikorensis] amelis* is generally confined to the lowlands.

SWIFTLET SP. *Collocalia* sp.

Small, dark swiftlets were commonly seen on **Sanga-Sanga** (5, 6, 10–13 August), with a maximum of about 50 individuals. They seem likely to have been Edible-nest Swiftlet *Collocalia fuciphaga*, which was also reported from the Sulu Archipelago by S. Jensen and J. Hornskov (*in litt.* 1992), but note that this record, of ten birds near Sangka-Sangka bridge on 24 March 1987, was subsequently accidentally listed as being of German's Swiftlet *Collocalia germani* in Hornskov (1995). The species has not previously been recorded in the Sulus, although it is common in Borneo (MacKinnon & Phillipps 1993).

A few birds (maximum ten individuals) were also seen on **Bongao** on 5 and 6 August. The bamboo ladders on the north face of Bongao peak suggest that edible swiftlet nests are harvested here, and so the birds were probably Edible-nest Swiftlets *Collocalia fuciphaga*. Medway (1966) also received reports of the collection of edible swiftlet nests in the Sulus, and so although Dickinson *et al.* (1991) suggested that these reports must have originated from Cagayan Sulu, they may after all refer to the Sulu Archipelago proper.

GLOSSY SWIFTLET *Collocalia esculenta*

Birds were seen commonly on **Sanga-Sanga** (5, 6, 10–13 August). The species is known from Bongao but not from elsewhere in the Sulu Archipelago.The species was also very common on **Tawi-Tawi** with flocks of over 100 individuals seen on 6–12 August. Although not listed for the island by Dickinson *et al.* (1991), it was recorded here by S. Jensen and J. Hornskov (*in litt.* 1992) on 25 and 26 March 1987.

PHILIPPINE NEEDLETAIL *Mearnsia picina*

A single bird was seen on **Sanga-Sanga** on 12 August. The species was only recently recorded in the Sulu Archipelago for the first time, on Tawi-Tawi (Lambert 1993).

HOUSE SWIFT *Apus affinis*

A single bird was seen on **Sanga-Sanga** on 12 August. Good views were obtained, excluding the possibility that this was a Fork-tailed Swift *A. pacificus*. Although only known from a few islands in the northern Philippines, *A. affinis* is common on Borneo (MacKinnon & Phillipps 1993), and seems to be expanding in the Philippines (Evans *et al.* 1993).

PURPLE NEEDLETAIL *Hirundapus celebensis*

Four individuals were seen at 600 m on Mt Madja-as, **Panay**, on 2 August. The species is known from most of the larger Philippine islands.

BARN SWALLOW *Hirundo rustica*

Two birds were seen on **Bongao** on 5 August. The species is a common passage migrant and winter visitor to the Philippines. The earliest Philippine record listed in Dickinson *et al.* (1991) is 15 August. Evans *et al.* (1993) recorded two birds on Negros on 29 July 1991.

YELLOW-VENTED BULBUL *Pycnonotus goiavier*

Two individuals were seen in scrub on **Sanga-Sanga** on 10 August. The species is already known from most of the islands in the Sulu Archipelago. A single bird was also seen on **Bongao** on 5 August. The subspecies of these birds was not determined but would indicate whether these populations originated from Borneo or the Philippines.

CELESTIAL MONARCH *Hypothymis coelestis*

A bird seen for some minutes at close range in logged forest in Barangay Buan, **Tawi-Tawi**, on 10 and 11 August appeared to be a Celestial Monarch *H. coelestis* but, given the range extension, may prove to be a new subspecies. It differed obviously from nearby Black-naped Monarchs *H. azurea* in its pale sky-blue crown, drooping crest and broad eye-ring. The length of the crest was difficult to assess but when held away from the neck, its projection was longer than that of the bill. The rest of the head, nape and breast had a purple wash whilst the mantle and wing-coverts had sky-blue streaking. The belly was white and the remiges and rectrices dull blue. The similar Short-crested Monarch *H. helenae* has a shorter crest, no eye-ring, no purple tones and no pale streaking on the upperparts. This is the first record of this rare bird from the Sulu Archipelago, although it is known from Basilan.

STRIPE-BREASTED RHABDORNIS *Rhabdornis inornatus*

Two birds were seen at 900 m on Mt Madja-as, **Panay**, on 2 August. *R. inornatus* is known from the mountains of Negros, and Panay birds are presumably of the same race (*R. i. rabori*).

TREE SPARROW *Passer montanus*

The species was common in Sanga-Sanga town, **Sanga-Sanga** (5, 6, 10–13 August). Tree Sparrows were also common in **Bongao** town (5 and 6 August), and Batu-Batu town, **Tawi-Tawi** (6–12 August). It has not been previously recorded in the Sulu Archipelago.

SCALY-BREASTED MUNIA *Lonchura punctulata*

Flocks of this species were seen in Pasonanca, Zamboanga, **Mindanao**, on 10 and 12 August. It is previously known only from the northern Philippines and these flocks may have originated from escaped cagebirds.

Discussion

The new island records of Philippine Eagle-Owl and of Celestial Monarch are most exciting and show that significant discoveries may still be made on Philippine islands rarely visited by ornithologists. Both of these species are listed as "threatened" in Collar *et al.* (1994).

However, the majority of the new island records listed above are a depressing testimony to the rapidly continuing destruction of forest habitats throughout the Philippine Archipelago. We found most of these species to be common, and they would surely have been recorded during any previous ornithological work on the islands in question had they been present. Species such as Spotted Dove, Zebra Dove, House Swift, Yellow-vented Bulbul, Tree Sparrow and Scaly-breasted Munia are rapidly spreading throughout the country following deforestation and urbanization. They are replacing the endemic forest birds which make the avifauna of the Philippines so special, and are indicative of the task facing the conservation of Philippine biodiversity.

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The taxonomic status of the bird of paradise *Paradigalla carunculata intermedia* (Paradisaeidae) with notes on the other *Paradigalla* taxa

by Clifford B. Frith & Dawn W. Frith

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By convention, the bird of paradise genus *Paradigalla* (Paradisaeidae) comprises two species, the Long-tailed Paradigalla *P. carunculata* and the Short-tailed Paradigalla *P. brevicauda* (Mayr 1962, Gilliard 1969, Cooper & Forshaw 1977). They are medium-sized (38 and 23 cm long respectively), sexually monomorphic members of the subfamily Paradisaeinae (typical birds of paradise). Adults are jet-black over the entire body with strongly iridescent blue-green scale-like crown feathering and a subtle deep green sheen to the leading edge of primaries and to dense velvet-like mantle feathering. The face is conspicuously adorned with a yellow wattle that covers the lores and forehead and a bulbous blue wattle at the base of the lower mandible. These wattles are fully developed in *P. brevicauda* hatchlings, but both are dirty cream-yellow with a smudged greyish lower border to the lower mandible wattle. In much longer and acuminately-tailed adult *P. carunculata* there is an additional small bare area directly beneath the blue wattle that is pigmented deep orange-red; these characters, including the long tail, distinguish this species from smaller, truncately-tailed, *P. brevicauda*. For more detailed plumage descriptions see Gilliard (1969), Cooper & Forshaw (1977) and Beehler *et al.* (1986).

The paradigallas occur in montane forests in New Guinea between approximately 1400 and 2100 m asl. They are little known; an exception is a study of the nesting biology of *P. brevicauda* showing that only a single, presumed female, parent attended the nest (Frith & Frith 1992). This finding suggests that males are promiscuous as in most bird of paradise species.

The long-tailed *P. carunculata* was described by Lesson (1835) from a specimen of unknown location. All subsequent specimens of known origin are from the Arfak Mountains in the Vogelkop which is now accepted as the type locality of the species (Mayr 1941, 1962, Gilliard 1969). A single early mounted specimen in the Muséum National d'Histoire Naturelle, Paris, labelled as from Amberbaki (north of the Arfak Mountains, to the south of the Tamrau Mountains), was probably purchased there from local people and was not at its place of origin. Ripley (in Mayr & Meyer de Schauensee 1939) and Gilliard (in Gilliard & LeCroy 1970) did not record *P. carunculata* on the Tamrau Mountains of the Vogelkop. Rothschild & Hartert (1911) described short-tailed *P. brevicauda* from an adult male collected on Mt. Goliath, Oranje Range (eastern Irian Jaya) by A. S. Meek. This simple pattern of allopatry was, however, complicated by Ogilvie-Grant's (1913, 1915) description of a supposed intermediate species *P. intermedia* from the Utakwa River, below Mt. Carstensz, Snow Mountains, at the western end of the central cordillera. "*P. intermedia*" was established on three specimens, consisting of the type, a subadult male (its only adult plumage being the central pair of jet-black tail feathers), an immature male and a nestling (with nest; see Frith 1970). The characters said to distinguish *P. intermedia* were that it resembled *P. carunculata* but was smaller with a shorter tail, and its wattles were all lemon-yellow (without blue or orange-red). Since then only one other individual bird has been attributed to *intermedia*, this being described as an adult male from the Ilaga Valley, Irian Jaya, collected by Ripley (1964).

While almost all subsequent authors accepted *intermedia* without question as a valid taxon, its position within *Paradigalla* has proved contentious. Most authors agree that *intermedia* does not constitute a valid species but disagree as to which of *P. carunculata* and *P. brevicauda* it belongs subspecifically. Notable exceptions were Rothschild (1921), Mathews (1930), Junge (1939) and Mayr (1941) who considered *intermedia* invalid at any level, and treated it as a synonym of *P. brevicauda*. Gyldenstolpe (1955) found that the material he examined was inadequate for decision. Mayr (1941) tentatively considered *P. brevicauda* conspecific with *P. carunculata*, and this treatment was followed by Mayr & Gilliard (1954) and Gyldenstolpe (1955). Iredale (1950), Mayr (1962), Frith (1970) and Frith & Frith (1992) treated *intermedia* as a subspecies of *P. brevicauda*, while Rothschild (1931), Ripley (1964), Rand & Gilliard (1967) and Cooper & Forshaw (1977) kept it subspecifically under *carunculata*. While acknowledging *P. c. intermedia* as valid Gilliard (1969) inexplicably detailed the nest and nestling collected at the type locality under his account of *P. brevicauda*.

With the statement that males and females (although no female specimen exists) have a "moderately long tail; male with large wattle at the base up the upper mandible and forehead and at the base of the lower mandible lemon-yellow", *P. intermedia* was resurrected as a full species by Cracraft (1992) "based on differences in wattle color (e.g. Ogilvie-Grant, 1915: 26; Ripley, 1964: 48)".

Two individual paradigallas recently sighted to the south, in the Fakfak Mountains, Bombarai Peninsula, Irian Jaya are described as having pale yellow facial wattles and swollen pale blue lower mandible wattles but without orange-red beneath them, and as having relatively short and square-tipped tails (Gibbs 1994).

No attempt has ever been made to review available series of *Paradigalla* specimens comprehensively with the aim of resolving the status and distribution of component taxa. This study seeks to redress this situation by using external morphology, biometrical data, and zoogeographical patterns.

Methods

All skins of *Paradigalla* spp. were examined in most major museum collections world-wide; and CBF measured as many as possible of each sex and age class of specimens with a recorded locality. Wing length was taken as the flattened and straightened, thus maximised, chord, using a stopped steel rule. The length of the central pair of, and also that of the remainder of, tail feathers was measured with a small steel rule from the point of entry of the central pair into the bird's skin to the tip of the longest central and remaining feathers. Bill length was measured from the bill-tip to the cranio-facial hinge which in *Paradigalla* spp. is markedly high on the forehead toward the level of the anterior edge of the eye. Bill width was measured at the anterior edge of the nostril. Tarsus length was that of the tarsometatarsal bone. All wing and tail measurements were made with the same rules and all others with the same electrical digital calipers.

Of the two taxa that we recognise herein, 50 specimens of *P. carunculata* and 101 of *P. brevicauda* were examined, and most measured, at the following institutions: American Museum of Natural History, New York (7/51), Rijksmuseum van Natuurlijke Historie, Leiden (4/15), Muséum National d'Histoire Naturelle, Paris (16/0), British Museum of Natural History (5/6), Zoologisches Museum, Berlin (3/4), Australian Museum, Sydney (0/5), Royal Ontario Museum, Toronto (1/4), Staatliches Museum für Naturkunde, Stuttgart (4/0), Naturmuseum Senckenberg, Frankfurt (3/1), Zoological Museum, Bogor (0/3), Naturhistoriska Riksmuseet, Stockholm (0/3), Field Museum of Natural History, Chicago (1/2), Australian National Wildlife Collection, CSIRO, Canberra (1/1), Zoologisches Museum, Hamburg (0/2), Peabody Museum, Yale University, New Haven (2/0), Museum of Comparative Zoology, Berkeley (0/2), Museum Koenig, Bonn (1/0), Zoologisk Museum, København (1/0), Liverpool Museum and Art Gallery, Liverpool (1/0), Staatliches Museum für Tierkunde, Dresden (0/1), Papua New Guinea National Museum & Art Gallery, Port Moresby (0/1).

Adult male paradigallas acquire a deep jet-black plumage with areas of rich iridescence and velvety sheens and as such are easy to identify in the hand, as are subadult males which show some of this feathering appearing within the duller plumage of immaturity. Adult females do not become as jet-black as adult males, however, and their subadults are therefore somewhat more difficult to identify. This must be kept in mind when assessing the measurements of specimens presented, there being greater variation in the tail length of females, as younger birds have shorter (*P. carunculata*) or longer (*P. brevicauda*) tails than their respective adults.

Results

Table 1 presents a summary of mean measurements of paradigalla specimens for each sex and age class and for the size differences between each sex overall. These results demonstrate that adult male and female *P. carunculata* have a wing length that is on average 15% and 9% and a total tail length 60% and 46% longer than those of *P. brevicauda* respectively. Within each sex and age class these differences are stressed by mostly mutually exclusive ranges in size, conspicuously so in the wing, tail and tarsus lengths of adult males.

TABLE 1
Measurements (mm) of paradigalla skin specimens from various museums

	Wing	Total tail	Central tail	Tarsus	Bill length	Bill width
P. carunculata						
Adult males	186	132	160	49.0	43.1	5.3
	180–201	122–137	132–170	47.9–50.2	38.0–44.5	4.6–6.7
	6.06	4.38	10.60	0.77	2.31	0.68
	10	10	10	9	8	9
Subadult male	178	125	137	49.4	43.2	5.5
Immature males	170	124	133	47.7	43.8	5.7
	160–179	115–130	121–148	44.4–49.8	42.4–44.5	5.2–6.4
	7.25	7.00	10.03	2.35	0.80	0.39
	6	6	6	6	6	6
Total males	**180**	128	149	48.5	43.4	4.4
Adult females	165	125	132	45.6	42.2	6.0
	157–175	118–131	125–138	41.4–50.2	39.0–44.0	5.2–6.4
	6.6	5.78	4.71	2.92	1.57	0.41
	11	9	9	11	10	9
P. intermedia						
Males	**160**	99	91	42	43.7	5.9
	155–164	94–107	75–106	41.6–43.0	43.0–44.4	5.4–6.1
	4.58	7.23	15.52	0.72	0.70	0.40
	3	3	3	3	3	3
P. brevicauda						
Adult males	158	53	51	44.0	44.2	5.6
	151–168	44–88	42–73	41.5–45.6	39.6–48.9	4.9–6.2
	4.45	8.85	6.99	0.99	0.93	0.40
	25	25	24	25	23	25
Subadult males	159	68	65	43.5	43.1	5.6
	156–163	56–88	59–70	41.1–44.5	40.1–45.3	5.4–5.7
	3.30	17.21	7.78	1.60	2.69	0.14
	4	3	2	4	3	4
Immature males	158	76	77	43.3	44.4	5.8
	148–164	54–97	53–96	38.8–46.3	40.6–48.0	5.2–6.6
	3.71	14.86	13.97	1.67	2.15	0.34
	23	23	21	23	20	23
Total males	**158**	64	63	43.7	45.1	5.7
Adult females	150	68	67	41.9	44.4	5.9
	144–154	46–96	53–91	39.1–43.9	42.1–47.9	5.2–6.5
	2.96	15.48	12.78	1.09	1.49	0.35
	26	26	23	26	25	25
Immature females	153	89	78	42.4	44.7	6.3
	152–153	85–93	67–89	41.8–43.0	44.1–45.2	6.3–6.3
	0.71	5.66	15.56	0.85	0.78	0
	2	2	2	2	2	2
Total females	150	69	67.8	41.9	44.4	5.9

Note: Figures for each age class are (top to bottom) mean, range, SD and sample size.

For adult males and females the average total tail length as a percentage of wing length is 71% and 76% respectively in *P. carunculata* and only 34% and 45% respectively in *P. brevicauda*, while the tarsus length as a percentage of wing length is nearly the same (*c.* 27%) in both species.

On average, adult male *P. carunculata* have a wing 11% longer than their adult females whereas wing length of adult male *P. brevicauda* is only 5% longer than that of adult females of their species. Average overall tail length of adult male *P. carunculata* is 5% longer than of females, whereas that of adult male *P. brevicauda* is, to the contrary, 22% shorter than that of females. In both sexes and all age classes of *P. carunculata* the central pair of tail feathers are on average 11% longer than the remainder of the tail whereas in *P. brevicauda* the central tail feathers are 4% shorter than the rest of the tail. Relative to its much larger body size, *P. carunculata* has a proportionately smaller bill than *P. brevicauda* (Table 1).

One other noteworthy biometric result is that in *P. carunculata* younger individuals have a shorter and less graduated tail than adults (*contra* Ogilvie-Grant 1913, 1915 & Gyldenstolpe 1955) whereas in *P. brevicauda* younger birds have a considerably longer tail than adults. Thus the two paradigalla species are distinctly different in size, relative proportions and in sexual dimorphism of these characters (*contra* Gilliard 1969, Cooper & Forshaw 1977 for the most part).

The three immature to adult specimens of supposed *intermedia* are all sexed as male. Of these the BMNH holotype (1916.5.30.1072) is subadult and the paratype (1916.5.30.1073) is immature. The third, Yale specimen (75320), recorded by Ripley (1964), has black adult plumage. Its total tail length of 107 mm is (8 mm) shorter than shortest-tailed adult male *P. carunculata* and (10 mm) longer than longest-tailed adult male *P. brevicauda*. Total tail lengths of the other two *intermedia* specimens are 95 and 94 mm, which fall within the range of that of young male *P. brevicauda* and are far (20 mm) shorter than those of male *P. carunculata* of any age.

Table 1 demonstrates that in young male *P. brevicauda* the central rectrices may be longer than the rest of the tail, and in several immatures we found them to be up to 5 or 6 mm longer than all other tail feathers. A shorter pair of central tail feathers notwithstanding, the overall shape of undoubted *P. brevicauda* individuals may be graduated. For example, the lengths of individual tail feathers, from the central to the outermost, were 95, 97, 97, 95, 88, 79 in BMNH immature/subadult male 1949.62.22 from Tomba, Papua New Guinea. This is a more distinctly graduated tail than is that of the type specimen of *intermedia*, which measures 75, 95, 94, 93, 87, 81 respectively.

In the BMNH holotype the central pair of tail feathers are the only jet-black ones of adult plumage and, being unsheathed and evidently fully grown (*contra* Ripley 1964), are shorter (75 mm) than the rest of the tail (95 mm) which is only slightly rounded, or graduated. Thus this bird would have acquired the shorter tail of *P. brevicauda* with its subsequent moult. Its slightly graduated tail, which would probably have become even more truncate with the subsequent moult, is identical to that of several undoubted subadult male *P. brevicauda* (e.g. BMNH 1969.41.806) from Mt. Kunupi in the central cordillera of Irian Jaya.

No specimens of *intermedia* show any sign of the additional bare orange-red area of skin (of *P. carunculata*) beneath the blue lower mandible wattle. Noteworthy too is that the colours of facial bare parts were not recorded for the holotype of *intermedia*. These are noted on the label of the paratype, however, as "nasal flaps base of bill lemon-yellow". In both of these specimens, however, the dried upper facial wattles are now a mustard-yellow while the lower ones are contrastingly blackish. Of the third *intermedia* specimen, at Yale, Ripley (1964) recorded all facial wattles of the freshly dead bird as clear lemon yellow. While describing this individual as an adult male, Ripley recorded on its label that its gonads were unenlarged at a time (10 September) when an adult might be expected to be in breeding condition. The tail of the latter specimen is graduated but that of the holotype and paratype is barely so, being merely slightly 'rounded' (see Discussion).

A point requiring clarification here relates to the unsexed nestling (BMNH 1916.5.30.1074) taken with its nest at the Utakwa River in conjunction with the collection of type material of *intermedia*. Vague wording by some authors subsequent to Ogilvie-Grant (1913, 1915) may give the impression that the male holotype or paratype of *intermedia* was collected with the nestling and nest. In fact the nestling was collected at Camp 9 on 27 January and the two male birds at Camp 6c on 24–25 February. Moreover, in view of what we now know about the nesting biology of *P. brevicauda*, and the fact that *P. carunculata* appears to have been a putative parent of hybrids involving other bird of paradise species, it would seem most unlikely that male *P. "intermedia"* would attend nests (Frith & Frith 1992).

The distributions of paradigalla taxa, derived from an examination of specimens and the literature, shown in Figure 1 demonstrate that *P. carunculata* is confined to the Arfak Mountains of the eastern Vogelkop proper. The species *P. brevicauda* is recorded from the central mountain ranges of New Guinea from the Mt. Wilhelm and Mt. Karimui area of Papua New Guinea westward to the Wissel lakes area, Weyland Mountains of Irian Jaya.

Discussion

It might be thought that the three male *intermedia* skins reflect a tendency for males of *P. brevicauda* to have longer tails at the western limits of the species range (Fig. 1). This is not the case, however, as six birds further to the west, on the Weyland Mountains, have the typically short tail of *P. brevicauda*. These specimens, AMNH 0049951, 302983, 678340, 678348, 302981 and 678347, have tail lengths of 44, 45, 45, 49, 51 and 52 mm respectively, all shorter than the average adult male *P. brevicauda* tail length (Table 1). Accordingly, we consider the three specimens of free-flying *"intermedia"* to be relatively young, and therefore long-tailed, individuals of *P. brevicauda* of which only one has

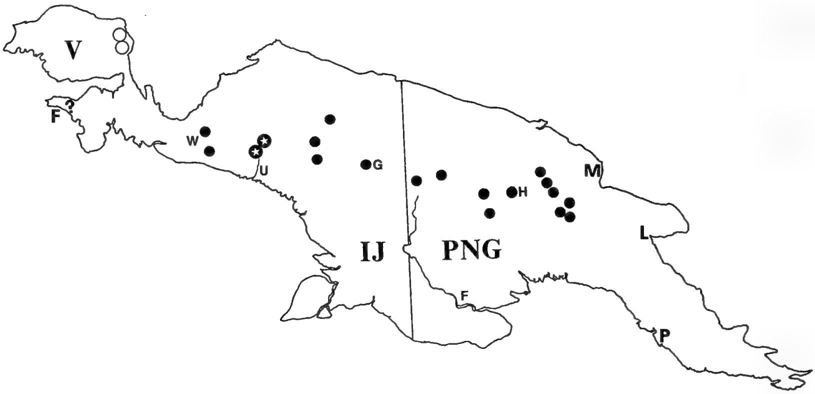

Figure 1. Map of mainland New Guinea showing the border between Irian Jaya (IJ) and Papua New Guinea (PNG) and the distribution of the two *Paradigalla* species based on collected specimens and published field sightings that are considered reliable. Note: Solid circles=*P. brevicauda*; circles with stars within=*P. (intermedia) brevicauda*; open circles=*P. carunculata*; ?=*P. sp.* sighted in Fakfak Mountains (see text). Note: a single circle may encompass several collecting locations. Locations of some key features are indicated by (left to right): V=Vogelkop; large F=Fakfak; W=Weyland Mts.; U=Utakwa River; G=Mt. Goliath; F=Fly River; H=Mt. Hagen; M=Madang; L=Lae; P=Port Moresby.

a tail length (see below) greater than recorded in that species (Table 1). In particular the central tail feather length of the holotype of *intermedia* (75 mm) is far more compatible with that of *P. brevicauda* than with *P. carunculata* (Table 1). Moreover, we are able to confirm Mayr & Gilliard's (1954) comment that specimens of *P. brevicauda* from the extreme eastern part of the species range (Mt. Hagen and Bismarck Range) are indistinguishable from those from the extreme west (Weyland Mountains).

Given that we found that the dried upper facial wattles (lemon yellow in life) were a mustard-yellow but the lower ones (blue in life) were blackish in all skins of adult *P. brevicauda*, the differences in wattle colours of live birds are clearly reflected in dried skins. That the upper wattle was mustard-yellow and the lower one blackish in the *intermedia* type material strongly suggests that, if not blue in life, the lower wattle was to have become so. Two immature BMNH *P. brevicauda* specimens (1949.62.22 and 1969.41.806 from Tomba, Papua New Guinea and Mt. Kunupi, Irian Jaya, respectively) have lower wattles mustard-yellow as their upper ones but with darker blackish pigment apparent along their upper and lower edges and at their posterior end. These immature birds thus appear to suggest that the blue wattle colour only begins to be acquired by advanced immatures or subadults. This is supported by the fact that the dried wattles in the BMNH nestling specimen are pale mustard-yellow throughout, with no sign of dark pigment. A near-fledged large nestling photographed in the wild also had wattles dull lemon yellow throughout (Frith in Coates 1990).

Moreover, Gilliard & LeCroy (1961) described a freshly dead subadult ("virtually adult") male collected at Mt. Ifal, Victor Emanuel Mountains as having the upper facial wattle bright lime yellow and the lower 'gape' wattle "dull yellowish grey, with black contour lines below". The latter feature matches the condition noted in a nestling and in dried specimens of *P. brevicauda* we consider to be subadults as detailed above. Thus, the supposed distinctive character of an all-yellow facial and bill wattle cannot be accepted as taxonomically diagnostic of *intermedia*, as it occurs in young and subadult *P. brevicauda*. We consider it quite possible that young *P. carunculata* will also lack blue colour in the lower mandible wattle. The additional area of distinctly orange-red bare skin beneath the base of the blue wattle of *P. carunculata* appears diagnostic of the species, although this area has been described as bare but yellow in a single freshly dead adult male *P. brevicauda* on Mt. Ifal, Victor Emanuel Mountains (Gilliard & LeCroy 1961).

In attributing his Ilaga Valley specimen to *P. c. intermedia*, Ripley (1964) supported his case by presuming that the shorter central tail feather pair of the holotype of *intermedia* must have been "not fully moulted out"; but these feathers are in fact fully grown in that specimen. Ripley also made much of the fact that the tail of his own specimen "has the normal wedge shape of *carunculata*, the central rectrices being the longest". Our measuring of this specimen, however, gave a total tail length of 107 mm, with the central pair of rectrices one millimetre shorter at 106 mm. All three *intermedia* specimens in fact have the central pair of rectrices shortest whereas in all male (adult and immature) *P. carunculata* specimens (n=16) the central pair are conspicuously longest. The tail lengths of the two BMNH specimens of *intermedia* (94 and 95 mm) fall within the range of younger male *P. brevicauda* (Table 1) but that of Ripley's specimen (107 mm) is longer than any male *P. brevicauda* but shorter than any *P. carunculata*. Notwithstanding the black adult-like plumage of Ripley's specimen, we interpret its exclusively yellow wattles and its just shortest central rectrices as indicative of a relatively young individual *P. brevicauda* in first adult plumage retaining the longer (longest known) tail typical of immaturity. That Ripley's bird had unenlarged gonads on 10 September permits the possibility it is in fact a less than fully sexually mature *P. brevicauda* which could account for its long tail (see above). That it had a graduated tail, moreover, does not exclude it from *P. brevicauda* as individuals of the latter are known with graduated tails (see Results). Significantly, the wing length of Ripley's specimen (155 mm) is not intermediate between that of *P. carunculata* and *P. brevicauda* but is shorter than all *P. carunculata* specimens (n=28) and is in fact short for male *P. brevicauda* (Table 1).

The above facts show that, in general size and shape, the specimens of supposed *intermedia* are in fact far closer to *P. brevicauda* than to *P. carunculata*, as emphasised by Mathews (1930) and Mayr (1941, 1962). In addition, the supposed diagnostically yellow lower wattle of *intermedia* is shown here to be characteristic of immature/subadult *P. brevicauda* and probably also *P. carunculata*; and this correlates with a longer tail in younger birds. Contrary to *P. brevicauda*, immatures of *P. caruncuiata* have a shorter tail than adults (*contra* Gyldenstolpe 1955: 135). For these reasons, and the fact that "*intermedia*" is known only from *within* the geographic range of *brevicauda*, not outside and adjacent to *caruncuiata* (Fig. 1), the taxon *intermedia* should be considered invalid.

In overall and proportionate wing and tail lengths, which differ sexually from *P. brevicauda*, the Arfak paradigalla is most distinct. On these characters alone *P. carunculata* and *P. brevicauda* may be judged good species, particularly as we found no clinal trend towards longer tails in western populations of *P. brevicauda*. Until such time as convincing evidence suggests otherwise, the four birds presently known as *intermedia* should be considered as representing immature and/or subadult individuals of monotypic *P. brevicauda*. The recent resurrection of *P. intermedia* as a full species (Cracraft 1992), confined to the Carstensz Peak type locality area entirely within the extensive range of typical *P. brevicauda* populations, is zoogeographically questionable, quite aside from the strongly contradictory morphological and biometrical evidence presented here.

P. carunculata, as far as is known, is endemic to the Arfak Mountains, with a congeneric representative elsewhere on the core cordilleras of New Guinea, as in several other west Irian Jayan montane species such as the Vogelkop Scrub-wren *Sericornis rufescens*, Grey-banded Mannikin *Lonchura vana*, Vogelkop Bowerbird *Amblyornis inornatus*, Arfak Astrapia *Astrapia nigra* and Western Parotia *Parotia sefilata* (Beehler *et al.* 1986).

The identity of two paradigallas sighted in the Fakfak Mountains, Bomberai Peninsula, with pale yellow upper and blue lower facial wattles, without any orange-red skin, and square-tipped short tails remains problematical (Gibbs 1994). On zoogeographical grounds, the Fakfak birds would appear most likely to be of *P. carunculata* stock (Beehler *et al.* 1986). While a markedly short and square-ended tail as described would suggest *P. brevicauda* (see Table 1), the drawing published by Gibbs could be of relatively short-tailed individuals of *P. carunculata*. If the birds seen by Gibbs were in fact *P. carunculata*, they would most probably have been young females, given their relatively short tails (Table 1). Because Gibbs (1994) also presents evidence suggesting that at least two or three distinctly new and unknown forms of passerines apparently await formal discovery and description from that region, the collection of paradigallas there is needed urgently.

Summary

The New Guinea montane genus *Paradigalla* (Paradisaeidae) is reviewed, based on an examination of most specimens in major world museums, and the literature. One hundred and fifty specimens were measured; their biometrics are presented and discussed, and their locations are mapped and presented. Only two taxa are accepted: larger and longer-tailed *P. carunculata* confined to the Arfak Mountains of the Vogelkop, Irian Jaya, in which adults have yellow, blue and red facial wattles and young birds a tail shorter than adults; and smaller and shorter-tailed *P. brevicauda* throughout mountains of the main trunk of New Guinea, in which adults lack the red facial wattle and young

birds have a tail longer than adults. The four known specimens of *P. c. intermedia* were found to show no distinctive characters and on morphological, biometrical and zoogeographical evidence are interpreted as relatively young individuals of monotypic *P. brevicauda*.

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Swamp warblers *Acrocephalus gracilirostris* and *A. rufescens* at Lake Chad, Nigeria

by R. J. Dowsett & Amberley Moore

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This paper aims to clarify the status of two swamp warblers at Lake Chad, the Lesser Swamp Warbler *Acrocephalus gracilirostris* and the Greater Swamp Warbler *A. rufescens*.

While living at Malamfatori (13°37′N, 13°20′E) on the Nigerian shore of Lake Chad during 1968, R.J.D. noted *A. gracilirostris* in song from the time of his arrival at the end of February. This species was fairly often in small numbers in lakeshore Cyperaceae and *Phragmites* in the vicinity of Malamfatori, but *A. rufescens* only rarely. The latter was normally confined to extensive areas of Papyrus elsewhere on the lake, such an ecological distinction being normal in parts of Africa where the two are sympatric. At Malamfatori in May 1968 R.J.D. ringed and netted four *A. gracilirostris* (and two *A. rufescens*) and has retained detailed notes of two of the *A. gracilirostris*. The five Lesser Swamp Warblers mentioned (under the name *Calamoeceter leptorhyncha*) by Sharland (1969) in the ringing report for Nigeria, ringed to the end of 1968, presumably included these four birds netted at Malamfatori. Each of the two ringed by R.J.D. had a wing-length of 69 mm, and their weights were 12.3 and 12.7 g. Other measurements included tarsus 27–28 mm and tail 63–65 mm. These data accord well with those of six specimens of *A. gracilirostris* collected at Lake Chad by Boyd Alexander, and re-examined by Bates (1930). They also fall well within the range of *A. gracilirostris* at Jekara (Aidley & Wilkinson 1987) and that of 131 *A. g. leptorhynchus* ringed by R.J.D. (unpubl.) in southern Zambia: wings 58–74 (mean 67 mm) and weights 11.3–20.3 (mean 14.8 g). The weight data for the Greater Swamp Warbler at Jekara showed it to be 50% heavier than *A. gracilirostris*, with no overlap. In another area of sympatry in Kenya Britton (1978) also gave mean wing-lengths and weights of *A. rufescens* that were considerably greater than those of *A. gracilirostris*.

The Lesser Swamp Warbler is also listed by Dowsett (1993: 106) from Chad, on the authority of Salvan (1968). But it must be admitted that Salvan himself had as his only certain records of the two swamp warblers the type specimens collected by Alexander.

Through the kind cooperation of the Federal Fisheries research staff R.J.D. was able to make three voyages, each of three days, on Lake Chad in the boat "El Kanemi", between late June and early August 1968. He found both warblers in Chadian territory, with *A. gracilirostris* especially numerous locally. Separation of the two in the field was based mainly on the notably larger size and longer tail of *A. rufescens*; although the latter does tend to have a deeper voice, this distinction is not always evident (Dowsett-Lemaire 1994). Vielliard (1972) also found *A. gracilirostris* to be abundant on the Chad side of the lake, collecting no fewer than 22 specimens (compared to 4 *A. rufescens*, which he did not consider to be rare). We have no definite record from the Niger sector of the lake, although R.J.D. did notice that around Nguigmi (Nguimi) there was suitable habitat in 1968. The species presumably does not occur there now, with the retreat of the surface area of Lake Chad.

Alexander (1908) gave the locality for the type specimen of *A. gracilirostris neglectus* merely as Lake Chad, and the date as 5 December 1904. However, A.M. has been able to determine a more exact type-locality, from consideration of the details in Alexander's field notebooks (held in the Natural History Museum at Tring), together with the account of the Alexander-Gosling expedition to the Lake Chad area published by Alexander (1907a). Boyd Alexander and P. A. Talbot began to survey and map part of Lake Chad in December 1904. A map published by Alexander (*op. cit.*) is marked with their route and a number of dates. Correlation of the dates and places with those given in Alexander's notebook provides an itinerary which is likely to be reliable.

Alexander's notebook contains for each bird collected his collector's number, the date and place of collection and some field observations. Warren & Harrison (1971) did not give the collector's numbers for these holotypes, nor are they in the BM register for the Alexander Collection (Mrs F. E. Warr pers. comm. to A.M.). The type specimen of *A. g. neglectus* in the BM bears Alexander's label with his collector's number 406; the entry in his notebook for no. 406 reads "Calamocichla ♂ Lake Chad 5.12.904 First observed in the Maria bushes. Breeding. Song like that of *C. brevipennis* . . .".

From 30 November 1904 Alexander worked the Yo area, from Kopichi (near Kukawa 12°55′N, 13°35′E), visiting both sides of the Yobe basin. He commented that the villages on the islands were cattle stations, inhabited for short periods only. The expedition did not cross to the eastern (Chad) shore of the lake until 10/11 December 1904. These dates accord well with those published for the various type specimens collected by Alexander during 1904–05 (Dowsett in prep.), November localities such as Kukawa and Yo being in the Nigerian sector of the lake and within a 40 km radius of Malamfatori. We would therefore clarify the type-locality of *A. gracilirostris neglectus* as "Lake Chad, Nigeria".

Alexander (1907b) did not give data for his type specimen of *A. rufescens chadensis*; its label bears the date 19 May 1905 and locality. This is given as "Wurmda" in Warren & Hastings (1971), but in Alexander's notebook and elsewhere written "Wunnda". The type specimen is also held in the BM and bears his label with his number 1094. His notebook records "1094 Calamocichla ♂ Wunnda 19.5.1905 Found in the depth of thick maria clumps. First time observed on Karraragga". From Alexander's published map Wunnda (13°30′N, 14°25′E) and Karraragga (13°22′N, 14°21′E), an area of "acacia, good pasture", are situated on the north shore of the eastern bay of the lake, in Chad.

Elgood *et al.* (1994) reported only one definite record of *A. gracilirostris* in Nigeria, from Jekara in Kano District (Wilkinson & Aidley 1982). At Jekara dam Aidley & Wilkinson (1987) caught and ringed 46. The Lesser Swamp Warbler was omitted from the first Nigerian checklist (Elgood 1981) through an oversight; it had been listed for the Malamfatori area by Hopson (1964), Dowsett & Hopson (1969) later adding *A. rufescens* to the local list.

Although Elgood *et al.* (1994) suggest that Greater Swamp Warblers in the Nigerian sector of Lake Chad "are possibly *A. r. chadensis*, though this has not been proven", there is no doubt of the type-locality. The question is perhaps rather whether or not *chadensis* is separable from the nominate race, which ranges from Cabinda to southern Nigeria. As pointed out by White (1960) the distinctions are slight, and presumably the range of the species is for practical purposes continuous.

Acknowledgements

We are most grateful to Mrs F. E. Warr and to Michael Walters of the Natural History Museum, Tring (BM). Mrs Warr kindly checked the entries in Alexander's notebooks and Mr Walters confirmed the collector's numbers of the two type specimens. Dr D. J. Aidley read the first draft of this note.

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Variation in the Cape Penduline Tit *Anthoscopus minutus* of the southern Afrotropics

by P. A. Clancey

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The austral African penduline tits *Anthoscopus minutus* (Shaw), 1812, and *Anthoscopus caroli* (Sharpe), 1871, form a species pair with a minimal measure of overlap, with the former disposed in the dry west and interior, and *caroli* replacing it in the north and east of their joint range. While generally viewed as closely allied, their proportions suggest they are not of immediate ancestral origin, the tail-length of *minutus* being appreciably longer than in *caroli* (33–37, *versus* 27–28.5 mm), which also has the forehead, distal face and chin boldly patterned with black, which surfaces are more or less bland in *caroli*. The range of the eastern *caroli* encompasses a wider range of woodland facies than that of the western *minutus*, whose range comprises a more mesic body of scrubland habitat types, being ecologically karroid. *A. minutus*, unlike *caroli*, is restricted to the South West Arid Zone of the Afrotropics, whereas its analogue in southern Africa is distributed in some six or seven named races as far north as northern Uganda and adjacent northeastern Africa, judging from Snow's (1967) treatment of the species in Peters' *Check-list*, the most recent assessment.

A high proportion of specimens, which I take to be in first-year dress, are often difficult to place in subspecies, except in the case of the southern race *gigi*, in which a brownish cast to the sides of the body and flanks is diagnostic. Birds are in newly assumed dress from about late April to early June. Seventy specimens were examined during this research.

Specimens agreeing with topotypes of *A. m. minutus* are present along the entire west coast of the Cape Province and Namibia from about the Tropic of Capricorn to the Cape of Good Hope, and are characterized by having the throat and breast coloration light neutral grey, this merging insensibly into pale yellow (close to Maize Yellow; Ridgway 1912), the sides of the body and flanks tending to be on the whole slightly darker. Over the upper-parts, the pileum and hind neck differ in being normally a little darker than the rest of the dorsal surface. The population present in Namibia lying to the north of those just dealt with are on the whole lighter in freshly plumaged adults, are starkly whiter over the chin and fore-throat, and are strikingly deeper yellow (close to Spectrum Yellow; Ridgway 1912) over the rest of the ventral parts. It was to such birds that Reichenow (1905) gave the name *A. m. damarensis*, the type-locality designated later as Ovaquenyama, Owambo, by Macdonald (1952). The range of *damarensis* extends eastwards to the northern and western aspects of Zimbabwe in the Matopos and to the Transvaal. In the east of the range, birds of *damarensis*-type are found as far south as Kuruman, but with the species clearly uncommon in this sector a picture of the racial pattern is of necessity tentative.

TABLE 1
Free State and eastern Cape localities from which specimens were found to agree closely with paratypical *A. m. gigi*

Free State	
Bloemfontein	11 May 1957
Glen Lyon Farm, Glen	28 April 1960
Sandymountpark, Fauresmith	22 March 1994
Cape	
Colesberg	19 August 1952
Melton Wold, Victoria West	26 May 1989
Graaff-Reinet	12 July 1967
Tarkastad	1 July 1959, 3 April 1969, 8 September 1969
Fort Beaufort	28 July 1961
Oudtshoorn	10 April 1956
Thomas River, Cathcart	21 May 1964

Examination of the distribution as defined in the *Atlas of Speciation* by Moreau & Hall (1970) reveals a singular absence of records of the Cape Penduline Tit over an extensive swathe of country lying inland beyond the coastal strip between the Tropic in the north and the territory to the west of Cape Agulhas area in the far south. It is hard to concede that this has come about fortuitously or as a result of the dearth of specimen records, certainly to the south of the Orange R., which has been well covered in recent times by collectors. To the immediate east of this major range hiatus lies a small detached segment of nominate *minutus* as well as elements of an allied form which Winterbottom (1959) separated, on a small sample of three skins from Oudtshoorn, as *A. m. gigi*, a race which seemingly has been consistently overlooked. Snow (1967) treated it as a straight synonym of nominate *minutus* without discussion. The taxon was briefly dealt with by me in my treatment of the present penduline tit in the *S.A.O.S. Checklist*, when I was able to study a limited sample. This has now been augmented to a series of eighteen skins, as listed in Table 1.

A. m. gigi is found to be a relatively well-marked subspecies distinguishable from the nominate form in its darker upper-parts which are dark Greyish Olive (Ridgway 1912), the olive-buff of the dorsal parts confined to the rump and upper tail-coverts. On the underside, the chin and fore-throat are greyish-brown, merging into olivaceous buff over the rest of the ventral surface, the sides and flanks overall darker. There is no vestige of white or clear yellow to the under-parts in what I take to be the definitive plumage of the present race. In the case of the two sub-adults from Glen Lyon Farm, these specimens differ in having the sides of the venter light brownish, as opposed to white or clear yellowish in the other two taxa.

The pattern of variation thus exhibited warrants recognition of three well-characterized races, with ranges as indicated in Figure 1. Details of each are given below.

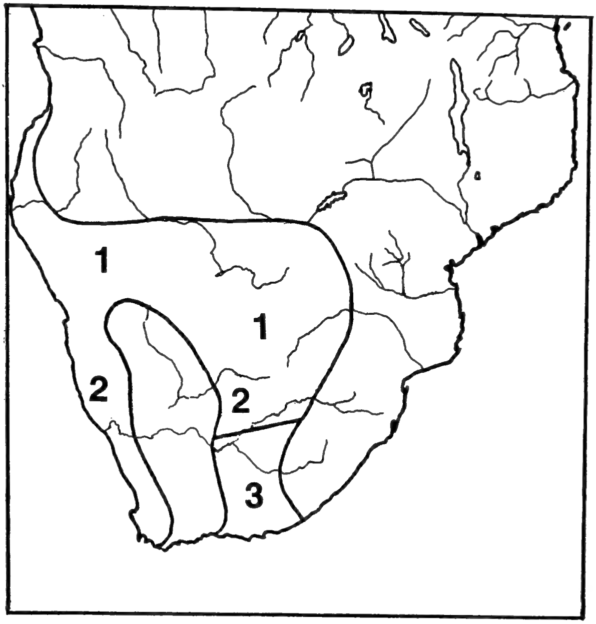

Figure 1. Sketch-map of southern Africa showing the range of the Cape penduline Tit and of its three subspecies: 1, *Anthoscopus minutus damarensis* Reichenow; 2, *Anthoscopus minutus minutus* (Shaw); 3, *Anthoscopus minutus gigi* Winterbottom.

Anthoscopus minutus damarensis Reichenow

Anthoscopus minutus damarensis Reichenow, *Die Vögel Afrikas*, vol. iii, 1905, p. 526: Damaraland, restricted to Ovaquenyama, Owambo, Namibia, by Macdonald (1952), *Bull. Brit. Orn. Cl.* 72, p. 49.

Adult with the dorsal surfaces deep olive-buff, the crown and hind neck rather more ochreous than the rest of the dorsum; on the underside with the chin and fore-throat clear white, merging into spectrum yellow medio-ventrally.

First-year dress with the dorsal surface as described for the adult but with the chin and fore-throat less starkly white, merging into more dilute yellow below.

Wing: ♂♂ 47–51.5 (49.3), *n*=9; ♀♀ 48–52.5 (50.2) mm, *n*=11.

Range. Northern Damaraland from about the Windhoek district to northern Owamboland, east to the Caprivi Strip and northeastern Botswana, western Zimbabwe in the Matopos Hills district and near Bulawayo, and western Transvaal; further south reaching as far as the Kuruman district in the northern Cape. Also recorded by Moreau & Hall (1970) as occurring on the Angolan desert coast as far north as Luanda. Generally confined to areas with annual rainfall less than 250 mm.

Anthoscopus minutus minutus (Shaw)
Sylvia minuta Shaw, in Shaw & Nodder, *Nat. Misc.*, No. 23, 1812, pl. 997: Elephant R., restricted to Heerenlogement, S.W. of Klaver, western Cape, by Macdonald (1952), *Bull. Brit. Orn. Cl.* 72, p. 48.

Adult differs from *damarensis* in having the crown and hind-neck dull olive-buff and rest of dorsum less ochraceous-olive; below, with the chin and fore-throat greyish white, rather than starkly white, and with the underside duller and less vibrant yellow. First-year dress with upper-parts duller and less yellowish ochraceous-buff than in adults; ventrally duller, less yellowish white.

Wings: ♂♂ 47–52 (49.5), *n*=8; ♀♀ 49–51.2 (49.9) mm, *n*=9.

Range. Western parts of the Namibian and Cape portions of the range from the Tropic of Capricorn south along the coast to the Cape of Good Hope and the Cape Agulhas region in the south, and east of *A. m. damarensis* to parts of southwestern Botswana in the northern Cape and the southern Transvaal at Hamanskraal. Generally occurs in areas with annual rainfall less than 120 mm.

Anthoscopus minutus gigi Winterbottom, *Bull. Brit. Orn. Cl.* 79, p. 152. Oudtshoorn, southern Cape.

Adult with upper-parts uniformly darker from the mantle to the rump (about dark Greyish Olive); the rump and upper tail-converts ochraceous-olive. Below, with the chin and fore-throat greyish or light fawn, tending to be darker laterally than in either of the other two forms; rest of venter olivaceous rather than yellow. Birds in first-year dress are ventrally lighter, with the lateral body surfaces and flanks washed with light brown rather than yellowish; dorsally they are a trifle darker.

Wings: ♂♂ 48.5–52 (49.4), *n*=7; ♀♀ 49–52 (50.2) mm, *n*=11.

Range. Southern and southeastern Cape from about 22°30′S, south of the mid-Orange and in the western parts of the Free State. Birds showing intergradation with *minutus* are present along the reaches of the lower Vaal R., near Kimberley. Generally confined to areas with annual rainfall of less than 250 mm.

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On a record of the Wattled Crane *Bugeranus caruncülatus* from Guinea-Bissau

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The Wattled Crane *Bugeranus carunculatus* is a rare and declining Afrotropical species distributed in the Ethiopian highlands and in central and southern Africa, with a total population in 1983 of not more than 6000 and possibly as low as 4000 (Urban *et al.* 1986). Total population numbers given by Collar & Stuart (1985) are slightly more optimistic, viz. little more than 7500 and conceivably as low as 6000. There is a single record from West Africa of a party of three birds at Cufada lagoon, near Fulacunda, Guinea-Bissau (11°40′N, 14°55′W), supported by a photograph and a specimen (Frade & Bacelar 1955). The record was included (and considered "surprising") by Mackworth-Praed & Grant (1970), while Snow (1978), who did not map the record, remarked that "it seems almost certain that [the birds] were either escapees from captivity or vagrants". Later, Collar & Stuart (1985) cast doubt on the validity of the record, stating that—referring to Frade & Bacelar (1955)—it was "supported without comment by a poor photograph which indicates that two or three birds were then present, given alongside an incomplete reference that suggests the species had previously been recorded at this locality". The record was not mentioned by Urban *et al.* (1986), but recently the matter was raised again by Dowsett (1993) who stated that "the record appears astonishing from what is known of the distribution of the species, and even though it is supported by photos I think it best not to accept the record unconditionally, pending some further evidence". Dowsett (1993) did not give the source of the record, nor did he mention that a specimen had been taken.

The record

The photograph was taken and the specimen collected by Major Júlio de Araújo Ferreira, a Portuguese soldier and naturalist stationed at Bissau at the time, who spent five days observing and photographing wildlife in the Cufada region in late March 1948 (Ferreira 1948). His itinerary allows the precise date of the record to be determined, viz. 26 March, the Friday before Easter Sunday. The photograph was reproduced in Frade & Bacelar (1955), but a better quality reproduction of the same picture can be found in Ferreira (1948), and this leaves no doubt whatsoever as to the identity of at least two of the three birds shown. The third bird is seen in back view, with its head away from the photographer, and does, therefore, perhaps not allow certain identification. Ferreira (1948), however, explicitly stated that he saw three birds and there appears to be no reason to doubt this. Apparently one of the birds was collected (but only partly preserved) and a photograph of the skull was published in Frade & Bacelar (1955). It appears that, apart from the skull, only one leg was preserved and Frade & Bacelar (1955) gave the following measurements: bill 155 mm, tarsus 305 mm, middle toe 115 mm. They suggested that this bird was immature but this cannot be decided from the measurements or the photograph. The measurements are within the range given for adults (*cf.* Walkinshaw 1973, Maclean 1985, Urban *et al.* 1986).

Although Ferreira's (1948) paper is written in a popular fashion, it includes many original data, with scientific names employed throughout, and it was illustrated with several photographs of birds and mammals taken during his visit to the Cufada region. About the Wattled Cranes he remarked that they were accompanied by a Saddle-billed Stork *Ephippiorhynchus senegalensis* "which could be easily photographed from the canoe, but the cranes were very shy and this forced me to crawl through the marsh vegetation in order to approach them sufficiently close" (translated). The conspicuous shyness of the species has also been reported by other authors, e.g. Collar & Stuart (1985) and references cited therein.

Frade & Bacelar (1955, 1959) presented the ornithological results of the 1945–1946 *Missão Zoológica* to Portuguese Guinea, organized at the initiative of the Natural History Museum of Lisbon. Data were presented in a scholarly manner, giving details of all specimens collected during the expedition as well as full citations of all previous reports of species collected in the country. Collar & Stuart's (1985) interpretation of Frade & Bacelar (1955), as given above, is less than adequate. In fact, the entry on *B. carunculatus* reads (translated): "Not collected during the *Missão*, but a specimen collected by Major Araújo Ferreira was presented to us (head, leg and foot); No. 1-1948, Cufada lagoon, Fulacunda". They continued: "It appears that this species has, so far, not been recorded from West Africa north of Benguela (Angola) and its presence in Portuguese Guinea is indeed unexpected . . . Bannerman does not mention it in any of his works on the birds of West Africa . . . J. A. Ferreira, in his paper on the Fauna of the Cufada Reserve, mentioned the species under the indication *grous de carúncula*". Contrary to Collar & Stuart's (1985) interpretation, there is no suggestion whatsoever that the species had been recorded on any other occasion while the reference to Ferreira's (1948) paper is given in full in the bibliography. Moreover, the caption of the photograph clearly stated that this was taken by 'capitão Araújo Ferreira'. It appears that not all the authors who expressed their doubt about the record (i.e. Snow 1978, Collar & Stuart 1985, Dowsett 1993) had fully understood Frade & Bacelar's (1955) Portuguese text, and that none of them checked the original paper by Ferreira (1948).

The fate of the specimen is unknown at present. It was presented, together with other specimens collected by J. A. Ferreira, to the *Missão Zoológica* (Frade & Bacelar 1955). The collections of the *Missão* are kept at the Centro de Zoologia of the Instituto de Investigação Científica Tropical, Lisbon, Portugal, but the specimen of *Bugeranus carunculatus* could not be located there (M. M. Pinheiro *in litt.* 13 August 1996).

Discussion

The Wattled Crane is a bird of local and discontinuous distribution and its movements are poorly understood. In Ethiopia it is present in highland marshes at the end of long rains but disappears as marshes dry up, and in southern Africa nomadic movements have been noted (Collar & Stuart 1985, Urban *et al.* 1986). Over the last few decades, the species has declined severely both in numbers and range and it now consists of two widely separated populations in Ethiopia and in central and southern Africa (Collar & Stuart 1985, Urban *et al.* 1986). This decline is attributed to loss of habitat, human interference and development projects, factors which undoubtedly play their role today. Initially, however, the separation of the Ethiopian and more southern populations may well have been due to natural fluctuations of the climate and subsequent changes in the hydrography and vegetation of the intervening areas, breaking up a once more or less continuous distribution (see e.g. Livingstone 1975, Zinderen Bakker 1976). Snow (1978) presumed that the absence of any appreciable geographical variation indicated a good deal of movement between populations. Alternatively, the combination of discontinuous distribution and lack of geographical variation may be due to relatively recent vicariance events resulting from climatic change. Range fragmentation has presumably been accelerated by human activities in recent decades.

In the past, the species may also have occurred further north, as it is depicted in Ancient Egyptian illustrations, indicating its former occurrence in lowland areas northwest of the Ethiopian highlands and perhaps even in Egypt itself (Kumerloeve 1983). During the Late Pleistocene, when at times a much more humid climate prevailed in the western part of the Sahara and the Sahel Zone than today (e.g. Nicholson & Flohn 1980, Dupont & Hooghiemstra 1989), the range of the Wattled Crane may have extended well into West Africa. One may speculate that the Guinea-Bissau birds were vagrants from Ethiopia, Zaire or Angola, having reached West Africa by way of the Lake Chad area, the Niger Inner Delta or other marshlands. On the other hand, there exists the possibility that the Guinea-Bissau birds were local breeders and belonged to a remnant and now extinct West African population. Although there is at present no further evidence for this, the possibility should at least be considered and not dismissed *a priori*. Indeed, the possibility of a fragmented range appears to be more parsimonious than the vagrant option, and this hypothesis would even gain in strength if one of the birds was indeed immature, as suggested by Frade & Bacelar (1955).

Of course, the possibility of the Guinea-Bissau birds having been escapees, as suggested by Snow (1978), cannot be proven to be false but this appears highly unlikely taking into account the location and year of the record. Although the record is certainly "surprising" (and perhaps even "astonishing"), there is nothing to suggest that the birds were anything but genuinely wild.

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First observations and new distributional data for birds in Paraguay

by Per G. P. Ericson & Luís Alberto Amarilla

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The Paraguayan bird fauna has long been one of the least studied in South America. Beginning in the late 1970s, this situation has gradually changed, and rather rapidly so during the last ten years. With the publication by Hayes (1995), the status, distribution and biogeography of the Paraguayan avifauna has been evaluated and summarised in the light of available published and unpublished sources, and of extensive field work. Hayes' book constitutes a welcome and solid foundation for further ornithological studies in Paraguay. The processes that determine the geographical and temporal distributions are still poorly understood, however, and additional important information is collected during almost every major field trip in the country.

In this paper, new distributional data on several bird species are presented. The data derive from two different sources. The first is a large, unpublished collection of Paraguayan birds stored at the Swedish Museum of Natural History. During an 18-month collecting trip to Paraguay in 1946–47, Claës-Christian Olrog collected 1048 birds, and many other vertebrates, for the Swedish Museum of Natural History, mainly from the Chaco.

The second is data collected during recent collaborative field work in Paraguay by the Museo Nacional de Historia Natural del Paraguay and the Swedish Museum of Natural History. Since 1993, the two museums have been collaborating in the project PROVEPA (Proyecto Vertebrados del Paraguay). The project contains a biodiversity training programme focusing on various aspects of vertebrate systematics and taxonomy, biological diversity estimation, and natural history museum practices. Within this framework, ornithological field work has been conducted in various areas of Paraguay. Information on the avifauna is regularly obtained in the process of training students in censusing methods, sound-recording and specimen collecting. Needless to say, all regular sight observations are also recorded.

The biogeographical regions referred to below are those defined from vegetational and topographical features by Hayes (1995) (Fig. 1).

Specimen data standards

Measurements. Wing length—maximum length method, i.e. with wing flattened against the ruler and the primaries straightened (*cf.* Svensson 1993); tail length—from the root of the central pair of rectrices; culmen—distance from tip to the base of the foremost feathers of the forehead; bill depth—measured where the calipers rest comfortably or, on wedge-shaped bills, at the feathering with the calipers oriented at 90 degrees against the cutting edge of the bill; tarsus length—from

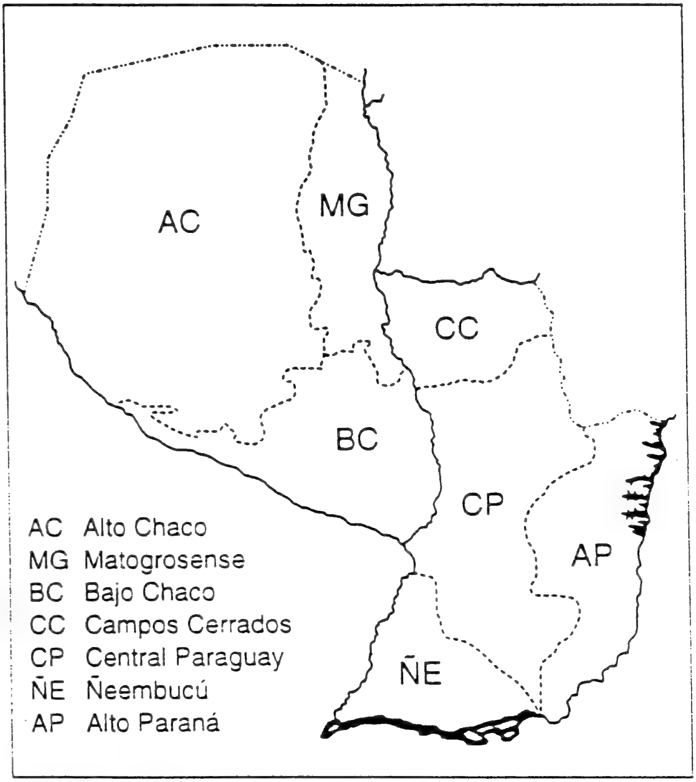

Figure 1. Biogeographical divisions of Paraguay based on vegetation and geographical features; from Hayes (1995). Alto Chaco, Matogrosense and Bajo Chaco constitute the Paraguayan Chaco. The region east of Río Paraguay is called the Oriente.

intertarsal joint to last complete leg scale before the toes diverge. All measurements are given in millimetres.

Museum acronyms. NRM stands for the Swedish Museum of Natural History and MNHNP for the Museo Nacional de Historia Natural del Paraguay.

Annotated list of species

RED-WINGED TINAMOU *Rhynchotus rufescens pallescens*

The Red-winged Tinamou is widely distributed in Bolivia, Brazil, Paraguay, Uruguay and Argentina (Blake 1977). In Paraguay it is common only in the Oriente, and is regarded as not occurring in the Alto Chaco and Matogrosense biogeographical regions.

Three males and five females (NRM 500061–500068), collected by Olrog in western Dpto. Presidente Hayes in the austral winter of 1947, constitute the first documented records of the Red-winged Tinamou

TABLE 1
Size comparisons (mm) of two subspecies of the Red-winged Tinamou *Rhynchotus rufescens*. Comparative data from Blake (1977)

		Wing length	Culmen
Males			
R. r. rufescens	10	192–207	36–39
R. r. pallescens	5	211–229	36–42
Olrog coll.	3	196–215	40–42
Females			
R. r. rufescens	10	183–211	34–39
R. r. pallescens	10	205–226	36–42
Olrog coll.	5	195–217	36–44

for the Alto Chaco biogeographical region. The birds collected by Olrog are much greyer on the breast and the belly than the nominate subspecies, to which the Chaco population has been assigned (Short 1975). Instead, they fully match the coloration of the race *R. r. pallescens*, that occurs in the grassy lowlands of north-central Argentina. From the rather small Paraguayan sample, it seems that the Chaco population of *R. r. pallescens* is somewhat smaller than are typical *R. r. pallescens* (Table 1). The distribution of this subspecies in the Paraguayan Chaco, in relation to that of the nominate subspecies (cf. Short 1975), remains to be determined.

HOOK-BILLED KITE *Chondrohierax uncinatus uncinatus*

The Hook-billed Kite occurs widely in Middle and South America. In Paraguay it is a rare resident in several biogeographical regions in both the Chaco and Oriente. A female (NRM 500111) collected 23 November 1946 *c.* 40 km east of Pozo Colorado in Dpto. Presidente Hayes is, however, the first record of the species from the Bajo Chaco region. The active egg follicles show that the bird was breeding at the time.

BLACK-BANDED OWL *Ciccaba huhula*

The Black-banded Owl has a wide distribution in forests of northern and eastern South America and occurs nearest to Paraguay in eastern Brazil (Meyer de Schauensee 1966). The only previous report of the Black-banded Owl from Paraguay is based on calls attributed to this species at the Estancia Itabó, Dpto. Canindeyú, by Brooks *et al.* (1992).

On 30 September 1993 a female Black-banded Owl (NRM field no. ICM-006; gonads active) was collected in Parque Nacional Caaguazú, Dpto. Caazapá, by a PROVEPA team. The owl was breeding, as shown by an almost fully developed egg present in the ovary with additional eggs under development. Two bats of different species were found in the stomach. Nothing is known of the food preferences of the Black-banded Owl, but information does exist on the diet of its allospecies, the Black-and-white Owl *Ciccaba nigrolineata*. That species frequently captures bats (Ibañez *et al.* 1992), and other data suggest that it feeds mainly on large insects (Mikkola 1973).

Despite considerable ornithological activity in areas where the Black-banded Owl could be expected to occur, it has never been recorded with certainty before (*contra* Meyer de Schauensee 1966). This makes it likely that the Paraguayan population of the species is rather small and local, although this remains to be determined. If so, the Black-banded Owl certainly warrants protection in Paraguay.

BLUE-CROWNED MOTMOT *Momotus momota*

Although widely distributed in tropical South America, the Blue-crowned Motmot has only been sighted twice before in Paraguay, both times in the northeastern Chaco (Hayes *et al.* 1990). A male (MNHNP field no. ICM-078) obtained on 12 November 1994 by PROVEPA near the city Bella Vista in Dpto. Amambay, one of two birds observed to cross the Río Apa from Brazil, is the first record from the Oriente. Two additional specimens, one unsexed and one male (NRM field nos. GFK-193 and PMN-145), collected 26–27 March 1995 at the Parque Nacional Defensores del Chaco constitute the first from the Alto Chaco biogeographical region.

From their distribution, these specimens are most likely to belong to the subspecies *M. m. pilcomajensis*, which occurs in southern Bolivia, northern Argentina, and eastward to Urucúm and possibly western São Paulo in Brazil (Chapman 1923). This subspecies is distinguished by its bluish-green throat and greenish underparts. The Paraguayan specimens are however much less bluish-green on throat than typical *M. m. pilcomajensis* from Argentina in the NRM collection, thus approaching the more rufous condition of some NRM specimens of the subspecies *M. m. simplex* from Amazonian Brazil. Also the breast and underparts are more cinnamon than typical *M. m. pilcomajensis*. It thus seems probable that these specimens are intergrades between *M. m. pilcomajensis* and *simplex*.

RUSTY-BACKED ANTWREN *Formicivora rufa rufa*

The Rusty-backed Antwren has a wide distribution in central South America (Ridgely & Tudor 1994). In Paraguay, it is a rare and local breeder in northern and central Oriente (Hayes 1995). Only one record exists from the Chaco: Villa Hayes in Dpto. Presidente Hayes (Bertoni 1930, Hayes 1995). Its closest breeding areas outside Paraguay are in northeastern Bolivia and southern central Brazil (Meyer de Schauensee 1966).

On 16 September 1994, an adult male (NRM field no. GFK-111; tail moulting, gonads inactive) was obtained by a PROVEPA team 5 km north of Bahia Negra, Dpto. Alto Paraguay. This specimen is the first documented occurrence of the Rusty-backed Antwren in the Matogrosense biogeographical region. It was mist-netted in open forest with high scrub vegetation, only a couple of metres from the Río Paraguay, indicating that it might have been a stray individual from the Mato Grosso do Sul of Brazil, where it is known to breed.

BRAN-COLOURED FLYCATCHER *Myiophobus fasciatus*

The Bran-coloured Flycatcher has a wide, almost circum-Amazonian distribution in South America. Contrary to the map in Ridgely & Tudor (1994), this species has previously not been thoroughly documented from the Paraguayan Chaco (Hayes 1995). A juvenile (NRM field no. GFK-184; fresh plumage) obtained on 25 March 1995 by a PROVEPA team in Parque Nacional Defensores del Chaco, Dpto. Alto Chaco, thus constitutes the first Paraguayan record of the Bran-coloured Flycatcher west of the Río Paraguay.

The subspecific allocation of this individual is somewhat problematic. The subspecies mainly differ in size and in the amount of rufous in the dorsal coloration. In the collections of NRM we compared the PROVEPA bird with samples of *M. f. auriceps* and *M. f. flammiceps* taken in Bolivia, Argentina and Brazil. Although a considerable variation in dorsal coloration and size can be observed between the samples, this does not co-vary geographically. Instead, much of this variation seems to be due to differences in the age composition of the samples, the juveniles being considerably more reddish on the dorsal parts than the adults. It is suggested from the NRM collection that the southern populations of the Bran-coloured Flycatcher are in need of a taxonomic revision.

RUSSET-WINGED SPADEBILL *Platyrinchus leucoryphus*

The Russet-winged Spadebill is endemic to the Mata Atlántica with a very restricted distribution in southeastern Brazil, eastern Paraguay and northeastern Argentina. It is rare and regarded as Vulnerable by Collar *et al.* (1992), who stressed the need for further field studies of its population dynamics and habitat requirements, which are largely unknown.

On 6 October 1993 an adult male (NRM field no. ICM-020) Russet-winged Spadebill was mist-netted by a PROVEPA team in primary forest at Parque Nacional Caaguazú in Dpto. Caazapá, Paraguay. Its testes were enlarged, indicating breeding condition. The stomach contained invertebrates in the following proportions by weight: 15% Hymenoptera, 5% Araneae, 5% Coleoptera, 4% Diptera? (eggs), 1% Arthropoda (eggs), and 70% undetermined. At the same site several individuals of the smaller, congeneric White-throated Spadebill *P. mystaceus* were obtained. Comparisons of the stomach contents of these few individuals could reveal no significant differences in food choice between the species.

The Russet-winged Spadebill is a rather inconspicuous bird occurring in the understory of subtropical forests. Albeit never in large numbers, the species has been collected and sighted at several localities in the Oriente where it may be more common than previously thought.

STRANGE-TAILED TYRANT *Alectrurus risora*

The Strange-tailed Tyrant is declining or has become extinct in large areas of its former distribution in southern Brazil, Paraguay, Uruguay and northern Argentina, mainly due to changes in land management (Collar *et al.* 1992). The present Paraguayan distribution is mainly in the southernmost part of the Oriente and the humid Chaco where it is local and uncommon (Collar *et al.* 1992, Hayes 1995). Two males and one female (MNHNP field no. AHN-203, and NRM field nos. AHN-206 and AHN-201; no moult recorded and gonads inactive) were obtained on 28 September 1994 at Estancia San José, Dpto. Presidente Hayes, where it is a not uncommon breeder (pers. obs.).

WHITE-NAPED XENOPSARIS *Xenopsaris albinucha albinucha*

In areas bordering Paraguay, the White-naped Xenopsaris occurs in northern Argentina, eastern Bolivia and southwestern Brazil, where it seems to be mostly a rare and local species (Ridgely & Tudor 1994). On 22 November 1946, Olrog collected a male (NRM 500445) White-naped Xenopsaris at Estancia Hermosa, *c.* 40 km east of Pozo Colorado, Dpto. Presidente Hayes. This is the first record of the species from the Bajo Chaco, despite a good number of records from the Alto Chaco biogeographical region of Paraguay (Hayes 1995).

GOLDEN-BILLED SALTATOR *Saltator aurantiirostris aurantiirostris*

Although the Golden-billed Saltator is generally distributed in western Paraguay (Ridgely & Tudor 1989) and is even abundant in the Alto Chaco biogeographical region, it has never been reported from the Matogrosense (Hayes 1995). On 13 September 1994, a PROVEPA team obtained a female (NRM field no. NEY-038; not moulting) at Estancia Dona Julia, 5 km north of Bahia Negra, Dpto. Alto Paraguay.

ULTRAMARINE GROSBEAK *Cyanocompsa brissonii sterea*

The Ultramarine Grosbeak is a rare to uncommon breeder in most areas of Paraguay (Hayes 1995). A specimen (NRM field no. LIY-019) obtained 13 October 1994 by a PROVEPA team near the city of Bella Vista, Dpto. Amambay, is the first record from the Campos Cerrados biogeographical region. Its small size (wing 80, tail 75, culmen 14.5, bill depth 13, tarsus 19) shows that it should be referred to the subspecies *C. b. sterea*, of eastern and southern Brazil, northeastern Argentina, and western Paraguay (Oberholser 1901, Paynter 1970).

SAFFRON-COWLED BLACKBIRD *Agelaius flavus*

The Saffron-cowled Blackbird is a rare breeder in the Oriente region of Paraguay, from which only a handful of reported sightings exist (Hayes 1995). On 3 March 1995, Per Ericson and Ingrid Cederholm observed four male Saffron-cowled Blackbirds perched for 2 minutes in a tree along Ruta General Bruguez, Dpto. Presidente Hayes (*c.* 24°45′S, 58°30′W). The typical icterid appearance of these birds, in combination with a yellow head, leaves no doubt about the species identification. This observation, made in open, wet grassland, is the first documented sighting in the Chaco of Paraguay. The species may, however, have been observed at least once before in the southern Bajo Chaco (Collar *et al.* 1992, Jorge Escobar pers. comm.). Because of its declining populations in all parts of its range, the Saffron-cowled Blackbird is regarded as Vulnerable (Collar *et al.* 1992).

TROUPIAL *Icterus icterus strictifrons*

In Paraguay, the Troupial occurs in the Alto Chaco and Bajo Chaco biogeographical regions. On 17 September 1994 an adult male (NRM field no. GFK-130; gonads active) was collected in the Matogrosense region by a PROVEPA team 5 km north of Bahia Negra, Dpto. Alto Paraguay. The bird appeared to be paired with another individual, but apart from its active gonads there was no further sign of breeding activity.

The two Troupials were the only individuals of the species observed during the 12 days of field work in the area. Since the collecting site is only 20 m from the Río Paraguay, the birds may have belonged to the population that inhabits the Río Paraguay drainage of the Brazilian Mato Grosso (Ridgely & Tudor 1989).

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On the identity of *Heterornis senex* Bonaparte

by G. F. Mees

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The name *Heterornis senex* was introduced in the ornithological literature by Bonaparte (1850: 419) with the following words: "Pastor senex, Temm. Mus. Lugd. ex Beng. Dorso brunnescente, alis caudaque chalybaeo-nigris, pileo griseo; subtus sordide albo-cinereus". The citation shows that, in Leiden, the mounted bird was labelled with the unpublished name *Pastor senex* Temminck. The binomen under which Bonaparte published the name was *Heterornis senex*.

Only a few years later, Layard (1854: 217) described a mountain-starling from Ceylon, which he named *Heterornis albofrontata*. In the discussion, he noted: "It may be *Pastor Senex*, Temm., as it agrees tolerably well with the short description given in Prince Bonaparte's Consp. Avium, p. 419, but that description is so concise that I cannot be sure of it; I therefore name it provisionally *H. albofrontata*".

Layard's suggestion that *H. senex* and *H. albofrontata* could be identical was soon transformed into certainty by Holdsworth (1872; 462): "*Temenuchus senex*, Temm. Peculiar to Ceylon; described by Layard as *T. albofrontatus*, as it was believed to be new; it has since been recognized as *T. senex*, Temm., erroneously described by Bonaparte from Bengal".

Since that time, the Ceylonese mountain-starling has been universally known by the specific epithet *senex* (its generic name has been less stable, the current one is *Sturnus*).

In spite of Holdsworth's definite statement, I have been unable to find published evidence that, since Bonaparte, anybody has ever actually examined the type material of *H. senex*.

In the old collection of mounted birds in Leiden, there are two specimens labelled *Pastor senex*. Both have a red-margined label for display, of a type used in Temminck's day (i.e. before 1858). The first one is labelled: "*Pastor senex* / Temm. n. sp. / Bp. consp. / jeune / Chine", and underneath the socle only a number: 45. This bird has evidently been provided with a new pedestal at some date after it was examined by Bonaparte, as it was Temminck's habit to write the name and other particulars underneath the socles of mounted specimens. The other bird has, underneath the socle, in Temminck's handwriting: "*Pastor senex* ♂ ad. / Temm. Nov. Sp. / Bp. consp. / Chine", and on the red-margined label exactly the same (the handwriting on the red-margined labels is unfamiliar, probably by a clerical assistant).

These birds have nothing to do with the Ceylonese species at present bearing their name, but are *Sturnus sericeus* Gmelin, 1789. The adult bird has a black pileum, and its identification requires no comment. The juvenile bird is a specimen of considerable antiquity; the way it is mounted suggests that it dates from the late 18th or early 19th century. Its upper parts are tinged with brownish and it lacks the black cap of the adult. As to their type status, Bonaparte's description was clearly based only on the juvenile specimen, which therefore is the holotype.

Regarding the authenticity of these two specimens, it certainly is a pity that the socle of the juvenile bird was replaced. It should be noted further that the provenance Bengal, given by Bonaparte, has been changed to China. The reference to Bonaparte's Conspectus also means that the labels could not have been written before 1850. Perhaps the second, adult, specimen was received from China only a short time after Bonaparte examined the juvenile bird, and Temminck may have changed the provenance of the latter to agree with this new information. Alternatively, the locality Bengal given by Bonaparte may simply be an error, of a kind numerous in his work.

Although I have been aware of the true identity of these birds for some years, it should be stressed that otherwise they seem never to have been examined or studied since *c.* 1850. These two specimens are still the only *Sturnus sericeus* in the Leiden collection, and the Ceylonese species is even now unrepresented in Leiden. This probably explains why none of my predecessors in Leiden ever examined these birds.

The question of nomenclature of the Ceylonese species remains. Evidently and simply, its correct name is *Sturnus albofrontatus* (Layard, 1854).

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New distributional information on eight bird species from northern Peru

by Roger Barnes, Stuart H. M. Butchart, Charles W. N. Davies, Mirko Fernández & Nathalie Seddon

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In July and August 1994 our team of five British and Peruvian ornithologists carried out surveys during an expedition organized with the help of the University of Cambridge, in close consultation with the Asociación Peruana para la Conservación de la Naturaleza (APECO). Our principle aim was to assess the conservation status and habitat requirements of threatened and endemic birds and mammals in remaining areas of cloudforest and elfin forest on the Cordillera de Colán in Amazonas Department, northern Peru.

The Cordillera de Colán is a large, projecting mountain ridge with high rainfall. Its forest cover is a complex mosaic of habitats, some of only limited extent. Human activity has altered and degraded several of these habitats (Davies *et al.* 1994). The range is almost surrounded by the dry forest in the valleys of the río Marañón and its tributaries, which holds its own endemic avifauna.

We concentrated our fieldwork at altitudes of 1500–2650 m at two sites in the southern part of the range, with some observations down to 550 m (Fig. 1, Table 1). Amongst our records were extensions of the known distribution of eight bird species. One of them, the Royal Sunangel *Heliangelus regalis*, is the subject of a previously published paper (Seddon *et al.* 1996).

WHITE-EYED PARAKEET *Aratinga leucophthalmus*

A widespread and fairly common species east of the Andes, recorded up to 500 m asl (Hilty & Brown 1986). We found it to be common at site 2, in flocks of up to 47, recording it daily from 17 to 30 August at 700–1950 m in both cloudforest and humid lower montane elfin forest, where it was regularly seen at the ridgetop at 1950 m.

WHITE-TIPPED SICKLEBILL *Eutoxeres aquila*

A bird of lower montane humid forest, previously known from Costa Rica to Amazonas north of río Marañón, northwest Peru (Hilty & Brown 1986). One was seen on 29 July at 2300 m in very humid lower montane cloudforest at site 1; we then netted and photographed four at 1950 m in ridgetop elfin forest at site 2 on 20–23 August. The Cordillera de Colán is a new site for this hummingbird and the first south of the deep gap formed by the Marañón valley which was previously presumed to restrict the range of this species (J. Fjeldså *in litt.*).

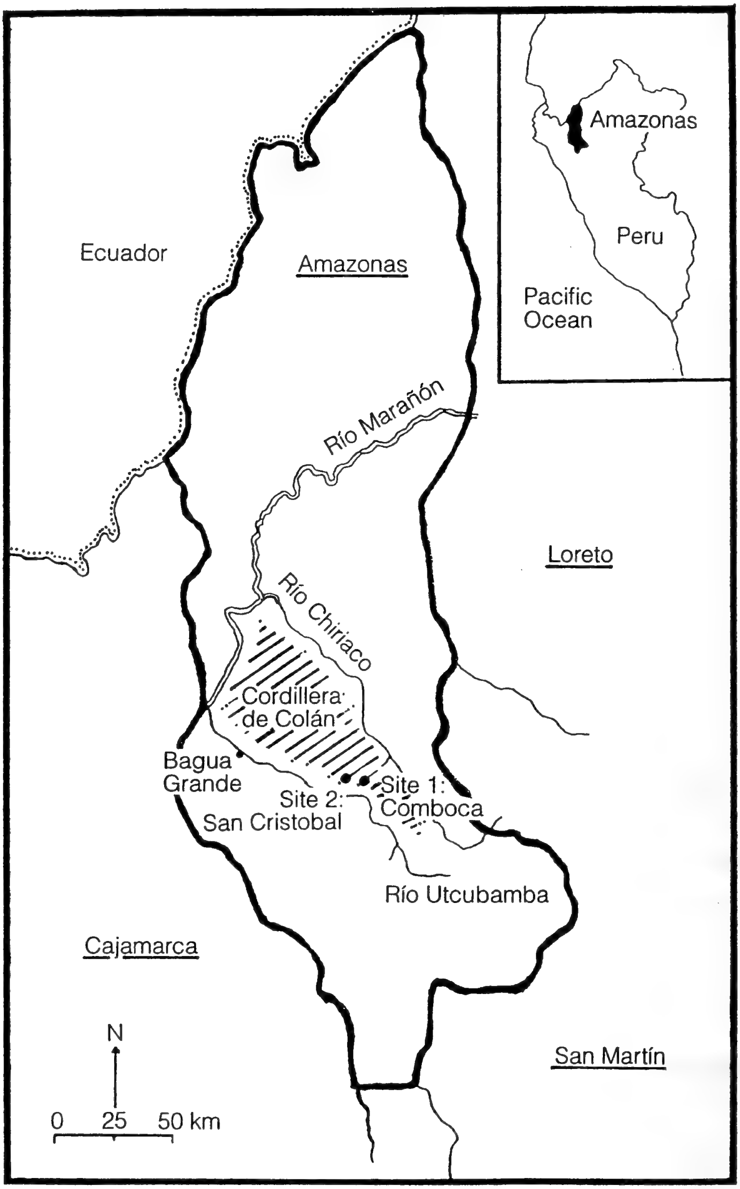

Figure 1. The location of our study sites on the Cordillera de Colán, northern Peru.

TABLE 1
Site characteristics and fieldwork effort

Site	Fieldwork dates	Altitudes surveyed (m)	Habitat	Field-hours day	Field-hours night	Mistnet-hours day	Mistnet-hours night
1	13–15 Jul	550–1500	Humid premontane forest	Casual obs.			
	15–22 Jul	1500–2150	Humid lower montane forest	219	15	129	
	22 Jul–6 Aug	2150–2650	Very humid lower montane forest	286	8	319	155
2	12–16 Aug	900–1100	Dry premontane forest	Casual obs.			
	15–31 Aug	1650–1850	Humid lower montane cloud forest	149	3		
	15–31 Aug	1650–1750+ 1850–1950	Humid lower montane elfin forest	97	14	334	54

RUSSET-MANTLED SOFTTAIL *Thripophaga berlepschi*

A very local species confined to the Andes of north Peru (Amazonas on Cordillera de Colán south to east Libertad) at 2450–3350 m (Ridgely & Tudor 1994). It is considered to be "near-threatened" (Collar *et al.* 1994). Restricted-range in EBA B25: North-east Peruvian cordilleras (Stattersfield *et al.* 1995).

We had six records at 1800–1950 m, on 15–28 August, at site 2, all in ridgetop elfin forest except for one in adjacent humid lower montane cloudforest. The birds were most often seen foraging in the canopy with mixed-species flocks including Grey-mantled Wren *Odontorchilus branickii*. These records constitute a downward altitudinal range extension of 650 m for the species.

BARRED ANTTHRUSH *Chamaeza mollissima*

Rare and local in the Andes of Colombia, Ecuador and northern Peru (Cerro Chinguela in Piura), also the Andes of southern Peru (Cuzco and Puno) and western Bolivia. Mostly at 1800 to 3000 m asl. Ridgely & Tudor (1994) suggested that it may occur in the intervening section of the Andes of Peru. We recorded nine at 2300–2600 m in very humid upper montane forest at site 1, 24 July to 2 August, and one was netted and photographed at 2300 m on 26 July.

These records occur between the two disjunct areas previously known for this "superb, rare antthrush" (Ridgely & Tudor 1994). The birds most closely resembled the northern nominate race *mollissima*, showing a barred rather than streaked throat, and narrow bars on the belly rather than coarse wavy barring. However the breast was not as clearly barred as on *mollissima*, and the markings suggested the chevroned breast pattern of the southern *yungae* (Ridgely & Tudor 1994). The Cordillera de Colán is much closer to the known range of *mollissima* than that of *yungae*, so the resemblance to the northern form is not surprising; but our records suggest plumage intermediacy in the intervening parts of this species' range, and that the río Marañón does not form a clean break between the two subspecies as might have been expected.

CHESTNUT ANTPITTA *Grallaria blakei*

A "near-threatened" species (Collar *et al.* 1994), with a restricted range in EBA B25: Northeast Peruvian cordilleras (Stattersfield *et al.* 1995). Ridgely & Tudor (1994) describe it as local on the eastern slope of the Andes in northern and central Peru in Amazonas, Huanuco and Pasco; 2150–2475 m. We recorded it once, on 16 July 1994 at 1700 m in humid lower montane forest at site 1. This small antpitta showed a black bill, greyish legs and uniform chestnut plumage with only the faintest hint of barring on the lower belly and no discernible eye ring. The bird was flushed from dense undergrowth, perched at 1 m and called once: a brief *weeoo*. No other antpitta exhibits this combination of field characters.

This record represents a 450 m downward extension of this species' known altitudinal range. Although recorded only once during the project it was familiar to local people and said to be occasionally seen on forest tracks.

RUSTY-TINGED ANTPITTA *Grallaria przewalskii*

This antpitta has a restricted range in EBA B25: North-east Peruvian cordilleras (Stattersfield *et al.* 1995). It has been recorded at 2200–2750 m (Ridgely & Tudor 1994).

This species was recorded 261 times, mainly aurally, at site 1 at 1700–2650 m on 16 July to 9 August 1994; it was uncommon in humid lower montane cloudforest below 2150 m, but more common in very humid lower montane cloudforest above this altitude. These records constitute a 500 m downward extension of the altitudinal range of this still poorly known species.

BLACK-CHESTED FRUITEATER *Pipreola lubomirskii*

This species is local on the east slope of the Andes from southern Colombia to northern Peru (west of the río Marañón in Cajamarca); 1500–2300 m (Ridgely & Tudor 1994). It is considered to be "near-threatened" by Collar *et al.* (1994). We had a total of six records, all in humid lower montane forest. It was rare at site 1, with two sightings on 16 July at 1750 m, possibly of the same individual. It was uncommon at site 2: two birds were netted in elfin forest at 1900 m (a female on 21 August and a male on 22 August), and two were seen, one in cloudforest at 1800 m on 29 August and one in elfin forest at 1900 m on 26 August. A photograph of the male was published in *Cotinga* 2: 40.

Our records clearly fit this species, with the males showing a distinctive solid black bib, the females a solid green bib, and both sexes lacking the pale tertial tips of the much commoner Green-and-black Fruiteater *P. riefferii*. The description precludes the closely related

Masked Fruiteater *P. pulchra*, in which the male has an orange lower throat and upper breast, and the female is entirely green streaked yellow below. Previously, *pulchra* was thought to replace *lubomirskii* south and east of the río Marañón in Amazonas department southwards (Snow 1982, Ridgely & Tudor 1994), which would include the Cordillera de Colán. No *pulchra* were recorded on the mountain range.

These records show that the río Marañón does not clearly separate the ranges of *lubomirskii* and *pulchra* and suggest the possibility that they may be sympatric. Further fieldwork is obviously needed at other sites in Amazonas department.

RED-BILLED TYRANNULET *Zimmerius cinereicapillus*

This species has a restricted range in EBA B29: East Andean foothills (Stattersfield *et al.* 1995). It occurs locally on the eastern slope of the Andes in eastern Ecuador (known definitely only from western Napo) and eastern Peru (Huanuco to eastern Cuzco and Madre de Dios); 750–1200 m. It was thought to possibly also occur in the intervening part of the Andes of Peru by Ridgely & Tudor (1994).

It is not easy to identify, and was recorded with certainty only once: at site 2 at 1800 m in ridgetop elfin forest, on 30 August. The following field characters were noted: a mainly yellow and olive bird with the contrasting remiges typical of *Zimmerius* tyrannulets. The rounded head showed a soft grey cap blending to olive on the nape. An indistinct pale supercilium, broken pale eye ring, pale iris and dark eye stripe leading to olive-grey ear coverts gave an overall plain facial appearance ruling out Golden-faced Tyrannulet *Z. chrysops*. The short bill was blackish above but dark pink below, paler at the base. The upperparts were uniform olive green from mantle to tail, and the rectrices darker with pale fringing. All the remiges appeared dark olive with strong yellow fringes. The dirty-white throat and faintly streaked upper breast blended into the buffy yellow belly and under tail coverts. The bird called often, either a single *seep* or a trill with a distinct *sip sip* ending.

This is the first sighting within the range suggested as likely by Ridgely & Tudor (1994). It also constitutes an upward altitudinal range extension of 600 m, though this may not be significant as the bird was with a small flock crossing through ridgetop elfin forest between valleys. The bird's occurrence in such low canopy made identification easier, and the species may have been overlooked elsewhere on the Cordillera.

BLACK-CHESTED MOUNTAIN TANAGER *Buthraupis eximia*

This is an uncommon and local species ranging from the Andes of southwestern Venezuela to extreme northern Peru (Cerro Chinguela on Piura–Cajamarca border), mostly at 2800–3500 m (Ridgely & Tudor 1994). It inhabits elfin forest, low mossy old forest, humid shrubbery and *Polylepis* forest (Fjeldså & Krabbe 1990). Two were seen at site 1 on 2 August and one on 3 August, at 2500 m in very humid lower montane forest. The combination of blue crown and nape, green back and wings and black upper breast distinguishes it from the other mountain tanagers with mostly yellow underparts. Our records are the first south of the Marañón Valley for this rather inconspicuous species (Hilty & Brown 1986).

Conclusions

Our records of White-tipped Sicklebill, Black-chested Fruiteater and Black-chested Mountain Tanager, showing new range extensions across the Marañón gap, tend to corroborate Fjeldså's contention that this barrier is not as biogeographically significant as previously assumed (Fjeldså 1994). There are at least nine other species with restricted ranges which are found north and south of the valley (Davies *et al.* 1994).

Our new altitudinal records probably result from several factors, including the atypical habitat spread. The areas of elfin forest at unusually low altitude "may be explained by a cool local climate owing to frequent rainfall" (Collar *et al.* 1994). Thus local conditions possibly lead to some vegetational zones occurring at lower altitudes than usual, in turn perhaps explaining the records of Russet-mantled Softtail, Chestnut Antpitta and Rusty-tinged Antpitta at unusually low altitudes.

The fascinating Cordillera de Colán is a biogeographically very complex mountain range, which supports taxa representative of six different EBAs (Davies *et al.* 1994). This vulnerable site remains in need of further study and, more importantly, needs urgent, effective protection.

Acknowledgements

The advisors and sponsors of the expedition during which these records were made are acknowledged in our report (Davies *et al.* 1994). We would also like to particularly thank our patron, the late Gerald Durrell; Dr Mariella Leo Luna and the Asociación Peruana para la Conservación de la Naturaleza; Thomas Schulenburg; Rob Clay; Jon Fjeldså; staff at BirdLife International, Cambridge, especially David Wege; Susan and Jeremy Zuppinger; Jo Daley; but above all, the brave villagers of San Cristobal and Daniel La Torre Lopez, the bear-hunter turned guide.

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IN BRIEF

A SUBSTITUTE NAME FOR THE BIOKO RACE OF *PYCNONOTUS VIRENS*

In a recent letter Mr R. J. Dowsett reminded me that *Andropadus*, which was long combined in the genus *Pycnonotus*, has again been recognized as a distinct genus (*cf.* Keith, Urban & Fry 1992, *Birds of Africa* Vol. 4: 287). Thus *Pycnonotus virens poensis* Dickerman, *Bull. Brit. Orn. Cl.* 114: 276, was preoccupied even when published by *Stelgidillas poensis* Alexander (Sipopo, Fernando Po). *Stelgidillas* Oberholser 1905 (*Proc. U.S. Nat. Mus.* 22: 30), the type of which is *Andropadus gracilirostris*, is a synonym of the latter genus. Therefore I propose the substitute name: **Andropadus virens amadoni**, nom. nov. Replaces *Pycnonotus virens poensis* Dickerman, 1994, not *Stelgidillas poensis* Alexander, 1903, *Bull. Brit. Orn. Cl.* 13: 35 (now=*Andropadus gracilirostris poensis*).

The name recognizes the contribution of Dr Dean Amadon to our knowledge of the birds of the Gulf of Guinea.

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ROBERT W. DICKERMAN

29 April 1996

THE THREAT STATUS OF THE SIDAMO LARK

Good as it was to read Iain Robertson's account of his observations of the Sidamo Lark *Heteromirafra sidamoensis* in November 1994 (evidently not 1974, as first indicated in his article) (*Bull. Brit. Orn. Cl.* 115: 241–243), he is mistaken in regarding the "Indeterminate" status assigned to this species in *Threatened Birds of Africa* (1985) as inconsistent. He bases this view on the fact that two other endemics of southern Ethiopia were classified as "Rare" despite their larger ranges and greater proportion of available habitat. I suspect the confusion arises because the word "indeterminate" suggests less urgency than the word "rare".

The categories used in *Threatened Birds of Africa*, which were those then formally adopted by IUCN for all threatened species classification, are explained in the Introduction (pp. xxv–xxvi). I quote: " 'Indeterminate' applies to 'taxa known to be Endangered, Vulnerable or Rare but where there is not enough information to say which of the three categories is appropriate' (. . . it should be noted that, since an Indeterminate species can be at best Rare, Indeterminate is a category of threat higher than Rare)."

The assignment of Indeterminate to the Sidamo Lark in 1985 was made in the knowledge of John Ash's 1974 observation, since he had kindly furnished an early draft of the paper he published in *Bull. Brit. Orn. Cl.* (105: 141–143) in 1985, but also in the light of his *in litt.*

comment, which I reproduced, that there was then "plenty of apparently suitable habitat" in the area. Following his discovery in 1989 that both sites at which the species had previously been recorded were being affected by man (*Scopus* 13: 90–97), and with the reformulation of the IUCN categories, the Sidamo Lark was classified as Endangered two years ago (Collar *et al.* 1994, *Birds to Watch 2*, which see also for the new categories).

It is encouraging to know that some of these human influences appear now to have ceased, but I cannot think that such news will make a difference to the 1994 classification of the species. This is, however, a notable instance of the difficulty of appropriate categorisation in the absence of data. If it is accepted that highly cryptic birds in relatively poorly known regions stand a reasonable chance of being found over much wider ranges than those reported, then the Sidamo Lark might better have been classified "Data Deficient", which stands outside the new threatened categories. However, given the propensity for birds in Ethiopia and Somalia to be confined to often inexplicably small ranges, the precautionary principle requires us to entertain the possibility that the entire range of the species may well not extend beyond the small area south of Negele in which it has so far been found. It therefore appears that Iain Robertson and I have been and remain in closer agreement over the threat status of the Sidamo Lark than he previously imagined.

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N. J. COLLAR

8 February 1996

RANGE EXPANSION AND SUMMERING OF PALM WARBLER *DENDROICA PALMARUM* IN VENEZUELA

On 29 June 1995, the first author observed a Palm Warbler *Dendroica palmarum* during an ornithological survey around the Mucubají Lake, Mérida State in Venezuela (08°48′N, 70°48′W), at an elevation of 3500 m. The bird was also seen by several bird watchers and a photographic record was taken. Only one individual was seen for a few minutes, feeding on the ground and continually wagging its tail. The area is open with very few trees, the dominant plant being Espeletia (*Espeletia* spp.).

The solid rufous cap and the combination of yellow undertail coverts, pale yellow throat and whitish, vaguely streaked underparts differentiates this species from any other migrant parulid. No resident species are similar in colour. This coloration is typical of breeding adult plumage and distinctive of the nominate subspecies *D. p. palmarum.* The Palm Warbler breeds in North America and winters on the Gulf and southern Atlantic U.S. coasts, in eastern Yucatan, and in the West

Indies; it has been occasionally recorded in Antioquia, Colombia, in October, and three times in Curaçao and Aruba in February, March and November (Curson *et al.* 1994, Voous 1983). The nominate subspecies breeds in the western part of the North American range.

It is well known that the Mucubají area and the Chama River Canyon in Mérida State are important routes for several species of northern migrants (Phelps 1961). Our June observation suggested that this individual stayed on the wintering grounds during the following summer. This is apparently rare in warblers. There is one record of Blackpoll Warbler *Dendroica striata* from Chile in June 1858 (Philippi 1940), and of Black and White Warbler *Mniotilta varia* and Northern Waterthrush *Seiurus noveboracensis* from the Netherlands Antilles in June (Voous 1983).

We are grateful to Brian G. Prescot for providing the photographic record of our observation, and to Raymond McNeil and Clemencia Rodner for their suggestions and comments on this manuscript.

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21 March 1996

HISTORICAL RECORDS OF THREATENED AND NEAR THREATENED ARGENTINIAN BIRDS FROM MUSEO PROVINCIAL DE CIENCIAS NATURALES "FLORENTINO AMEGHINO" OF SANTA FE, ARGENTINA

The Museo Provincial de Ciencias Naturales "Florentino Ameghino" in Santa Fe, Argentina, has a small but regionally important collection of 2300 bird specimens. It includes specimens of a number of species considered by Collar *et al.* (1992) to be threatened or near threatened, details of which are given below. Scientific nomenclature follows Altman & Swift (1993), English names Meyer de Schauensee (1982).

Threatened species

CROWNED EAGLE *Harpyhaliaetus coronatus*

Two specimens: MFA-ZV-113 male, Campo La Eugenia (Dpt. San Cristóbal, Prov. Santa Fe), 14 Jul 1957, R. Murnie coll. MFA-ZV-988 (sex?), Tintina (Dpt. Moreno, Prov. Santiago del Estero), without date, exchange with Escuela No. 62, collected before May 1950.

BLACK-FRONTED PIPING-GUAN *Pipile jacutinga*

MFA-ZV-1640 male, Km. 55, El Soberbio (Dpt. Guaraní, Prov. Misiones), 24 Sep 1971, C. Ríos coll.

SPECKLED CRAKE *Coturnicops notata*

MFA-NV-1825 female, Piquete (Dpt. La Capital, Prov. Santa Fe), 21 Jan 1941, R. Muhn coll.

HELMETED WOODPECKER *Dryocopus galeatus*

MFA-ZV-1606 female, Dos de Mayo (Dpt. Cainguás, Prov. Misiones) 18 Jun 1968, E. Maletti coll.

STRANGE-TAILED TYRANT *Alectrurus risora*

Three specimens: MFA-ZV-1113 male, MFA-ZV-1118 male, MFA-ZV-1119 female, all from Itá-Ibaté (Dpt. Gral. Paz, Prov. Corrientes), 28 May 1952, A. Bonetto-G. Martínez Achenbach coll.

MARSH SEEDEATER *Sporophila palustris*

MFA-ZV-1985 male, Concordia (Dpt. Concordia, Prov. Entre Ríos), 13 Aug 1976, C. García coll.

Near threatened

GREATER RHEA *Rhea americana*

Three specimens: MFA-ZV-1431 young male, La Brava (Dpt. San Javier, Prov. Santa Fe), 18 Dec 1961, G. Martínez Achenbach coll.; MFA-ZV-1878 female, V. Saralegui (Dpt. San Cristóbal, Prov. Santa Fe), 30 Nov 1948, H. Gavarró coll.; MFA-ZV-1161 young male, Santa Fe (Dpt. La Capital, Prov. Santa Fe), 26 Dec 1952, I. Costa coll.

SOLITARY TINAMOU *Tinamus solitarius*

MFA-ZV-1987 female, Cerro Moreno (Dpt. Cainguás, Prov. Misiones), 2 Aug 1978, C. Ríos coll.

HARPY EAGLE *Harpia harpyja*

(1), MFA-ZV-2020 (sex?), Cerro Moreno (Dpt. Cainguás, Prov. Misiones), without date, was collected by E. Maletti before Oct 1980.

HUDSONIAN GODWIT *Limosa haemastica*

MFA-ZV-1460 female, Recreo, Salado River swamps (Dpt. La Capital, Prov. Santa Fe), 1 Feb 1948, G. Martínez Achenbach coll.

RED-CAPPED PARROT *Pionopsitta pileata*

Two specimens: MFA-ZV-268 male, MFA-ZV-267 female, from El Cerrito Island (Dpt. Bermejo, Prov. Chaco), 16 Jul 1944, C. Ríos coll.

BLACK-BODIED WOODPECKER *Dryocopus schulzi*

Two specimens: MFA-ZV-1614 male, Cañada Ombú (Dpt. Gral. Obligado, Prov. Santa Fe), 15 Jul 1970, C. Ríos coll.; MFA-ZV-1497 male, Colonia Castelli (Dpt. Gral Guemes, Prov. Chaco), 27 Aug 1963, C. Ríos coll.

SHEAR-TAILED GRAY TYRANT *Muscipipra vetula*

MFA-ZV-1996 male, Salto Encantado (Dpt. Aristóbulo del Valle, Prov. Misiones), 29 Jul 1978 C. Ríos coll.

BLACK-MASKED FINCH *Coryphaspiza melanotis*

Four specimens: MFA-ZV-1670 male, Carabajal Island (Dpt. La Capital, Prov. Santa Fe), 10 Sep 1944; MFA-ZV-1359 male, Riacho Santa Fe (Dpt. La Capital, Prov. Santa Fe), 30 Aug 1959; MFA-ZV-639 (sex?), Carabajal Island, 10 Jun 1945; MFA-ZV-638 (sex?), 20 May 1944, Arteaga Island (Dpt. La Capital, Prov. Santa Fe), 20 May 1944; all collected by G. Martínez Achenbach.

CHESTNUT SEEDEATER *Sporophila ruficollis*

Three specimens: MFA-ZV-619 (two males and one female with the same number), Santa Fe (Dpt. La Capital, Prov. Santa Fe), 10 Oct 1933, M. Tesera coll.

We thank Prof. Edelvita Fioramonti and Lic. Carlos Virasoro of Museo Provincial de Ciencias Naturales "Florentino Ameghino" and M. Sc. Adolfo Beltzer of Instituto Nacional de Limnología (CONICET), Santa Fe.

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10 April 1996

BOOKS RECEIVED

Lambert, F. & Woodcock, M. 1996. *Pittas, Broadbills and Asities*. Pp. 271, 24 colour plates, maps, text-figures. Pica Press. ISBN 1-873403-24-0. £26. 24 × 16 cm.

Restall, R. 1996. *Munias and Mannikins*. Pp. 264, 80 colour plates, maps, text-figures. Pica Press. ISBN 1-873403-51-8. £28. 24 × 16 cm.

The two latest in the Pica Press guides to bird families (or parts of families). The essential character of this outstanding series will doubtless be known to readers. Here, in the limited space available, it seems best to mention only the more particular features of the two under review.

Frank Lambert's account of two little known families, which are not only fascinating in themselves but important in our understanding of avian biogeography, aims to be fully comprehensive, and makes use of much unpublished data as well as his own field research over many years, together with a thorough study of museum specimens and the previous literature. The numerous unpublished observations by others are all acknowledged with the observer's name. It thus provides the essential base on which all future studies will stand, the last monographic treatment of either family being Elliot's *Monograph of the Pittidae* (2nd edn, 1893). The extraordinary courtship behaviour, still hardly understood, of a bird such as the Green Broadbill should surely spur young ornithologists to take up the challenge of documenting and filming the life history of this and many of the other species described here. The colour plates by Martin Woodcock, illustrating all the species and the main subspecies, in their various plumages, are spectacular and beautifully reproduced.

Robin Restall's book is a one-man tour de force. It deals with one section of the Estrildidae which (although split by some authors) he considers best treated as a single enlarged genus, *Lonchura*, with 40 known species. The text, which follows the standard pattern for books in the series, is packed with unpublished information and is illustrated with a large number of the author's excellent, lively drawings of display postures, as well as diagrammatic figures of mouth markings of nestlings. Of the colour plates, the first 16, placed before the main text, illustrate all the species and well-marked subspecies in standard poses, Plates 17–80, which come at the end of the book as a sort of appendix, are a superb collection, of Tunnicliffe quality, of the author's paintings from the life of individual birds of most of the species, most of them shown with a wing extended, from above and below, as well as in side view; all are accompanied by hand-written notes on points of colour, feather pattern, sex or geographical differences etc. Those interested in scientific bird painting as an art will want to buy this book for these 64 plates alone.

Roselaar, C. S. 1995. *Songbirds of Turkey: an atlas of biodiversity of Turkish passerine birds*. Pp. 240, 145 maps. Pica Press. ISBN 90-74345-07-7. £24. 24 × 17 cm.

This work, the result of more than 20 years' research (much of it summarised in *BWP*), is essential for anyone interested in the subspecific variation of west Palearctic birds. Turkey is in a key position in the west Palearctic, with its connections to southeast Europe, the Caucasus area to the east and the Near East to the southeast, and its Mediterranean coastal habitats in the south. It was not possible to include in *BWP* all the details relevant to a full account of the situation in Turkey; this is presented here, together with the most complete distribution maps available to date. Records are mapped individually, not by grid squares, an essential requirement for the detailed analysis that is presented and discussed.

Sea Swallow (Annual Report of the Royal Naval Birdwatching Society), vol. 45, 1996. Pp. 120.

Volume 45 of *Sea Swallow* is an enlarged Golden Jubilee edition, celebrating the first 50 years of the Society's life since its foundation just after the end of the last war. In addition to reports and papers of the usual kind, it includes a number of interesting reviews of the development of birdwatching at sea, from the earliest days to the present. There is also a special 8-page colour section of RNBWS photographs depicting 26 species, some of them sea-birds and some ship-borne migrants. Non-members can obtain a copy (price £8, including postage in U.K.) from the Editor, our Hon. Secretary.

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Edited by
Dr R. A. CHEKE and Dr D. W. SNOW

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FORTHCOMING MEETINGS

Tuesday 16 September 1997. Graeme Green will speak on **"Cotingas, and their niche in the neotropical avifauna"**. Graeme has long had a special interest in the taxonomy, identification, ecology and conservation of tropical birds. He is an active member of the Oriental Bird Club and the Neotropical Bird Club, travelling widely in pursuit of these interests. He is co-author of *Cotingas and Manakins*, due to be published by Pica Press in 1998.

*Applications to the Hon. Secretary by **12 September**, please.*

Tuesday 4 November 1997. Tony Marr will speak on **"An Atlantic Seabird Odyssey"**. Tony has had a life-long interest in seabirds, especially through 'pelagics' in the eastern Atlantic, and he has pursued them from a wide variety of boats and craft, off Portugal, The Canaries, Madeira, West Africa, and the South Atlantic. Having retired early to devote more time to birds, he is well-known to many as a tour leader to many parts of the world, and as a lecturer and author of articles on seabird topics. He serves on the BOU Records Committee, and the Seabirds Advisory Panel for *British Birds*.

*Applications to the Hon. Secretary by **21 October** (Trafalgar Day!), please.*

Meetings are held in the Sherfield Building of Imperial College, South Kensington, London SW7, at 6.15 p.m. for 7 p.m. The nearest Tube station is at South Kensington, and car parking facilities are available; a map of the area will be sent to members, on request. The cash bar is open from 6.15, and a buffet supper, of two courses followed by coffee, is served from about 7.00. (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion.

Overseas Members visiting Britain are particularly welcome at meetings. For details in advance, please contact the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants. GU31 5PA.

Tel/Fax: 01730-825280 for late bookings and cancellations.

Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

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The eight hundred and sixty-fifth meeting of the Club was held on Tuesday, 21 January 1997, at 6.15pm. 32 Members and 15 guests attended.

Members present were: D. GRIFFIN (*Chairman*), Professor C. J. FEARE (*Speaker*), Miss H. BAKER, J. W. BARRINGTON, Captain M. K. BARRITT RN, P. J. BELMAN, I. R. BISHOP, Mrs D. M. BRADLEY, D. R. CALDER, Cdr M. B. CASEMENT RN, Professor R. J. CHANDLER, Dr R. A. CHEKE, S. J. FARNSWORTH, Rev. T. W. GLADWIN, Dr A. GOSLER, C. A. R. HELM, R. M. KETTLE, Dr C. F. MANN, D. J. MONTIER, R. G. MORGAN, Mrs A. M. MOORE, Mrs M. N. MULLER, Dr R. P. PRYS-JONES, N. J. REDMAN, S. J. R. RUMSEY, R. E. SCOTT, P. J. SELLAR, S. A. H. STATHAM, Dr D. W. SNOW, N. H. F. STONE, Mrs F. E. WARR, Professor W. E WATERS.

Guests attending were: Dr E. GILL (*Speaker*), Mrs S. GRIFFIN, Miss G. BONHAM, M. BRADLEY, Mrs J. B. CALDER, Mrs C. R. CASEMENT, Mrs J. M. GLADWIN, A. MARTIN, Mrs M. MONTIER, P. J. MOORE, M. PALING, R. RANFT, Mrs B. K. SNOW, Cdr J. M. W. TOPP RN, J. WARR.

After dinner, Professor Chris Feare and Dr Elaine Gill gave a joint presentation under the title "The Biology of Pink Omelettes", illustrated by a splendid series of their own slides. The following is a brief synopsis:

During June and July, omelettes and other culinary treatments of the pink-yolked eggs of Sooty Terns *Sterna fuscata* provide the people of the Seychelles with a traditional and much sought-after delicacy. The eggs are harvested from large colonies, mainly on remote islands, and transported by boat to the main island, Mahé, for sale and distribution. Since the 1940s, concern has been expressed about over-exploitation, following declines in colony size and some colony extinctions. Although many of these problems have in fact been caused by habitat changes on breeding islands, the Seychelles Government wants to ensure that exploitation is sustainable and is therefore supporting research on the biology of the Sooty Tern and the management of the islands where they breed.

Sooty Terns normally lay their single egg in a scrape on open, lightly-vegetated expanses on flat islands; in Seychelles they also nest on rocky islands and, exceptionally, on the floor of woodland. The breeding season lasts from June to October, each pair taking around three months to raise its offspring to fledging. During studies in the early 1970s, under an NERC grant to Prof. George Dunnet, it was discovered that egg-laying within a colony is highly synchronous, with most eggs being laid within nine days. The fledging success of eggs laid after the period of intense laying early in the season declines markedly. After losing an egg, parents may return to lay a replacement about 13 days later, but the ability to replace lost eggs also shows a marked seasonal decline.

The current studies by both speakers were initially funded by the Royal Society, Seabird Group, Percy Sladen Memorial Fund, Bird Island Lodge and Air Seychelles, but are now largely supported by the Seychelles Government, Island Development Corporation and Bird Island Lodge. The aims are to investigate inter-colony movements, through ringing and inter-genetic studies; to determine from ringed birds their age at first breeding and longevity; and to assess the potential effects of island vegetation management on nest density and colony size. Thereafter the aim is to establish schemes for monitoring colony size, breeding success and egg harvests. Using these and other data, the intention is to produce a model of Sooty Tern population dynamics, from which a sustainable egg harvest and harvest strategy can be derived.

A regulated harvest of Sooty Tern eggs ensures that the exploited colonies are protected during the laying season. This prevents poaching, which can be destructive on unprotected islands, and also confers other benefits on Sooty Tern islands—for example the protection from illegal killing of other species, such as Masked and Brown Boobies *Sula dactylatra* and *S. leucogaster*, and Green Turtles *Chelonia mydas*. All of these have suffered serious declines in the Seychelles, despite being legally protected, but while Sooty Tern eggs are being collected the legal protection afforded to these species can be enforced.

The eight hundred and sixty-sixth meeting of the Club was held on Tuesday, 18 March 1997, at 6.15pm. 21 Members and 8 guests attended.

Members present were: D. Griffin (*Chairman*), Miss H. Baker, J. W. Barrington, P. J. Belman, Cdr M. B. Casement RN, Professor R. J. Chandler, A. Gibbs, Rev. T. W. Gladwin, J. A. Jobling, C. A. R. Helm, Lt. Col. P. S. Kerr-Smiley, Dr J. F. Monk, D. J. Montier, R. G. Morgan, Mrs A. M. Moore, Mrs M. N. Muller, R. C. Price, Dr W. G. Porteous, N. H. F. Stone, Mrs F. E. Warr, Professor W. E. Waters.

Guests attending were: Major F. Courtenay-Thompson (*Speaker*), Mrs C. R. Casement, Miss F. Courtenay-Thompson, Dr D. Foskett, Mrs J. M. Gladwin, Mrs M. Montier, P. J. Moore, J. Warr.

After dinner Major Frank Courtenay-Thompson spoke on the subject of "Three Years Birdwatching in Saudi Arabia", illustrated with a wide range of colour slides. In 1970, when he arrived in Saudi Arabia, there were few good roads and travel was slow. Living in Jeddah, most of his bird watching was in the western region. The fascination was the geographical location and the variety of habitats, but the challenge was the lack of background information.

Much has been published about the birds of Saudi Arabia in recent years, but 25 years ago there was very little. Meinertzhagen's *Birds of Arabia*, published in 1954, was already out of print and scarce. The 1972 Collins Field-guide was the first to include the Middle East with Europe, and even that did not give the full picture. Frank published his own bird list in 1972, with the aim of helping people out there, rather than contributing to world knowledge. Copies were, however, circulated in Europe and America, and aroused some interest at the time.

The west coast has many creeks and mangroves. A mountain range rising to over 10,000 feet runs the length of the peninsula, on the southern half of which are extensive juniper and olive woodland. East of this range, a plateau extends to the Persian Gulf, and the two sand seas are centrally placed in the north and south. Seasonal temperature on the plateau varies from 120°F to below freezing, with a far smaller range and very high humidity at the coast. Much of the country has a brief period of rain most years, which can reach 20 inches in the mountains.

Any green area becomes a haven for exhausted Palearctic-African migrants crossing Saudi Arabia but, following the blistering summer, there are less of these and a number of migrant species are only seen in the spring. Many are unfamiliar to the British ornithologist, the most colourful of which are the European Bee-eater *Merops apiaster*, Golden Oriole *Oriolus oriolus* and large parties of Hoopoes *Upupa epops*, some of which nest. There are twelve species of wheatear and six races of yellow wagtail. Flocks of European Cranes *Grus grus* fly over, often after dark.

The southern tip of Arabia was once joined to Africa, and there is a remnant population of African (Ethiopian) origin. Typical of these are the Bateleur Eagle *Terathopius ecaudatus*, the Grey Hornbill *Tockus nasutus*, Rüppell's Weaver *Ploceus galbula* and Abyssinian Roller *Coracias abyssinica*. Along the coast are to be found the Reef Heron *Egretta gularis*, Goliath Heron *Ardea goliath* and Little Green Heron *Butorides striatus*, as well as the Crab Plover *Dromas ardeola*. There is no evidence that any of these migrate to and from Africa, but they do move up and down their corner of the peninsula following the rains.

There are eleven species which are only found in Arabia. These include the Arabian Babbler *Turdoides squamiceps*, White-eyed Gull *Larus leucophthalmus* and the increasingly rare Arabian Rock Partridge *Alectoris philbyi* and Arabian Woodpecker *Dendrocopos dorae*. In addition, a number of species are strictly birds of the desert belt, notably the Trumpeter Bullfinch *Bucanetes githagineus*, Isabelline Shrike *Lanius isabellinus* and the Isabelline Wheateater *Oenanthe isabellina*. All appear as washed-out versions of brighter cousins.

Saudi Arabia has a wide range of both migrant and resident species, but unlike most other parts of the world, is still largely unexplored by ornithologists.

AVIAN TAXONOMY FROM LINNAEUS TO DNA

PAPERS PRESENTED AT A JOINT MEETING BETWEEN THE BRITISH ORNITHOLOGISTS' CLUB AND THE LINNEAN SOCIETY OF LONDON HELD AT BURLINGTON HOUSE, 23 MARCH 1996

PREFACE

by Robert A. Cheke

The use of the binomial system to classify plants and animals, as formalised by Linnaeus, continues to be the means by which species are named. Acceptance of binomials after much controversy was followed by further, often heated, debates about the usefulness of the trinomial system and the idea of subspecies. The latter arguments occupied the members of the British Ornithologists' Club (BOC) for many years, especially at the end of the 19th century. We have now come full circle and, once again, the subspecies concept is under criticism, but mostly for quite different reasons from those advanced by the contemporaries of the founders of the BOC. It is salutary that there is probably now more disagreement over what is meant by species than there has ever been (Malliet 1995).

The purpose of the gathering, fittingly held in the meeting rooms of the Linnean Society of London, was to provide an opportunity to discuss modern views of avian taxonomy, at the same time remembering the historical context. The papers from the meeting which are published in full here are only those which addressed species concepts *per se*. Abstracts are included for three of the others, as well as a paper on Linnaeus' correspondence with Scopoli, based on a poster presentation.

Current arguments are not without practical import, and the consequences that their resolution might have, for purposes such as conservation or zoo-archaeology, was another major issue for discussion, as was the whole construct of traditional classification. If a population is genetically distinct, such as one of the groups of Red Kite *Milvus milvus* described by Parkin, why shouldn't it be classed as a subspecies or even a species? Indeed, where can the line be drawn, since each individual bird has a unique genetic code? Does the logic necessitate the acceptance of many more species of birds than are hitherto recognised? Are traditional higher order groupings redundant?

As Jeremy Greenwood points out in the introductory contribution, there are many taxa of taxonomic thought and each might classify the same group of animals differently. The abolition of subspecies is one consequence of the phylogenetic species concept (PSC) advocated by Robert Zink, whose conclusions would have been heard with approval by some of the BOC's founders, as well as by a few of the Italian ornithologists discussed by Violani and Barbagli. Zink's arguments include conclusions derived from DNA data and analyses which would be difficult to obtain without the use of microprocessors. Although the post-Watson and Crick era has seen extraordinary advances in our understanding of biological processes at the molecular level, especially when coupled with information technology, DNA may yet only serve taxonomy as another set of "characters", so far as bird classifications are concerned. David Snow maintains support for the biological species concept and warns that the general adoption of the PSC could lead to decades of instability in taxonomy. He also draws attention to the proliferation of new species (though this in itself is not a valid argument against the PSC), which adherence to the adoption of the PSC would engender; and these two themes are taken up by Collar, who emphasises that the adoption of the PSC would make the role of international conservationists impossibly difficult. The 'problem' of the recognition of extra species, under the PSC, was emphasised in an account of the meeting (Martin 1996) but disputed by Zink (1996), who pointed out that most of the putative extra species are already recognised as subspecies.

Parkin demonstrated that there are genetic differences between populations of Red Kites from Germany, Spain and Wales, the latter being the least variable and having the poorest breeding success. Russell showed that it is possible to identify mummified birds of prey from X-rays, using taxonomic methods of much newer vintage than the mummies. The main conclusions reached in a study of eggshell structure to elucidate taxonomic relationships, principally at levels above the species (mainly sub-order or order), were summarised by Mikhailov. A detailed account of this research will appear elsewhere (Mikhailov 1997).

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Introduction: the diversity of taxonomies

by *Jeremy J. D. Greenwood*

Taxonomy and related fields are battle grounds onto which the non-combatant ventures at his peril, liable to be shot at from all sides. Even the definition of the subject is one on which its practitioners clearly disagree. I shall accept that: "Taxonomy is, strictly speaking, the study of the principles and practice of classification" (Jeffrey 1977). Classifications have three main uses in biology: they allow us to summarise and organise our knowledge about living organisms, they help us to identify organisms, and they can provide an approximate summary of evolutionary relationships. The first is important because of the sheer diversity of living organisms and the second because that diversity makes identification difficult. Summarising evolutionary relationships is important because "Nothing in biology makes sense except in the light of evolution" (Dobzhansky 1973). So most biologists use classifications in most of their work. One might therefore assume that taxonomy would be a key element in the education of young biologists. In Britain, at least, this assumption would be completely unjustified; without having carried out any systematic investigation, I suspect that most undergraduate courses are devoid of formal teaching in taxonomy. As a result, most of us have a rather hazy knowledge of the principles and methods underlying classifications; even worse, because we use classifications every day of our lives, we may be unaware of quite how hazy our knowledge is. Furthermore, Arthur Cain's (1959) prescient opinion that "we are about to see a considerable revision of the whole basis of taxonomic theory" has been amply justified; with the major developments in taxonomic philosophy, in sources of data, and in analytical methods that have occurred in the last four decades, the gap between the taxonomist and the users of the taxonomists' products may, indeed, be wider than ever before. For that reason, I shall take some space to look at those developments, in the hope that my brief summary may be of use to others who feel the need to be more familiar with modern ideas in taxonomy but whose work, like mine, has prevented them from closely following those ideas as they have developed. My own recent education in the subject has relied particularly on: Ridley (1986), who provides a thought-provoking, if personal, view of the major schools of taxonomy from the point of view of an evolutionary biologist rather than of a practising taxonomist; Forey *et al.* (1992), who clearly explain cladistic views and methods; and Hillis & Moritz (1990), who cover many of the principles as well as covering in detail how molecular evidence may be used. (For those whose knowledge of molecular evolution is becoming rather rusty, Li & Graur (1991) provide a useful introduction to current ideas.)

Organising knowledge

We are able to use classification as a means of organising knowledge about living organisms particularly because species fall into clusters.

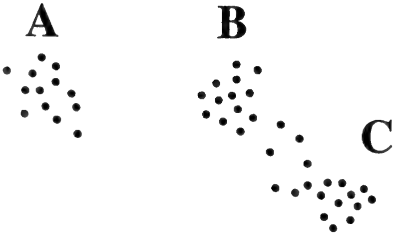

Figure 1. Clusters of species in a two-dimensional character space. Cluster A is distinct but do B and C represent one cluster or two? If they form two clusters, where should the dividing line be drawn?

For example: bird species share certain characteristics in common, mammal species share other characteristics, and there is a gap between them; bats share some characteristics with birds but are still firmly linked to the mammals by most of their characteristics; bats do not cause us to have difficulty in recognising the two chief clusters of warm-blooded vertebrates or in distinguishing between them. We can make general statements about all members of such clusters, to help us reduce our knowledge base to manageable proportions. The process is further facilitated by the fact that we may arrange the clusters in a non-overlapping hierarchy, with clusters at each taxonomic level themselves being clustered at the level above. Unfortunately, the clusters into which species tend to fall are often indistinct (Fig. 1), especially when we consider fossils as well as extant species (Fig. 2), so the distinctions between taxa may not be clear and generalisations about the members of a taxon may not all apply to every species.

Evolution: branching and divergence

For many, the chief fascination of biology is that living organisms have an evolutionary history, being related to each other through descent from common ancestors. The history of life can be described by a simple branching pattern (e.g. Fig. 2) and that pattern can be reflected by the taxonomic hierarchy. Because evolution is central to biology, taxonomy has traditionally been used to summarise evolutionary relationships as well as to provide groups (clusters) about which general statements can be made. For example, as well as being seen to have many characteristics in common, species in the class Aves are recognised as sharing an evolutionary relationship closer than the relationship between any one of them and any species in other classes.

If species that were evolutionarily closely related were always more similar than those that were more distantly related, classifications could easily reflect both degrees of similarity and degrees of relationship. Unfortunately, this would only be true if evolution involved species descended from a common ancestor simply becoming steadily more and more different from each other (Fig. 3a). Unfortunately, life is not that simple: rates of divergence vary, as in Fig. 3b, in which species 3 is now

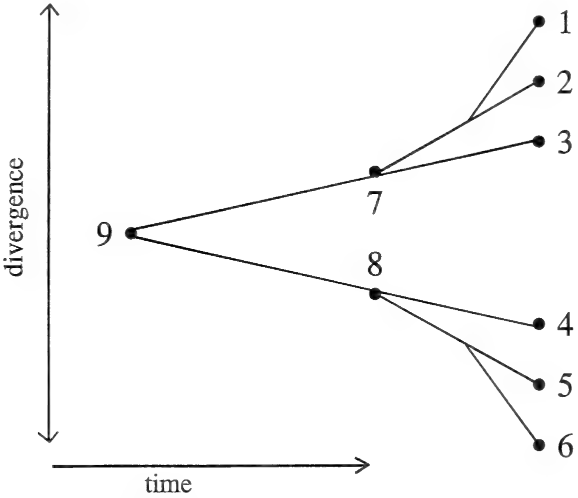

Figure 2. A hypothetical evolutionary tree in which six extant species (1–6) form two distinct clusters on the axis of divergence. The known fossils (7–9) link these clusters together.

more different from species 2 than the latter is from species 1, even though species 2 and 3 share a more recent common ancestor; convergent evolution is equally destructive of the correspondence between similarity and evolutionary relationship (Fig. 3c).

The diversity of taxonomies

Because patterns of similarity and evolutionary relationships may not be congruent and because there are various ways of describing both similarities and relationships, different taxonomists may employ different principles and procedures in their work. For the purposes of exposition, I recognise five main groups: the traditional evolutionary taxonomists, pheneticists, distance-based evolutionary taxonomists, Hennigian cladists and pattern cladists. Cladists have dominated taxonomic thinking in recent decades and some (perhaps all) of them claim that the other schools are now extinct. That this is not true is shown by the fact that the best-known recent classification of birds (Sibley & Ahlquist 1990) is distance-based. Furthermore, many non-taxonomists have grown up knowing something about traditional evolutionary taxonomy and may assume that all biological classifications rest on traditional principles and procedures. Indeed, because classifications take time to re-work, many of them still do.

It is clearly important that those who use a particular classification should know and understand the taxonomic principles used to produce it. If they do not, they are likely to draw invalid conclusions from it. The most important message I have to deliver is that it is up to the

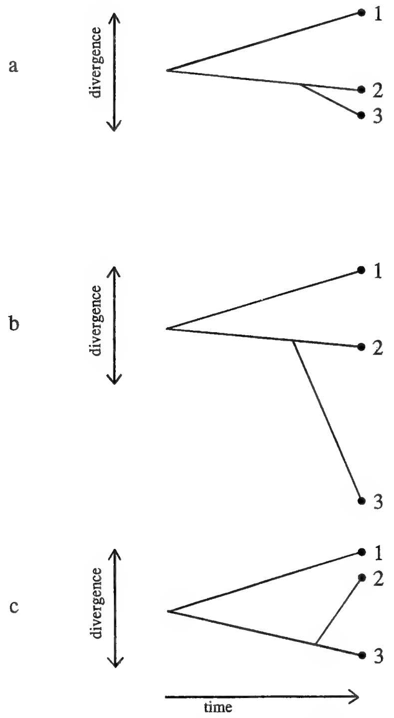

Figure 3. Three evolutionary trees. Note that each is meant to represent the actual course of evolutionary events, not what might necessarily be inferred from available evidence. In (a) species diverge at fairly steady rates, so that degrees of similarity between extant species reflect their evolutionary relationships. The correspondence between similarity and relationship is broken in (b) because rates of divergence differ and in (c) because of convergence.

taxonomist to state clearly the principles and procedures involved in producing a classification and up to the user to pay proper attention to such statements.

What sorts of characters to use?

Taxonomists differ not only in their principles and procedures but also in the sorts of characters they use as the basis for their classifications. Morphological characters have traditionally been dominant but the use of other characters has a long history: not only have naturalists long used song to identify and distinguish similar birds (e.g. White 1789) but among formal taxonomists Linnaeus (1758) used behaviour (''*adscendit noctu*'', in respect of *Lumbricus terrestris*) and Nuttall (1904) used immunological characters. From time to time, individual taxonomists have promoted the use of particular sets of characters, either because of the ease with which they may be studied or because they are supposed to be particularly revealing of evolutionary relationships. The latter suppositions generally rely on questionable arguments about certain sorts of characters being evolutionarily conservative because they are likely to be less (or more!) subject to natural selection than other sorts. But, just as the history of evolutionary biology is littered with examples of characters once thought to be selectively neutral but now known to be strongly selected, so is the history of taxonomy littered with classes of characters no longer thought to be peculiarly valuable. Molecular (especially DNA) data are still often thought to be especially useful but they produce no more consistent pictures of phylogeny than do morphological data (Patterson *et al.* 1993, Sheldon & Bledsoe 1993). The best classifications are likely to result from considering all the available data—though for evolutionary and cladistic taxonomies homologous characters are of particular importance.

Traditional evolutionary taxonomy

What one regards as traditional evolutionary taxonomy is a matter of opinion. I refer to the approach, growing out of "The Modern Synthesis" of Stebbins (1950), Simpson (1961) and Mayr (1969), which has been further discussed by Cronquist (1988) and Bock (1989). It involves working out the evolutionary history of the species under consideration, taking into account evidence such as ecology and biogeography as well as the distribution of characters among species. Attention is paid to the function of characters, with assessments being made of the likelihood of different possible evolutionary changes; it is important to assess whether or not similar character states are homologous or the result of convergence. This is because taxa are required to be monophyletic which means, for the traditional evolutionary taxonomist, merely that all group members should share a common ancestor, which should also be a member of the group (Fig. 4). Note that it is not necessary that all the descendants be included for a taxon to be regarded traditionally as monophyletic, so a divergent species (or group of species) can be separated from a group with which it shares common ancestry (as taxa VI and VII are separated from taxa III and IV in Fig. 4c). For the cladist (see below), in contrast, taxa III and IV (Fig. 4b and 4c) are paraphyletic (and not allowed); strict monophyly requires that all descendants are included in the group. Thus traditional evolutionary taxonomies attempt to reflect both the branching pattern of the evolutionary trees and the extent of divergences.

The problem with traditional evolutionary taxonomy is that it is highly subjective, both at the stage of working out the underlying evolutionary narrative and at the stage of converting the phylogenetic tree into a classification.

Phenetic taxonomy

Pheneticists dispense with the subjectivity of traditional evolutionary taxonomy by abandoning the attempt to summarise evolutionary relationships in the classification. For the phenetic school, taxonomy is

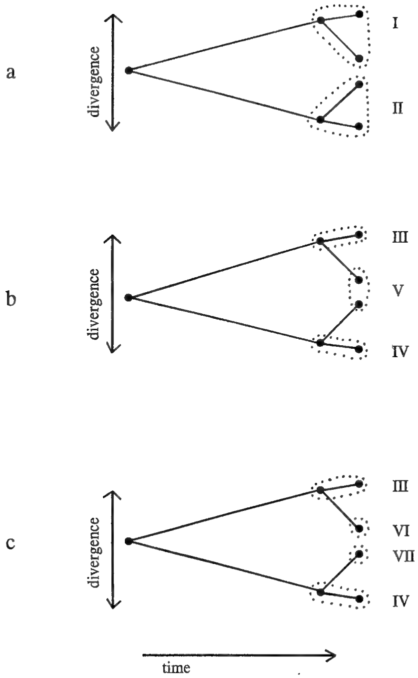

Figure 4. A hypothetical evolutionary tree and various classifications (a–c) for four extant species and two known fossils. Classification (a) would be acceptable to both traditional evolutionary taxonomists and cladists, since taxa I and II are monophyletic. Classification (b) would be more acceptable to a phenetic taxonomist, because taxon V reflects the similarity between the two species falling into it; but this taxon is polyphyletic, so the classification would be rejected by both traditional evolutionary taxonomists and cladists. The latter would also object to the paraphyletic taxa III and IV and so would also object to classification (c), though this would be acceptable to traditional evolutionary taxonomists. Whether one of the latter preferred (a) or (c) would depend on the weight he or she gave to divergence relative to phylogenetic relationship.

a matter of producing a hierarchy that reflects the inherent hierarchical clustering of nature. Species are grouped according to degrees of resemblance. In effect, species are seen as points in a multi-dimensional hyperspace, the dimensions corresponding to various characters and the positions along those dimensions being determined by how different the species are in respect of those characters. The phenetic taxonomist's job is to establish the dimensions, to measure positions and distances, and to recognise clusters (and the clusters of clusters . . .). Thus the pheneticist would apply classification (b) in Fig. 4; the fact that taxon V is polyphyletic is immaterial, since the taxa are units of resemblance not of phylogeny.

At first sight, phenetics is less subjective than traditional taxonomy because it requires no judgements about evolution. But, as Ridley (1986) and others have pointed out, it is possible to define and measure "similarity" in a variety of ways and the choice between them is entirely arbitrary; furthermore, a large variety of different methods is available for defining clusters and the choice is again arbitrary. Because the classifications produced may differ markedly according to which similarity measures and clustering methods are used, it is difficult to argue that phenetic methods are superior to traditional methods.

Distance-based evolutionary taxonomy

The extent to which single-strand DNA from two different sources produces hybrid double strands under specified conditions depends on the extent to which the two DNAs contain identical sequences, so such hybridization provides a measure of similarity. If it were true that evolution at the level of DNA (base substitution) proceeded in a steady, undirected, clock-like manner and provided that one could properly correct for the likely occurrence of changes that limit divergence (parallel changes in the two species and multiple changes, including reversals, at single nucleotide sites), then the similarity between species would reflect their evolutionary relationship (as in Fig. 3a). An essentially phenetic classification based simply on the degree of resemblance (of DNAs) would then have an evolutionary interpretation. However, the speed at which the "molecular clock" runs is clearly far from constant (Hillis & Moritz 1990) and the corrections required for parallelism, multiple hits and reversals are based on somewhat arbitrary assumptions. Furthermore, distance measures based on DNA–DNA hybridization are subject to considerable experimental error (Werman *et al.* 1990). It is for these reasons and others that the classification of Sibley & Ahlquist (1990) aroused so much controversy (see Sheldon & Bledsoe 1993, Harshman 1994). It has, nonetheless, become widely accepted, as have other classifications based on the idea that the degree of similarity (especially of DNAs) can be used as a direct assessment of evolutionary relationships.

Hennigian cladistics

Hennig (1950, 1966) revolutionised systematics by proposing clear, non-arbitrary methods for exposing the patterns of diversity that result from phylogenetic branching and for describing those patterns in an hierarchical classification. Both Ridley (1986) and Forey *et al.* (1992) present clear introductions to cladistic methods. Forey *et al.* describe its axioms as:

1. Nature's hierarchy is discoverable and effectively represented by a branching diagram.
2. Characters change their status at different hierarchical levels. Characters within a study group that are either present in all members of the study group or have a wider distribution than the study group (plesiomorphies) cannot indicate relationships within the study group.
3. Character congruence is the decisive criterion for distinguishing homology (synapomorphy) from non-homology (homoplasy).
4. The principle of parsimony maximises character congruence.

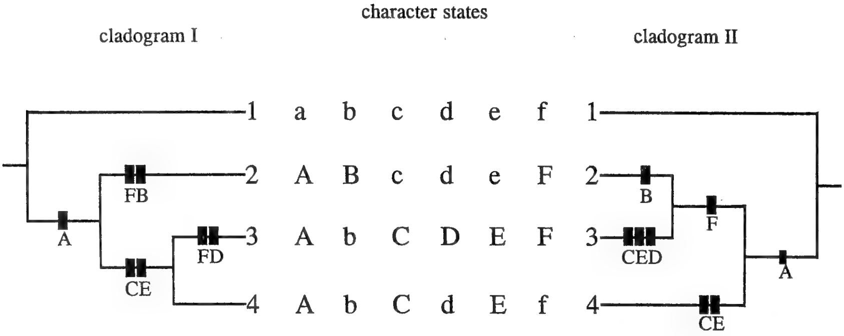

Figure 5. Two alternative cladograms for species 2, 3 and 4, based on six characters, for which the primitive states (seen in the 'outgroup' species 1) are represented by lower case letters and derived states by upper case letters. The dark bars represent points at which a primitive state changes to a derived state. Redrawn from Forey *et al.* (1992).

The branching diagrams produced by cladistic methods are referred to as cladograms. By "character congruence" is meant the co-occurrence of characters, such that they specify the same taxonomic group. Thus in cladogram I of Fig. 5, C and E are congruent (since they both occur in, and only in, the group 3–4) whereas F is incongruent with them (since it occurs not only in some, but only some, members of the group but also outside the group). Incongruencies imply convergent evolution. Cladogram II has fewer congruencies and more incongruencies than cladogram I, entailing more evolutionary changes and more convergences. By the principle of parsimony, cladogram I is preferred over cladogram II.

The stark clarity of cladistics is a recommendation in itself. Furthermore, it allows not only the process of cladogram building to be computerised but also the ready search for, and objective comparison of, alternative cladograms. Cladistics is not, however, completely objective and non-arbitrary: the taxonomist's judgment is important in defining characters and judging homology, in particular. The comparison of DNA sequences shows this up most starkly. Because sequences evolve both by substitutions of one nucleotide by another and by changes in number of nucleotides (by deletion or insertion), there are often various ways of explaining differences between homologous sequences, depending on the numbers of substitutions and deletions/insertions assumed; parsimony cannot fully resolve such cases because it is usually impossible simultaneously to minimise the number of substitutions assumed and to minimise the number of deletions and insertions.

Traditional evolutionary taxonomists have a more fundamental objection to cladistics than simply that it is not as objective in practice as it is in principle. This is that cladograms do not reflect the underlying evolutionary tree in the way that the traditionalists would like them to do. The problem lies with the cladists' rejection of paraphyletic groups, i.e. taxa which do not contain all the descendants of the common ancestor, such as taxon III in Fig. 4. One manifestation of the problem arises from traditional classifications attempting to show patterns of divergence as well as patterns of branching whereas cladistic classifications are concerned only with branching. For example, traditionalists separate the Class Aves from the Class Reptilia because of the great divergence of birds from reptiles, whereas cladists do not allow this because birds are descendants of the common ancestor of reptiles (indeed, they are, in branching terms, more closely related to crocodiles than either is to turtles or to lizards and snakes). Which classification better represents the evolutionary tree depends on one's view of the relative importance of branching and divergence. The second manifestation of the paraphyly problem is illustrated by Fig. 5, in which species 1 shows the primitive condition for all characters. Thus, on the evidence available, the most parsimonious view of the evolution of the four species in the Figure is that species 1 is the common ancestor of all of the others. However, cladistics involves recognising groups by homologies and has no means of distinguishing ancestor–descendant relationships. (Cladists would, indeed, argue that no-one has such means since, even if species 1 was represented in the fossil record at a time compatible with its being the ancestor of the others, there is no way of knowing that the fossil specimens were certainly ancestral to the other species.) Furthermore, to recognise species 1 in Fig. 5 as the ancestor of the other species would make that species itself a paraphyletic taxon, since it does not contain all its descendants. A practical example, if one assumes *Archaeopteryx* to represent the ancestor of all later birds, is that *Archaeopteryx* cannot be recognised (in a cladistic classification) as a genus equivalent to other avian genera, because it would then be a paraphyletic taxon. Cladists have attempted to resolve this problem in various ways, though none of the solutions produce classifications that non-specialists find easy to understand. Whether the matter will be resolved by non-specialists becoming sufficiently educated to be able to understand such classifications or by the partial acceptance of paraphyletic taxa, I am reluctant to predict.

Pattern cladistics

Pattern cladistics uses cladistic methods to produce classifications but it avoids the uncertainties involved in working out phylogenetic trees and the problems that arise if one tries to describe trees through classifications by ignoring evolution (for the purposes of classification). In brief, it concentrates on the pattern of organic diversity rather than on the process that produces the pattern. Ridley (1986) has argued that, once evolution is abandoned, there is no justification for cladism (it is reduced to just one arbitrary method among many for pigeon-holing animals and plants) but pattern cladists would reply that, to study evolution, one should describe the patterns first (without preconceptions) and then worry about the processes. They remain the major force in modern taxonomy and their methods have undoubtedly been useful in many systematic and biogeographical studies.

Topics addressed in the symposium

Endler (1989), in a balanced and illuminating review, has pointed out that not only is there a variety of different species concepts but that there are several major differences in the aims of species concepts and that different concepts have different uses. Much attention at the symposium, led particularly by Liversidge, by Zink and by Snow, focused on the relative merits of various species concepts, especially the *biological* and the *phylogenetic* species concepts. The latter, though it comes in various forms (see Cracraft 1983, 1989, McKitrick & Zink 1988, Nelson 1989), can be seen as a logical extension of cladistics to the species level, with its concentration on pattern rather than process. There is no doubt that, because of uncertainties associated with assessing the 'process' (potential interbreeding), defining biological species is not always easy or objective. Indeed, most evolutionary biologists would agree with Templeton (1989) that his "cohesion species concept" is generally more useful than the traditional biological ("isolation") species concept; but this still emphasises process rather than pattern. The phylogenetic concept may appear to resolve problems by concentrating on pattern but some of us remain to be convinced that it will prove more workable in practice. Indeed, disputes over trinomials (discussed at the symposium by Violani & Barbagli) are symptomatic of the difficulties of defining taxa at levels below that of the biological species. The well-known difficulties for the biological species concept of deciding whether or not to treat allopatric forms as separate species are paralleled for the phylogenetic species concept: if one applies the usual criterion under this concept that the two populations are to be specifically separated if they are diagnosably distinct, then one would separate two populations that differed at only a single genetic locus provided that difference was consistent; this would not generally be helpful, but the alternative is to impose an arbitrary rule about how much difference is required before one treats two forms as separate species—just as when applying the biological species concept to allopatric forms.

Which species concept one uses clearly has implications beyond systematics (some being explored at the symposium by Knox and by Collar) but in my view the critical points are ones that centre on systematics itself. Firstly, even though the process of speciation is usually gradual and not always a simple branching, the stage at which the genetic and ecological cohesion of a species breaks down to produce two or more separate daughter species (themselves internally cohesive) represents an important discontinuity; the separation itself favours more rapid genetic and ecological divergence, so there is a positive feedback. Secondly, the criterion of reproductive and ecological cohesion results in biological species having an objective existence in a way that other taxonomic levels do not—"the species is not an invention of taxonomists or philosophers, but it has a reality in nature" (Mayr 1988). That is why most modern philosophers of biology reject the idea that species are classes, though they may differ as to whether they are therefore to be described as individuals (see discussions in

Mayr 1988, Hoffman 1989, Sober 1993). Admittedly, this argument falls down if, like some cladists (Nelson 1989), one does not believe in species. Such extreme views should not lead us to conclude that the ideas involved in the phylogenetic species concept have nothing to offer in terms of improving our classifications. Equally, the occasional difficulties of applying the biological species concept should not lead us to abandon it, given its proven value in ornithology over the last half century.

The symposium was not only concerned with taxonomic principles and the consequences of applying different species concepts. Mikhailov's presentation on egg-shell structures reminded us of the constant search for new characters needed to resolve taxonomic problems. We were reminded of the intimate practical connection between classification and identification by Parkin's contribution on DNA-based methods for identifying individuals and their relationships and by Russell's presentation on identifying mummified falcons, where the nature of the material required the use of characters other than those normally employed.

Taxonomy is not just a subject for the specialists but a subject of importance for all biologists. The level of attendance and liveliness of debate at the symposium confirm ornithologists' current interests in avian taxonomy and the freshness of the presentations promise continuing developments of both ideas and methods.

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Species concepts

by Robert M. Zink

It is difficult to imagine a concept that impinges on more biological research than that of the species. Most biological studies refer to their subjects as members of some species (Hauser 1987). We are often taught that species are the only units in the classificatory scheme that exist independent of taxonomists; i.e. species are real. Given the importance of species in theories about evolution, ecology, and behaviour, faunal lists, and for communication of our understanding of biodiversity, lack of agreement about how biologists define species is surprising.

The species debate was evident in Darwin's time (1859), and has escaped general resolution in the last 130 years, except perhaps for the fact that most agree that the word species derives from Latin meaning 'appearance' with a secondary meaning 'kind'. Today the literature is replete with different definitions (Table 1). Some (e.g. Endler 1989) suggest that different species concepts are needed to study different evolutionary processes. Paleontologists must cope with incomplete fossil histories and absence of information on mating tendencies (Wiley 1978). Botanists must deal with reticulation, recognizing that a large percentage of all plant species, perhaps 50% or more, is of hybrid origin (Cronquist 1978). A large number of biologists claim to follow the so-called biological species concept (BSC; Mayr 1942), in which reproductive isolation is viewed as the crux of speciation. In the past 15 years, those coming from a background in phylogenetic systematics, or 'cladistics', have made substantial contributions to the debate about species, and have penned a number of 'phylogenetic' species concepts (Cracraft 1983, de Queiroz & Donoghue 1988, Nixon & Wheeler 1990). Although argument over species concepts has persisted for more than 100 years, it is my thesis in this paper that the contributions from phylogenetic systematics have substantively changed the nature of the debate. Furthermore, it is my opinion that the long-entrenched biological species concept is losing favour in ornithology (Zink & McKitrick 1995, Hazevoet 1996) and elsewhere (Mallet 1995).

Comparison of the species concepts given in Table 1 is beyond the scope of this review. Instead, I will contrast the biological species concept and a phylogenetic alternative. The reason for doing so is that I believe that the current debate about species concepts has come to focus on whether to give primary emphasis to a process, such as mate choice, or to correct representation of evolutionary patterns, such as those recovered by direct analysis of characters (Graybeal 1995). These two conceptual positions are embodied in the BSC and a PSC, respectively. Here I review each concept, noting some perceived strengths and weaknesses (Tables 2, 3).

The biological species concept has a long history in ornithology (Haffer 1992, Amadon & Short 1992, Bock 1986, Hauser 1987). A perceived advantage of this concept is that it is 'biological'. By

TABLE 1

Some species definitions or views on species

"No one definition has as yet satisfied all naturalists; yet every naturalist knows vaguely what he means when he speaks of a species." (Darwin 1859)

"A species is a set of populations capable of combining with each other but not with other similar sets of populations on the basis of affinity and co-direction in ecological specialization." (Shaposhnikov 1966)

"A species is a group of organisms not itself divisible by phenetic gaps resulting from concordant differences in character states (except for morphs such as those resulting from sex, caste, or age differences), but separated by such phenetic gaps from other such groups." (Michener 1970)

"We may regard as a species (a) the smallest (most homogeneous) cluster that can be recognized upon some given criterion as being distinct from other such clusters, or (b) a phenetic group of a diversity somewhat below the subgenus category, whether or not it contains distinct subclusters." (Sneath & Sokal 1973)

"Somit ist die Art als das Kollektiv von Lebewesen zu bestimmen, das gemeinsam eine ökologische Nische behauptet." (von Wahlert 1973)

"Species may then be defined as groups of phenetically similar populations that have the capability to interbreed, and share similar ecological characteristics." (Doyen & Slobodchikoff 1974)

"Species, then, are the most extensive units in the natural economy such that reproductive competition occurs among their parts." (Ghiselin 1975)

"A species is a lineage (or a closely related set of lineages) which occupies an adaptive zone minimally different from any other lineage in its range and which evolves separately from all lineages outside its range." (Van Valen 1976)

"Species are the smallest groups that are consistently and persistently distinct, and distinguishable by ordinary means." (Cronquist 1978)

"A species is a single lineage of ancestral descendant populations of organisms which maintains its identity from other such lineages and which has its own evolutionary tendencies and historical fate." (Wiley 1978)

"A 'species' is merely a population or group of populations defined by one or more apomorphous features, it is also the smallest natural aggregation of individuals with a specifiable geographic integrity that can be defined by any current set of analytical techniques." (Rosen 1979)

"A species is a group of animals or plants all of which are similar enough in form to be considered as minor variations of the same organism. Members of the group normally interbreed and reproduce their own kind over considerable periods of time." (Trueman 1979)

"A species is a diagnosable cluster of individuals within which there is a parental pattern of ancestry and descent, beyond which there is not, and which exhibits a pattern of phylogenetic ancestry and descent among units of like kind." (Eldredge & Cracraft 1980)

"Species are simply the smallest detected samples of self-perpetuating organisms that have unique sets of characters." (Nelson & Platnick 1981)

"Each species is an internally similar part of a phylogenetic tree." (Willis 1981)

"We can, therefore, regard as a species that most inclusive population of individual biparental organisms which share a common fertilization system." (Paterson 1985)

"An 'evolutionary species' is a single lineage of ancestor–descendant populations which maintains its identity from other such lineages and which has its own evolutionary tendencies and historical fate." (Wiley 1978)

"A species is what a good taxonomist says it is." (Anon.)

TABLE 1 *continued*

"At the outset I confess a disbelief in species, as that word is commonly understood to refer to the basic taxonomic unit or to the taxonomic unit of evolution . . . There seem to be no basic taxonomic units and no particular taxonomic unit of evolution . . . and as Agassiz said in 1859 'species do not exist in nature in a different way from the higher groups'." (Nelson 1989)

". . . species as the most inclusive group of organisms having the potential for genetic and/or demographic exchangeability." (Templeton 1989)

A species is "the smallest aggregation of populations (sexual) or lineages (asexual) diagnosable by a unique combination of character states in comparable individuals (semaphoronts)". (Nixon & Wheeler 1990)

Species "refer to groups of actually or potentially interbreeding populations isolated by intrinsic reproductive barriers from other such groups. Evidence for reproductive barriers . . . will involve concordant genetic differences among the populations involved". "Subspecies are groups of actually or potentially interbreeding populations phylogenetically distinguishable from, but reproductively compatible with, other such groups. Importantly, the evidence for phylogenetic distinction must normally come from the concordant distributions of multiple, independent, genetically based traits." (Avise & Ball 1990)

"Species are groups of actually or potentially interbreeding natural populations, which are reproductively isolated from other such groups." (Mayr 1942)

"A species is a reproductive community of populations (reproductively isolated from others) that occupies a specific niche in nature." (Mayr 1982)

"A species is the smallest diagnosable cluster of individual organisms within which there is a parental pattern of ancestry and descent." (Cracraft 1983)

Species are "lineages whose components (if distinguishable) are not incontrovertibly on different phylogenetic trajectories (i.e. sublineages, if distinguishable, are reproductively compatible), as long as these sublineages do not form a paraphyletic group in recovered history". "The species category . . . would represent the largest entities that *have evolved* whose parts, if distinguishable, are not likely to be on different phylogenetic trajectories." (Frost & Hillis 1990)

"if a given historical group of hybridogens is persistent and is not affecting the evolutionary trajectory of its Mendelian ancestor (as indicated by biogeography, habitat preferences, or genetic divergence), it should be considered a separate species." (Echelle 1990)

A species is the "smallest recognizable monophyletic or unresolved unit". (Donoghue 1985)

"Phylogenetic species can be delimited by a procedure (population aggregation analysis) that involves a search for fixed differences among local populations, followed by successive rounds of aggregation of populations and previously aggregated population groups that are not distinct from each other." "descent relationships among [phylogenetic species] must be hierarchic." (Davis & Nixon 1992)

observing birds from differentiated groups that interact in sympatry, one can determine if they mate assortatively. Because we observe the birds themselves choosing mates, this is deemed 'biological'. However, there is nothing 'non-biological' about the evolution of groups of individuals, the hallmark of the PSC, and the BSC cannot make a claim to be uniquely biological. Perhaps the 'B' in 'BSC' should stand for behavioural.

TABLE 2

Perceived strengths and weaknesses of the biological species concept (see Cracraft 1983, McKitrick & Zink 1988, Zink & McKitrick 1995, Zink 1996b)

Perceived strengths
- Reproductive isolating mechanisms objective in sympatry
- Reproductive isolation=genetic closure of a lineage

Perceived weaknesses
- Amount of hybridization required for conspecifity is vague
- Stable hybrid zones are difficult to assess
- Time to fusion is potentially enormous
- Allopatric populations are judged subjectively
- Evidence of evolutionary pattern is "overruled" by actual or presumed interbreeding
- Non-historical species result because hybridization is not limited to sister taxa
- Reproductive isolation is an epiphenomenon, not a directly measured characteristic of allopatric populations

TABLE 3

Perceived strengths and weaknesses of a Phylogenetic Species Concept

Perceived strengths
- Species limits are consistent with recovered phylogenetic patterns
- Same procedures used for species limits as for higher taxonomic categories
- Based directly on character variation, not an epiphenomenon such as mate choice
- Better description of spatial patterns of biodiversity
- Produces units required by evolutionary theories and conservation biology

Perceived weaknesses
- Lower limits of species require careful study of variation
- Limits of diagnosability problematic
- Too many species will result
- Species might be too ephemeral

The crux of the BSC is that species are reproductively isolated—they have reached that stage in evolutionary divergence where members no longer recognize individuals in other species as mates, or if they do, their offspring are of reduced fitness. Conversely, taxa that are reproductively compatible, especially if they interact in sympatry and form a hybrid swarm, are considered to be conspecific. Thus, the *process* of mate choice is accorded primary significance in determining whether two taxa are to be considered one or two species. This view has intuitive appeal, although I believe that the theoretical and practical flaws with the BSC are insurmountable.

One might argue that in practice the BSC cannot be deemed of primary significance because taxonomists working with some of the most speciose groups actually do not appear to use it. It would be hard to argue (see Whittemore 1993) that botanists use the BSC when delimiting species, given the propensity of plants to hybridize. Similarly, it is doubtful if entomologists (perhaps excluding lepidopterists) use the BSC, depending instead on morphological differences to recognize most species boundaries. If botanists and entomologists do not generally apply the BSC when describing species, it follows that the bulk of the world's biodiversity is classified primarily by a non-BSC paradigm.

Controversy has surrounded the BSC since its inception (Donoghue 1985, Mallet 1995), although many believe that it has survived the tests of time (Coyne *et al.* 1988). Many problems with using the BSC are familiar (Cracraft 1983), such as the need to speculate whether allopatric populations are reproductively isolated (e.g. Thompson 1991). Zink & McKitrick (1995) reviewed how the significance of hybridization has been misconstrued by proponents of the BSC. It has been implied that hybridization might 'erase' evolved differences between two taxa. However, fusion of hybridizing taxa will likely require long time periods (Zink & McKitrick 1995). Thus, the BSC has been criticized, rightly in my opinion, for basing species limits on what might happen in the future rather than what has happened during the evolutionary past (Cracraft 1983).

The primary new criticism of the BSC to emerge from the writings of phylogenetic systematists is the recognition that reproductive isolation often does not evolve concomitantly with characters that delimit evolutionary taxa, especially in the early stages of divergence. Within many biological species we can recognize separate evolutionary groups, and analyses of their relationships can suggest a pattern that is inconsistent with the pattern of reproductive compatibility—i.e., two hybridizing taxa might not be each other's nearest relatives. A 'species' consisting of two or more groups that are not each other's nearest relatives is unacceptable to modern systematists. In systematics terms, reproductive compatibility is an ancestral condition, because individuals in the ancestral population recognized each other as mates (Rosen 1979). To use the primitive ability to hybridize (perceived in allopatry or documented in sympatry) as a grouping criterion for species limits, as the BSC requires, violates the way in which systematists unite taxa in an evolutionary manner—by possession of shared-derived (i.e. non-ancestral) characters (Rosen 1979). Species limits based on reproductive compatibility (BSC) or patterns of character variation (PSC) can conflict and lead to different species limits from the same data set (Frost & Hillis 1990) (see Fox Sparrow *Passerella iliaca* example below).

The above comments do not mean that advocates of a PSC consider reproductive isolation uninteresting or unworthy of study. Indeed, one could argue that without reproductive isolating mechanisms, the world's species diversity would be kept low because taxa could not become sympatric. Reproductive isolation is an inevitable but temporally unpredictable by-product of evolutionary divergence (McKitrick & Zink 1988). At some point in evolutionary divergence, nearly all differentiated taxa are reproductively isolated, and all reproductively isolated taxa are likely to be 'good' phylogenetic species. I suspect that all species concepts recognize reproductively isolated taxa as different species. However, between the time of the emergence of taxa on their own evolutionary trajectories (as evidenced by characters) and their eventual reproductive isolation, the pattern of reproductive compatibility is an unreliable predictor of historical relationships of taxa. Although recognizing the intrinsic importance of reproductive isolation, users of a PSC choose not to include this information in the delimitation of species (Frost & Hillis 1990). In fact, proper study of the evolution of an attribute such as reproductive isolation requires first that historical patterns among taxa are known (Brooks & McLennan 1990). The potential for non-historical groupings together with the other often-noted problems (e.g. Donoghue 1985) leads to the inevitable conclusion that the BSC should be replaced with a concept that correctly represents history.

Debate continues over how to use information on evolutionary pattern to delimit species. For example, several phylogenetic species concepts exist (Table 1). Davis & Nixon (1992) suggest that the phrase "phylogenetic species concept" is misleading because the point is to delimit terminal taxa *for* phylogenetic analysis, and they describe a process whereby phylogenetic analysis does not play a role in species delimitation. Rather, they show how morphological or molecular character evidence can be used alone to delimit species. Unlike the BSC, characters are not weighted by their presumed role in a process such as mate choice. Nonetheless, common to history-based concepts, including the evolutionary species concept (Wiley 1978), is the (1) rejection of reproductive compatibility as the primary criterion of conspecific status, and (2) recognition that species can hybridize owing to the retention of the ancestral ability to do so. In my opinion, the crux of a phylogenetic species concept is to recognize groups of individuals that have been on independent evolutionary trajectories. Evaluation of multiple characters does not allow further subdivision of such groups. That is, a PSC attempts to recognize the *status quo*—character analysis reveals groups of individuals that qualify as basal evolutionary units (Cracraft 1983, 1989). Nonetheless, ongoing debate revolves around how best to recognize history at the population level (Davis & Nixon 1992, Zink & McKitrick 1995).

Several criticisms of phylogenetic species concepts exist. Avise & Ball (1990) suggested that with modern molecular methods, each individual would be diagnosable, and might qualify as a separate phylogenetic species. Indeed, if one studied individual gene genealogies (i.e. single characters), one would likely be able to circumscribe groups of individuals on a gene-by-gene basis that are not mutually exclusive, historical entities (see Maddison 1995). One might then think they are forced to recognize individual organisms as phylogenetic species to escape the problem raised by conflicting gene genealogies. However, the opposite trend is actually true. One uses multiple (unweighted) characters and resolves conflicts by an explicit *a priori* criterion (e.g. Davis & Nixon 1992). Species limits are set where character evidence becomes maximally congruent. Some character conflicts might remain, as they do in most phylogenetic studies. Thus, rather than species being single individuals, species often will become geographically coherent groupings of individuals. Resolution of conflicting character

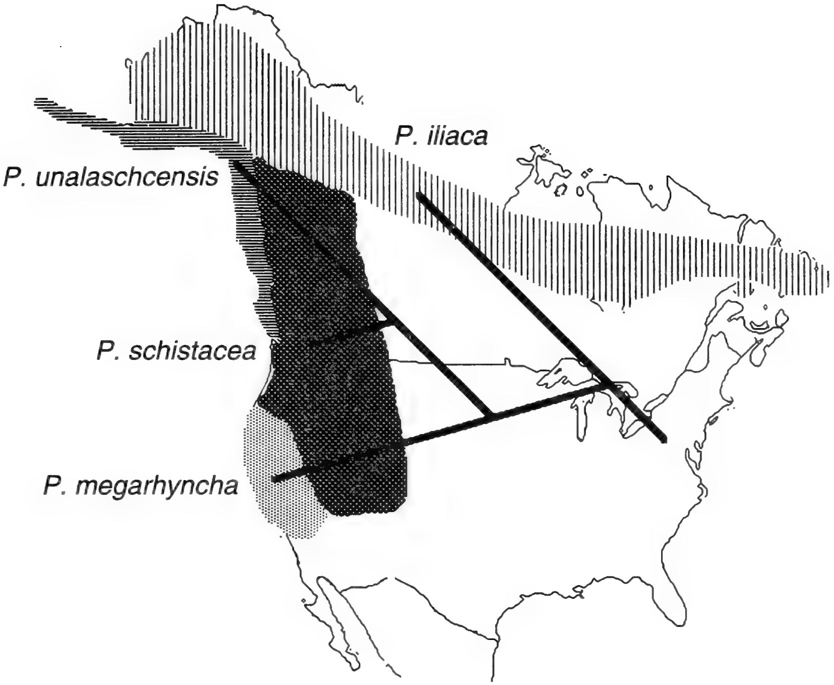

Figure 1. Approximate breeding distribution of four phylogenetic species of the Fox Sparrow *Passerella iliaca*. Phylogenetic tree derived from pattern of restriction sites (Zink 1994).

distributions (e.g. gene genealogies) results in more, not less, inclusive groupings of individuals. The mistaken belief that advocates of a phylogenetic species concept rely on single characters to delimit species has misled several authors (e.g. Amadon & Short 1992). Put another way, a problem with avian subspecies is that they are often based on single characters, and analysis of other characters can suggest different subspecific limits (see below). No taxonomic category, species or otherwise, will likely be based on single characters (Barrowclough 1982).

Differences between biological and phylogenetic species concepts are illustrated by studies of the Fox Sparrow *Passerella iliaca*. In North America, Fox Sparrows range over the taiga, northwest coast, and mountainous regions of the west (Fig. 1). There is considerable phenotypic variation, partitioned by taxonomists into 18 subspecies. However, four basic groups exist: *iliaca*, *unalaschcensis*, *megarhyncha*, and *schistacea*. Each of the four groups was originally recognized as a separate species. The Fox Sparrow is currently considered a single biological species because each group is known to hybridize with at least one other group, although only a few hybrid specimens between *iliaca* and *unalaschcensis* are known (Zink & McKitrick 1995). Zink (1994) found that each of the four groups possessed a distinct set of mitochondrial DNA haplotypes. Thus, both genetic and morphological evidence reveal four groups of individuals with separate evolutionary histories—hence, four likely phylogenetic species. (Note that molecular analysis did not indicate a greater number of taxa than that apparent from morphological comparisons.) Zink (1994) suggested, however, that further study of morphology was needed to test and refine species limits.

The question of how many biological species of Fox Sparrow exist depends on how one interprets the evidence on hybridization. An extreme view supports one species, because at least a trickle of genes links all parapatric forms. A moderate view might envisage three species, *iliaca*, *unalaschcensis*, and (*megarhyncha* plus *schistacea*). The latter grouping would obtain because of a narrow hybrid zone between the latter two taxa (Zink 1994).

The main problem in interpreting biological species limits in the Fox Sparrow concerns *megarhyncha* and *schistacea*. MtDNA evidence reveals a narrow hybrid zone between the two groups (Zink 1994). The zone seems broader when morphometric patterns are considered. The stability of the zone is unknown, a factor critical in interpreting biological species limits (Mayr 1982, Zink & McKitrick 1995). If the hybrid zone was stable, Mayr (1982) would consider *schistacea* and *megarhyncha* to represent two species because there was an unknown barrier to complete introgression despite random mating in the zone. Because the zone appears to be between two non-sister taxa, it is probably one of secondary contact (Cracraft 1989) between two phylogenetic species that have retained the primitive ability to hybridize. This study therefore illustrates the problem identified with the BSC by phylogenetic systematists (e.g. Rosen 1979); other avian examples are found in Moore *et al.* (1991) and Freeman & Zink (1995). Lumping *schistacea* and *megarhyncha* into a single species would mis-represent evolutionary history, because although they hybridize extensively, they are not each other's nearest relatives (Fig. 1). It could take tens of thousands of generations for significant introgression to occur (Zink & McKitrick 1995). The PSC would recognize the *status quo*, namely that these two taxa have had independent evolutionary histories and are therefore (phylogenetic) species. Biological species limits depend on one's interpretation of how much (or little) hybridization is required. BSC advocates could therefore recognize 1, 2, 3, or 4 species (which should challenge the belief of those who think that species are real entities of nature). However, a non-historical species including only *megarhyncha* and *schistacea*, permissible under the BSC, would be of no intrinsic value in phylogeny studies, speciation research, biogeography, comparative biology or conservation. I can think of few studies that would intentionally use this classification. Non-historical taxa, then, are the Achilles heel of the BSC.

It is worth noting that the inconsistent relationship between patterns of evolution among populations and their reproductive isolation has only recently been recognized, in part owing to molecular systematics. Molecular methods, such as DNA sequencing, can resolve evolutionary relationships over short evolutionary time scales, such as within biological species. Prior to molecular analysis, relatively little attention focused on phylogenetic relationships among, for example, subspecies (including those in the Fox Sparrow). Molecular studies can, of course, reveal taxa 'invisible' to morphologists, but more often they elucidate inter-relationships of closely related taxa. Thus, the BSC was invented and used commonly before it was realized that hybridizing taxa might not be sister taxa, and that the pattern of hybridization might misrepresent the true pattern of evolutionary history. Now, however, molecular phylogenetic analysis and classification (i.e. cladistic) methods that require taxonomic boundaries to be faithful to evolutionary ones, mean that the BSC is not an appropriate species concept.

Given the historical usage of the BSC in ornithology, one might wonder if it can be salvaged. The BSC would be improved if subspecies were phylogenetic species that were not reproductively isolated. Species would be required to be consistent with recovered patterns of history (thus, the 'Fox Sparrow' would be either one, two or four species, but one would not accept a species consisting solely of *megarhyncha* and *schistacea* given the pattern of history suggested in Fig. 1). Notwithstanding potential improvements to the BSC, 'species' would still contain variable numbers of basal evolutionary taxa, and thus not be comparable. Also species membership of allopatric subspecies would be judged subjectively, and still one would have to guess whether an allopatric taxon was reproductively isolated rather than emphasizing directly observable character variation. I think that scientific studies require more of species concepts than can be accomplished by re-modelling the BSC.

Implementation of a phylogenetic species concept would remove another contentious area from avian systematics, the subspecies category. Many practising avian taxonomists have in mind a certain 'level of distinctness' required to elevate a subspecies to species; unfortunately, this level varies from taxonomist to taxonomist because of subjective character weighting. Under a PSC, there is no need for the subspecies category (McKitrick & Zink 1988). I suggest that this would be beneficial because of the many avian subspecies that represent arbitrary divisions of clines, or are based on characters not supported by, or conflicting with, other characters. Thus, there would be a single taxonomic category for basal evolutionary taxa—phylogenetic species.

Mayr (1993) was concerned that implementation of a PSC would double the number of biological species of birds (*c.* 9000) recognized worldwide. Mayr implied that this number of species would hinder ornithological research. If this were so, botanists and entomologists surely would be unable to conduct research. G. F. Barrowclough, J. Cracraft & R. M. Zink (unpubl. data) estimated that *c.* 18,000 species of birds exist, using the PSC. This estimate was reached by evaluating morphological evidence that was gathered by previous avian taxonomists for subspecies designations; in fact, many subspecies did not qualify as phylogenetic species (see Hazevoet 1996). This number of species can hardly be perceived as a negative aspect of a PSC (Cracraft 1992). I suggest that it would (1) more accurately portray avian species diversity (Moritz 1994, Rojas 1992, Cracraft 1997), and (2) put the assessment of avian biodiversity on a more comparable footing with other groups of organisms.

Martin (1996) suggested that use of molecular methods would drastically inflate the number of avian phylogenetic species, many of which would be recognizable only with sophisticated molecular tools (i.e. beyond field identification). Zink (1996a) suggested that the number of new species that were diagnosable only through molecular analyses would in fact be relatively low, and that most taxa supported by molecular analyses also have morphological characteristics (Zink *et al.* 1995). The doubling of the number of bird species mentioned above (G. F. Barrowclough *et al.*, unpubl. data) was based solely on morphological criteria. At the Linnean symposium from which this paper derives, two independent speakers estimated the number of phylogenetic species for particular areas by examination of published (morphological) taxonomies. Thus, I doubt that molecular analyses will reveal many species that are 'invisible' to field workers (see the Fox Sparrow example above), and even if they did, would we recognize as valid components of our biodiversity only those taxa that could be identified with binoculars and a certain level of expertise?

A phylogenetic species concept would also benefit conservation biology (Cracraft 1997). Today, under the BSC, one needs to argue that sometimes local populations, subspecies, or species are units that should be targeted for conservation efforts. In my opinion, many non-systematists (and systematists) view this inconsistency as unscientific. Under a phylogenetic species concept, phylogenetic species would become the category for conservation biology. The explicit goal would be to preserve biodiversity at its most basic spatial scale. It might be thought that some phylogenetic species, formerly 'only' subspecies, would be indefensible for conservation efforts. Because conservation efforts are likely to move from the level of individual species to communities, patterns of species diversity will be used to define conservation entities, such as reserves that capture the bulk of areas of endemism. Spatial patterns of species diversity are most consistently and precisely described under a PSC.

Is the species debate important? Clearly, if different species concepts lead to different species limits given the same data, the answer is yes. The species debate is not a semantic battle between cladists and evolutionary taxonomists. Many researchers are studying speciation. If we cannot agree on a concept of species, how can speciation be effectively studied (Zink 1996b)? If we are discussing how to preserve biodiversity, and species are our measure, species concepts are extremely important. If we use species in evolutionary theories, or comparative studies (Brooks & McLennan 1990), we must be in agreement about how they are described. We must understand properties of species under differing concepts and determine that these properties are what our theories and uses of species require. Researchers should recognize the impact that different species concepts can have on their research, and explicitly consider whether their research programme depends on which concept is used.

Today, the seemingly perennial species debate has been materially changed by contributions from phylogenetic systematics, and has come to involve whether to represent evolutionary history faithfully by species limits. I think that the BSC is theoretically flawed because it can lead to, and accept, misleading historical groupings, and because there has not been a satisfactory resolution to the problem of classifying allopatric populations. Problems with a PSC involve mainly practical ones, such as how to delimit basal taxa, an impressive start at which was made by Davis & Nixon (1992). Although there will be phylogenetic species whose limits are 'fuzzy' owing to the dynamic nature of evolutionary change, and specific individuals difficult to place into a particular species, I think that these problems are far less important than the theoretical and practical ones encountered by applying the BSC. Giving primacy to correct representation of history should be the basis of our species concept, and it will produce species that are best (not perfectly) suited to the majority of biological uses to which they are put. A species concept consistent with a phylogenetic species concept should be adopted in ornithology, replacing the BSC.

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Summary

The debate over species concepts is in an active phase. After years of acceptance of the biological species concept (BSC) in ornithology and other disciplines, the field of phylogenetic systematics has contributed a significant new challenge. Reproductive isolation, the hallmark of the evolution of biological species, does not necessarily evolve in concert with characters that reflect the pattern of population subdivision. That is, taxa on independent evolutionary trajectories, only some of which might be reproductively isolated, can exist within biological species. Therefore, setting species limits consistent with patterns of reproductive compatibility can lead to species limits that misrepresent evolutionary history because hybridizing taxa might not be each other's nearest relatives. A phylogenetic species concept (PSC) equates species with groups of evolutionarily distinct groups of individuals that cannot be further subdivided by analysis of multiple characters, irrespective of mating tendencies. It requires that species limits are consistent with known patterns of evolutionary history. The PSC recognizes that (phylogenetic) species can hybridize because they retain the primitive ability to do so. The debate over species concepts currently focuses on whether to give primary emphasis to reproductive isolation and the process of mate choice (BSC), or to historical patterns of character variation (PSC); this distinction results in different species concepts leading to different species limits given the same data, such as in the example discussed of the Fox Sparrow *Passerella iliaca*. I suggest that a version of the PSC should replace the biological species concept. This would serve several useful functions, such as (1) making species of birds more equivalent with species in other major taxonomic groups, (2) providing an objective method for classifying allopatric populations, (3) removing the contentious category of subspecies, and (4) ensuring that species limits are consistent with recovered historical patterns. Fears that a PSC coupled with molecular methods would produce too many species are unfounded. The units required by phylogenetic analyses, comparative ethological, evolutionary and ecological studies, biogeography, and conservation biology are in practice phylogenetic species; biological species can fail these needs.

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Should the biological be superseded by the phylogenetic species concept?

by D. W. Snow

A controversy of fundamental importance has been developing in animal taxonomy in recent years, and is beginning to have practical effects on ornithology. It is the argument that the long-accepted biological species concept (hereafter BSC)—as expounded notably by E. Mayr in influential publications since 1942—is fundamentally flawed and should be replaced by the concept of the 'phylogenetic species'. Hazevoet's (1995) excellent check-list of the birds of the Cape Verde Islands, the latest in the B.O.U. check-list series, adopts the phylogenetic species concept (hereafter PSC), and is the first authoritative work on an entire, though small, avifauna to do so. Cracraft's (1992) reclassification of the birds-of-paradise was the first, and still remains the only, such treatment of a bird family; Livezey (1991, 1995a, b) has applied the PSC to three tribes of the Anatidae.

The principles underlying the PSC have been expounded by Cracraft (e.g. 1983, 1987, 1992), Sluys (1991) and several other authors in the U.S.A., where the concept originated; McKitrick & Zink (1988) have advocated its use in ornithology. For most British readers the most accessible, concise introduction to it will be the clear and forceful 4-page exposition by Hazevoet in Appendix 4 to his check-list.

The purpose of the present paper is not to discuss at length the arguments for and against different species concepts. This has been done in a number of publications, including those mentioned above. Its main purpose is to mention briefly what seems a fundamental weakness of the PSC; to argue that the flaws in the BSC, while not being denied, have been exaggerated; and finally to discuss in greater detail the practical difficulties that would be encountered in any attempt to apply the PSC wholesale in avian taxonomy.

The phylogenetic species

Cracraft (1983) defines a phylogenetic species as "the smallest diagnosable cluster of individual organisms within which there is a parental pattern of ancestry and descent". Other definitions have been given, but all agree that the species should be defined as the smallest distinct group or population of common (monophyletic) ancestry; that individuals within the group must normally interbreed only with other members of their group; and that whether or not they are reproductively isolated from members of other such groups (in the sense of not interbreeding successfully with them in the event of their coming into contact) is not relevant to their species status. Species are therefore the present end-products of evolutionary change, or "evolutionary units".

It is at once obvious that, if the PSC is adopted, there will be a huge increase in the number of bird species. The species recognised will comprise every monotypic species and many of the subspecies recognised under the biological species concept. The total will increase from *c.* 9000 to perhaps 20,000 (the latter figure based largely on guesswork; many of the 27–28,000 subspecies and monotypic species estimated by Mayr & Gerloff (1994) would not be recognised as phylogenetic species—see below). One must agree with Hazevoet (1995), however, that the sheer number of species recognised under any species concept should not in itself be a factor of any importance in the argument, which is based on principle not convenience. The critical issues are two: first, whether the PSC is biologically sounder than the BSC; and second, whether its application would be practicable.

Validity of the biological species concept

The BSC is now so well entrenched in almost all standard ornithological literature that it is taken for granted by all ornithologists who are not primarily taxonomists, and by most taxonomists too. But there are difficulties in applying it, some of which are in practice insuperable. Insuperable practical difficulties do not, of course, prove that the concept is unsound. The main criticisms of the BSC—defined as "groups of actually or potentially interbreeding natural populations which are reproductively isolated from other such groups" (Mayr 1942), with later variants which are not fundamentally different—are threefold: (1) that it is 'process-based', that is, based on an inferred speciation process, not on a rigorous analysis of taxonomically valid characters; (2) that the criterion of reproductive isolation is almost always untestable, so that informed guesses have to be made about the status of more or less closely related allopatric populations; and (3) that the polytypic species recognised under the BSC are not single irreducible evolutionary units; some (monotypic species) are, others (polytypic species) are not. Other objections that have been made seem less crucial, as they result largely from misapplication of the BSC through insufficient knowledge or inadequate analysis; for instance, that some polytypic species later turn out not to be monophyletic (with the likelihood that there are other such, not yet detected).

It cannot be denied that the first two of these major criticisms have some validity. The first is valid insofar as it reflects on the way in which some bird taxonomists have worked in the last 50 years; but as is argued below, cladistic analysis of taxonomic characters would in the great majority of cases almost certainly confirm the validity of the assemblages recognised by the BSC as polytypic species. The second criticism has long been recognised as the main stumbling block preventing a consistent and generally accepted application of the BSC. Decisions about the specific status of well-marked allopatric forms *are* somewhat arbitrary. They may even seem to be susceptible to changing fashions, as shown by the present trend towards giving species status to forms that have previously been treated as subspecies. In fact, such changes are usually a consequence of fuller knowledge of vocal differences and other potential isolating mechanisms; but see Collar

1997 (p. 130 in this issue). If the allopatric model of speciation is valid—and proponents of the PSC do not argue against it—this problem is to be expected. In any process of gradual change from one category to another there will be borderline cases; indeed it seems, as mentioned below, that the PSC encounters the same problem.

The third main criticism of the BSC is of a rather different kind. It concerns a matter of definition, and in my view is a main weakness of the PSC. It is not at once obvious why it is right to define species in the way the PSC defines them, rather than in the way the BSC does. Why, in fact, should all the distinct, even if only slightly distinct, 'end twigs' of the avian family tree be ranked as species? I know of no convincing answer. The idea seems to have a quasi-philosophical rather than a biological basis, and tends to be presented as dogma. Thus Cracraft (1992) writes: "The proper taxonomic framework for counting biological diversity resides with taxa of species rank, not with subspecies as required by the biological species concept." One is at liberty to disagree, and to answer that it is equally proper to use subspecies (as well, of course, as monotypic species). I suggest that this is a matter of opinion, not of science.

Defence of the BSC, at least in birds, can be argued more positively. Surely any ornithologist who has studied any group of birds with a wide geographical range (except perhaps some oceanic birds) must be convinced of the reality of what we have become accustomed to call 'polytypic species', however the units comprising them may be designated by taxonomists. The facts are so well known that it may seem unnecessary to labour them, but in the present context it is necessary. Typical Blackbirds *Turdus merula*—differing slightly in colour, but more in size and proportions; some very large, some very small, some of intermediate size; with rather different wing-shapes depending on whether they are migratory, resident, confined to oceanic islands, etc.—comprise an assemblage of forms which not only differ from other such assemblages but only make evolutionary sense on the assumption that they have been derived from an ancestral form probably centred on the west Palaearctic. This is an inference arrived at, not perhaps by cladistic analysis of all valid taxonomic characters (though such an analysis would almost certainly support the relatedness of the members of the assemblage), but by that generally very reliable computer, the unaided human brain. The fact that there are other more distinct, allopatric *merula*-like forms in the east Palaearctic and Oriental regions (*maximus* of the Himalayas, *mandarinus* of China, the *simillimus* group of the Indian subcontinent), and that it is impossible with present knowledge to know which, if any, of them might prove to be reproductively isolated, i.e. behave as separate species, from west Palaearctic *merula*, may be inconvenient for those wanting a stable taxonomy but is entirely consistent with the allopatric (Mayrian) model of speciation. The difficulty of deciding the taxonomic status of *merula*-like birds in the east is reasonably explained by their longer geographical isolation from western Blackbirds, and the very different environmental influences to which they have been subject and become adapted.

This kind of pattern of variation is all-pervasive; its details are summarised in regional handbooks, and dealt with in greater detail in monographs and other specialised publications. Attention is usually drawn to cases in which there is doubt as to the best taxonomic treatment under the BSC. Revisions are often made, as further data become available, but the main framework, based on the polytypic species, remains intact. It is reasonable to argue that the onus is on the advocates of the PSC to show, not only that the BSC is not a satisfactory framework for the classification of the different kinds of birds existing in the world today, but also that adoption of the PSC would be fraught with fewer problems.

Problems of the PSC

Cracraft's (1983) definition of a species has been quoted above. Nelson & Platnick (1981) give a very similar definition: "Species are simply the smallest detected samples [=populations, presumably] of self-perpetuating organisms which have unique sets of characters". In both definitions, the essential points are that they are the smallest groups of individuals and that their set of characters is diagnosable as unique. This seems simple enough, but the application of the definition would in very many cases be by no means easy. In the first place, the samples available are often not very large; in birds, their effective size would be further reduced by the need to compare specimens of the same age and sex class, and with plumage in a comparable state (breeding or non-breeding, degree of wear, etc.). Size differences may often be critical; but in passerines, for example, first-year birds are usually a little shorter-winged than older birds, and it is not always easy to distinguish them by plumage. Slight colour differences, which may be diagnostic in fresh plumage, may not be apparent in worn plumage. For the BSC, such sources of variation may make it hard to assess subspecies, but it is well understood that there may be differences of opinion about subspecies; it is not very important. For the PSC, where the decision affects the recognition or non-recognition of a species, the problem is acute. Two examples from the west Palaearctic may illustrate the kind of difficulty that will make application of the PSC hard to achieve with any hope of a consensus or of stability.

The kind of geographical variation shown by *Turdus merula* has already been mentioned. At the two extremes of size (based on male wing-length) are *T. m. maximus* of the Himalayas (144–167 mm) and *T. m. azorensis* from the Azores (117–127 mm). *T. m. maximus* should perhaps be treated as specifically distinct from the west Palaearctic forms under either of the debated species concepts; not only is it huge, but it differs quite markedly in plumage, and also in song and calls (Roberts 1992). But leaving aside *maximus*, *T. m. intermedius* of the central Asian mountains, which has typical *merula* plumage, is also very large, with a long bill, its wing-length (130–143 mm) falling outside the range of *azorensis*. *T. m. syriacus*, of Turkey and the Levant, may form a link with the European populations, being intermediate in size, but further study of these central and southwest Asian populations would be needed in order to establish how isolated they are from one another and whether variation is clinal. At the bottom end of the size range, *T. m. cabrerae* of Madeira and the Canary Islands (122–129 mm) is about as small as *azorensis*; it differs form *azorensis* in having darker female plumage, a less rounded wing, and a slightly longer tail. There is some variation within the Canary Islands, which needs further study. In Europe and North Africa, between the very large eastern continental populations and the very small Atlantic island populations, there is clinal variation which the BSC recognises by a number of subspecific names. It is generally admitted that their boundaries cannot be exactly defined (e.g. Cramp 1988).

If there is some difficulty under the BSC in deciding whether the eastern Palaearctic and Oriental groups of Blackbird-like forms should be treated as conspecific with *merula*, the problem for the PSC would involve the whole range, from the Atlantic islands to China. The Azores population would certainly be a phylogenetic species; the Madeiran and Canary Islands populations would demand detailed study. They are certainly isolated from one another and further research, including molecular analysis, would very likely bring to light diagnosable differences not only between Madeira and Canary birds but perhaps also between populations of different Canary Islands. Himalayan *maximus* and Chinese *mandarinus* would certainly be given species status, while the *simillimus* group of peninsular India and Sri Lanka would probably be treated as three species, as they comprise three rather distinct allopatric groups (5 subspecies have been recognised, but at least one pair of them intergrade). Central Asian *intermedius* might well be treated as a species, as would the main bulk of the west Palaearctic mainland populations within which variation is clinal. This clinal variation would not be given formal taxonomic recognition (see below). In fact, a major re-examination of the whole complex would be necessary before any final decision could be made on the division, into a number of phylogenetic species, of what is now treated as polytypic *Turdus merula*.

The Coal Tit *Parus ater* would present a similar, perhaps even worse, problem. It has a vast continental range in Eurasia in which variation is clinal, and a number of isolated peripheral populations, some of which are very distinct. At the extreme west of the range, *P. a. hibernicus* from Ireland is diagnosable over most of that island by a yellowish wash over its plumage, but some individuals in eastern Ireland are indistinguishable from the British population, *britannicus*, and a small proportion of birds in western Britain show a slight development of the yellow colouring that is marked in Irish birds. As British and Irish birds are not all diagnosably distinct from one another they would have to be treated as conspecific. Furthermore, the Coal Tits from the Iberian peninsula are very similar to, and in fact doubtfully distinguishable from, British Coal Tits; to the east they intergrade with nominate *ater* which extends over most of Europe and Siberia. At the eastern end of the range, there is a population in northern China very distinct from nominate *ater*, with a conspicuous crest and markedly different plumage colours (*pekinensis*). It is not isolated from nominate *ater*, but intergrades with it in Manchuria, Korea and the Amur region. Under the PSC all these populations, from Ireland and Iberia east to China, would have to be treated as conspecific, and no formal recognition would be given to their many and striking differences.

Attention would then have to be given to the isolated southern populations. They comprise what are usually recognised as 14 subspecies, ranging from northwest Africa east through central Asia to southern China and Taiwan. Some are well isolated and distinct, and would certainly be treated as phylogenetic species, e.g. *cypriotes* from Cyprus and *ptilosus* from Taiwan. Others would be problematical. For instance, the two northwest African forms, *atlas* and *ledouci*, are very distinct from all others. They differ conspicuously, but superficially, from each other, *ledouci* from mesic woodlands in Tunisia and eastern Algeria having a bright yellow wash over its plumage that is totally lacking from the very grey-plumaged, and also slightly larger, *atlas* from the Moroccan Atlas Mountains, which lives mainly in drier woodlands and at higher altitudes than *ledouci*. These two forms have stouter bills than their European relatives and differ from them in voice (Cramp & Perrins 1993). Under the PSC they would probably, at least until a short time ago, be treated as two species. There are, however, complications. It has recently been found that some populations apparently isolated in patches of rather dry montane woodland in Algeria, between *atlas* and *ledouci*, are intermediate in plumage but closer to *atlas* in size. They may constitute a third distinct form (Cramp & Perrins 1993), but have not been well studied. The Coal Tits from the Crimea, where they are well isolated from other populations, are usually considered to represent a distinct subspecies, but it is not well-marked. Further east, from the Caucasus down into the mountains of Iran, there is a trend towards brown-backed and thick-billed populations, apparently adapted to dry oak woodlands. Some at least of them are probably well isolated from others by intervening desert or semi-desert; but they have not been studied in detail and the three subspecies recognised may well need revision.

It is clear that very considerable research would be needed by anyone undertaking to reclassify the Coal Tits according to PSC principles. One can only guess at how many species would result; probably at least 15, and the number might well be altered by later research.

These examples were chosen because I happened to be familiar with them, and they may for that reason be suspected of being biased so as to exaggerate the problems of using the PSC. To check on this, I made an analysis of the 94 European breeding species in the two volumes (5 and 7) of *Birds of the Western Palearctic* containing the Blackbird and Coal Tit, using the detailed information given in the sections on geographical variation, nearly all by C. S. Roselaar. I tried to see how many phylogenetic species they would constitute and how many problems, and of what kind, would be encountered in attempting such a classification. To anticipate what is dealt with in a little more detail below, it must be noted again that the PSC gives no taxonomic recognition to geographical variation within continuous populations, however well marked it may be; all distinct and isolated populations are, as we have seen, given species status. The analysis gave the following results, summarised here in broad categories because hardly any two cases are exactly alike.

No. of spp. (BSC)	*Nature of geographical variation*	*Presumed PSC treatment*
21	None or very slight (monotypic species)	Same number recognised
18	Slight; mainly or entirely clinal	Ditto; slight geog. variation ignored
4	Moderate; mainly or entirely clinal	Ditto; moderate geog. variation ignored
5	Marked; mainly or entirely clinal (e.g. *Parus montanus*)	Ditto; marked geog. variation ignored
13	Slight, mainly clinal, but with more distinct disjunct populations (e.g. *Motacilla cinerea, Erithacus rubecula*)	Disjunct populations recognised as species; each BSC sp. probably becoming 2–4 PSC spp. (further study needed)
8	Moderate or marked, with some disjunct populations (e.g. *Monticola solitarius, Turdus merula, Parus ater*)	Disjunct populations recognised as species; each BSC sp. probably becoming 2–*c.* 15 PSC spp. (further study needed)
12	Marked; in distinct subspecies groups, some clinal variation within groups or areas of secondary contact/intergradation (e.g. *Cercotrichas galactotes, Saxicola torquata, Parus caeruleus, Lanius excubitor*)	Impossible to predict, would need detailed study
13	Complex and (except in 2 cases) marked; mainly continental ranges, probably with complex evolutionary histories (e.g. *Galerida cristata, Motacilla flava, Sitta europaea, Remiz pendulinus*)	Ditto

The above figures indicate that about half of the species recognised under the BSC would need further study before any attempt could be made at a PSC classification; many would have to be the subject of major revisions. Such research would certainly lead to improved understanding of the assemblages of forms involved; it seems unlikely that it would lead to stability in species-level nomenclature in the coming decades.

In making this analysis, the strong impression was gained that the great majority of polytypic species recognised under the BSC, although not based on cladistic analysis, would stand up to such an analysis and be shown to be monophyletic. In a few cases, there is doubt about whether the species recognised should be split, or merged with another species, but not about their monophyly. Before the polytypic species is rejected by proponents of the PSC, I suggest that it would be desirable to subject a representative selection of widespread polytypic species (as recognised under the BSC) to cladistic analysis, rather than reject the concept wholesale because of detected errors and questionable methods previously used in avian taxonomy.

Recognition of subspecies under the PSC

It has been widely recognised that the subspecies is not an altogether satisfactory taxonomic category, mainly because (1) geographical ranges of subspecies cannot be clearly delimited in clinally varying populations; (2) there is no general agreement (though some suggestions have been made) on what degree of difference between populations should be accepted as justifying their subspecific separation; (3) it is very often impossible to decide whether or not isolated and well-marked subspecies should be given specific rank. Means have been suggested for dealing with these problems—e.g. Huxley's (1938) notation for clines; the use of special terms such as semi-species or megasubspecies for very distinct forms thought to be verging towards specific status—but they have not been generally adopted. Lack (1968) and later authors have concluded that the objections are so serious that the subspecific terminology at present in use has outlived its usefulness and should be replaced by some more appropriate method of categorising variation below the species level.

Under the PSC, the subspecies at present has a shadowy existence in a kind of limbo. In his general, theoretical discussion of the phylogenetic species, Cracraft (1987) mentions subspecies only in a footnote, which is devoted mainly to the problems discussed above and implies that the naming of subspecies would have no place in the PSC. In his re-classification of the birds-of-paradise (1992), he is more explicit, but still with some ambivalence: "Adoption of the phylogenetic species concept solves a long-standing source of contention within systematics, namely the taxonomic status of subspecies. Because phylogenetic species are basal (smallest recognizable) differentiated taxonomic units, subspecies could only be applied as arbitrary descriptors of within-species variation. Within that context, therefore, they serve little useful purpose." In his Cape Verde Islands check-list Hazevoet (1995), after summarising the subspecies problem, concludes that "trinomials can perhaps still serve a minor role within a continuum showing clinal or otherwise geographical variation", but whenever he uses it he places the word subspecies in inverted commas, implying non-recognition of it as a valid taxonomy category.

Both authors therefore recognise the existence of geographical variation within the phylogenetic species, but decide that it does not need formal taxonomic recognition. Under the BSC, some kind of formal recognition of within-species variation is clearly essential, and the subspecies, for all its shortcomings, is the only method that has found widespread, though not uncritical, acceptance. If the PSC were brought into general use there would surely be a need, in formal listings of bird species, to draw attention in some way to clinal variation, in which differences between ends of a cline may be as marked as, or in some cases considerably greater than, differences between taxa that would rank as species. Would it be sensible, for example, to give no formal recognition to the striking difference between the small, dark, brownish Willow Tits *Parus montanus* of lowland western Europe and the large, very pale, greyish populations of eastern Siberia, because they are connected by a range of intermediate forms?

Use of the PSC in check-lists

Systematic listing of the avifauna of the Cape Verde Islands (Hazevoet 1995), with comparatively few breeding species, is not very much affected by the choice of species concept. Hazevoet recognises 14 "diagnosably distinct endemic taxa", which he treats as phylogenetic species. Four of them (*Apus alexandri*, *Alauda razae*, *Acrocephalus brevipennis*, *Passer iagoensis*) are distinct enough to be treated as endemic species in *Birds of the Western Palearctic*, the latest standard work covering the Cape Verdes. Three of the remaining 10 are oceanic birds (*Pterodroma*, *Calonectris*, *Puffinus* spp.), which present their own problems of classification; see, for example, Shirihai *et al.* (1995) on the *Puffinus assimilis/lherminieri* complex. The remaining 7 land-birds include such forms as *Buteo* (*b.*) *bannermani*, *Tyto* (*a.*) *detorta* and *Falco* (*p.*) *madens*, which under the BSC are currently treated as well-marked subspecies.

Hazevoet lists 8 "taxa of which the Cape Verde population has been treated as a 'subspecies', which is, however, not diagnostically distinct". Some of these are certainly very poor subspecies; he synonymises them with their respective continental species. But among them is the Grey-headed Kingfisher *Halcyon leucocephala*, which differs to a certain extent in coloration and measurements (especially bill-length in which there is little overlap) from its Afrotropical relatives. It is resident, having lost the migratory habit of the mainland populations. Using traditional methods of diagnosis based on measurements and plumage, and confining comparisons to adult specimens in fresh plumage, it seems quite likely that it would prove to be diagnosably distinct. Molecular analysis might be expected to support the distinction. In passing it may be suggested that it was by good fortune that the other 7 Cape Verde land-bird subspecies all proved to be poor ones; applying the PSC to some other island avifaunas might have been trickier.

A case like this suggests that proponents of the PSC, when listing local avifaunas, will be confronted with problems similar to those that face the conventional BSC taxonomist; but for the former the judgment is about the existence or otherwise of a species, and a mistake is more serious.

Application of the PSC to an inadequately known family

Cracraft's (1988) re-classification of the birds-of-paradise highlights some of the difficulties of applying the PSC to a family in which ranges and geographical variation are incompletely known. His analysis results in the recognition of 90 species, double the number recognised under the BSC (40, Mayr 1962; 42, Gilliard 1969; 45, Sibley & Monroe 1990). The increase in number of species comes mainly from the elevation to species rank of a large number of BSC subspecies.

Such a procedure is unjustified in the present state of knowledge. The collection and taxonomic study of birds in New Guinea to date involves a tiny fraction of the area of the island. In many cases nothing is known of the possible presence, or variation, of populations between the places where forms usually treated as subspecies have been collected. There may well be continuous populations, with intergradation; in such cases two or more phylogenetic species would have to be merged. Conversely, as Cracraft notes, further collecting may reveal new forms, which would be given species status under the PSC if their allopatric status vis-à-vis closely related forms could not on available evidence be disproved. In all such cases the mistakes that may result from inadequate knowledge are more serious for the PSC than for the BSC. For instance, Cracraft recognises three species of *Paradigalla*. A recent thorough analysis of this little known genus (Frith & Frith 1997) has shown that one of the three, a controversial BSC subspecies based on few specimens, is in fact indistinguishable from one of the two other (clearly diagnosably distinct) forms. The three PSC species should be reduced to two; under the BSC, the only change necessary is to reject one doubtful subspecies.

Cracraft's treatment seems in some cases inconsistent with PSC principles, probably because subjective judgment still seems necessary in spite of professions of rigorous analysis. Thus the two populations of *Lycocorax pyrrhopterus*, on Batjan and Halmahera, seem from his account to be diagnosably distinct; but he does not treat them as two phylogenetic species. The reason ("These two populations are united here until further information is available as to the extent of their behavioural and genetic differentiation") surely applies equally to forms that he does treat as separate phylogenetic species.

One result of elevating to species rank very similar subspecies of one species within a genus, such as the four forms of *Paradisaea minor*, is that the resulting genus consists of some very distinct and some all-but-identical species. There is then an obvious need to recognise a category intermediate between the phylogenetic species and the genus, as Cracraft does by placing the four above-mentioned forms in a 'species group'. This is likely to be a common problem for the PSC. If species groups of this sort are formally recognised, the arrangement that will result is likely to parallel, and in many cases become identical with, the BSC arrangement of polytypic species and their component subspecies; the PSC would simply have elevated each category to a higher rank. And all this would be due to what seems to me to be a dogma rather than a reasoned decision, that species *must* be the smallest diagnosable clusters or end-products of the evolutionary tree.

Conclusion

The arguments set out above lead, I suggest, to the conclusion that the biological species concept, while not perfect, is still useful and meaningful; and that adoption of the phylogenetic species concept is likely to be beset by problems that are equally or more intractable; at the very least, they will require years of research in order to establish which taxa, now treated as subspecies, have uniquely diagnosable characters. Even if this could be done, there would be the risk that future research and analysis, using more sophisticated methods, might necessitate constant changes. Examples of this are in fact already apparent in recent publications. Thus, in their analysis of genetic and phenotypic differences between related bird populations on either side of the Bering Strait, Zink *et al.* (1995) find that, on the basis of their DNA, the populations of *Anthus rubescens* would be considered different phylogenetic species, but no morphological differences are detectable. For some reason they do not do so on the basis of DNA alone (perhaps sensing that this would open the floodgates?), but write: "If morphological or other genetic differences between these populations are found, we think that they should be treated as separate species". How many other such cases are there which may come to light; and how many that will not come to light? From a purely practical point of view, the adoption of the PSC would mark the end of the relative taxonomic stability that has been achieved by the acceptance of the biological species concept. From a theoretical point of view, its adoption would not, in my opinion, signal any advance in our understanding of evolutionary processes at the species level.

Summary

The biological species concept (BSC), which has been generally accepted as the basis of avian taxonomy for over 50 years, has recently been challenged as being fundamentally flawed, and the proposal has been made that it should be replaced by the phylogenetic species concept (PSC). Under the PSC, polytypic species are not recognised, the species being defined as the smallest diagnosably distinct cluster or population of individuals that normally interbreed only among themselves. Reclassification of birds on PSC principles would at least double the number of species, but this is not a reason to reject it.

It is argued here that the concept of the polytypic species is based on recognition of a real and widespread phenomenon, and is not invalidated by the old-fashioned and inadequate methods that have often been used in its study. The problems encountered are just those that would be expected. It is also argued that the definition of what constitutes a species under the PSC is arbitrary and includes an element of dogma, and has no more inherent validity than definitions based on the BSC.

Wholesale application of the PSC to birds would meet with serious problems. There are many polytypic species (as recognised by the BSC) in which much further, and difficult, research would be needed if they were to be reclassified according to PSC principles, decisions about what is or is not a diagnosably distinct population being impossible on present knowledge. Even if this were done, there would always be the likelihood that further research would entail further changes. All such changes under the PSC would involve changes in the number of species recognised, and so are more serious than changes under the BSC, which would usually affect the recognition of subspecies, a category well known to be subject to change. The relative stability in species-level taxonomy achieved under the BSC would be lost, certainly for decades. To judge from publications to date in which the PSC is adopted, there would still be a need for the sort of subjective judgments that have been condemned as a fundamental weakness of the BSC. It is concluded that there is at present no case for replacing the BSC by the PSC.

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Taxonomy and conservation: chicken and egg

by N. J. Collar

Taxonomy: a dying discipline in a dying world

Taxonomy precedes conservation. This is as basic as to say that language precedes education. The one is a precondition of the other. Without the formal structure of names and an agreed system of usage, there can be no understanding of what exists to be conserved. So, if taxonomy is simply the time-honoured chicken and conservation her newest-laid egg, any implied circularity in their relationship—the point about chickens and eggs being that you cannot say which came first—might appear whimsical. However, I believe there is an important sense in which that circularity—conservation engendering taxonomy no less than *vice versa*—is now a real phenomenon.

This new emphasis is a side-effect of the widely perceived "global biodiversity crisis", in which catastrophic depletion of the natural resources of our planet by entirely unsustainable and barely controlled patterns of human exploitation—"development" is an absurd word for it—is engulfing an unprecedented proportion of the world's animal and plant species in a man-made extinction spasm (Wilson 1992, May *et al.* 1995). Many (meaning millions) of these species are not yet known to science; many (meaning hundreds of thousands) are in the half-way house of knowledge between original description and a basic understanding of their habitats, biology and distributions: up to 40% of the world's 400,000 described species of beetle, for example, are still known only from their type-localities (Mawdsley & Stork 1995). The utter inadequacy of our knowledge (although of course it has always been the case that the exploration of the planet has only ever been a subset of its exploitation) is a crippling disadvantage.

Consequently there is now enormous pressure on the discipline of taxonomy, whose services have never more urgently been needed; yet in one recent calculation (Soulé 1990), made by multiplying the number of tropic-specialised systematists on earth (1500) by the number of new species each describes per year (5) and dividing the result into the anticipated number of species awaiting description (30,000,000), it transpires that on present effort we will need to wait until the year 6000 before we have names for all the planet's species. Worse, this "present effort" shows no sign of maintaining itself for the next 40 years, let alone the next 4000: 23% of teachers of systematic biology in the U.K. were 35 and under in 1980, falling to 8% in 1990 (Gaston & May 1992). Indeed in the 20-year period after 1975 the Sub-department of Ornithology at the British Museum (Natural History) lost over half its staff, and more significantly some 90% of its research capacity (R. P. Prŷs-Jones, pers. comm.). This is the institution that houses by far the greatest amount of ornithological reference material on earth, yet now employs not a single full-time in-house taxonomist and has undertaken no exploration or collecting work of any coherent description since the Mount Nimba enterprise a quarter of a century ago (see Colston & Curry-Lindahl 1986). The situation is little different in virtually all the great old natural history museums of Europe.

Ironically, although the relative (and I stress: *relative*) completeness of avian taxonomy has prevented it from adding significantly to modern museum angst over function, direction and need, the current trend (perhaps a better word is thrust) appears to be one that will only add to the time it takes for a yet more complete ornithological world picture to be composed. Conservationists, however, may not be willing to wait; and I am inclined to think that their alliance with birdwatchers—a very strong link having been forged between the two in recent years—will be at least as crucial to the advance of avian taxonomy in the next few decades as any developments within formal academic circles.

Global conservation and international birding: parallel evolution

Birds are indeed anomalous amongst major classes or their approximate equivalents in the animal and plant kingdoms for the (relatively) high degree to which their taxonomies and distributions are known. Such knowledge is not, and can never be expected to be, complete, but it is largely sufficient for the purposes of global conservation. This is in part a reflection of the relatively low total number of recognised species (under 10,000). It is also in part a reflection of the relative ease with which birds—mostly diurnal, often brightly coloured and normally very vocal—are recorded (and indeed adopted as popular objects of interest and study).

There are several important consequences for conservation. First, it is actually still possible for an organisation like BirdLife International to consider it a realistic ambition to see *all* the world's bird species saved, even if not by its own hand. Hence the repeated evaluations of threatened species in Red Data Books remain relevant, providing the stimulus and context not only for single-species initiatives but also for site-oriented programmes dealing with major areas of sympatry between such species (Collar 1996a).

Second, the latter principle—targeting areas of sympatry between the rarer species, whether technically regarded as threatened or not—can be, and has been, formally developed as the basis of more efficient conservation investment. This could only be done in a group where taxonomic and distributional knowledge was highly advanced. Thus ICBP (1992) mapped and overlaid the distributions of 2609 bird species with ranges of less than 50,000 km^2, resulting in the identification of 221 "Endemic Bird Areas" (EBAs). An important underlying theory of EBAs is that they are likely also to be areas to which other elements of biodiversity are likewise restricted; considerable evidence has been accumulated to support this assumption (Thirgood & Heath 1994, Balmford & Long 1995), which therefore means that the targeting of conservation resources on EBAs represents a considerably more practical alternative to waiting another 4000 years for the appearance of a more sophisticated and accurate data set.

Third, it has become standard for BirdLife, in various manifestations, to promote the investigation of many of these threatened species, key sites and EBAs via self-funding expeditions, individual adventurers, holidaymakers, and of course the ever-increasing numbers of in-country ornithologists and conservationists. Biological exploration, once the exclusive province of museums and run under the direction of taxonomists, has transferred to the popular realm of conservation and amateur enthusiasm. Between 1983 and 1994, BirdLife published the reports of 43 expeditions to 30 different countries which its own staff or publications had had some direct influence in developing, and stimulated at least as many more whose results have appeared elsewhere. There has of course been a concomitant growth in interest in wild birds in most countries in the world, and BirdLife itself has worked both to encourage such growth into coalitions and clubs and to harness them for conservation purposes.

On the face of it, then, bird taxonomy in the 1990s is not a major issue: the species seem largely to have been worked out, and it simply remains for their distributions to be more finely plotted. Nevertheless—without prejudicing the claim that birds are sufficiently well known for small-ranged species to identify biodiversity sites—there are hundreds upon hundreds of taxonomic questions relevant to bird conservation that remain to be answered, many of them pressingly urgent. The interesting part is that, when these questions are not being asked by conservationists, and since in Europe they virtually cannot now be asked by taxonomists, they are very commonly coming instead—often with answers as well—from *birdwatchers*.

The reason for this is, of course, that it is birdwatchers who, alongside conservationists, are in the vanguard of the new "explorers", moving round the planet long-distance by plane, short-distance by logging road, armed with sophisticated optical and tape-recording equipment, high-quality protective clothing and the latest immunisations, and backed up with technical reference material (textbooks, recordings) of a totally new level of authority. What we find is that more and more such people are coming up against current boundaries of taxonomic clarity and knowledge, and are seeking to resolve issues beyond these boundaries on the basis of their own increasing experience and expertise. They are becoming—one only has to consider the burgeoning memberships of the newly founded Oriental, Neotropical and African Bird Clubs—a new ornithological establishment.

For such fieldworkers, unallied to museums, the question of collecting does not arise. At best, mostly on expeditions, there will be mist-netting, which allows detailed descriptions, measurements and photographs to be taken. Apart from this, their notebooks are filling up with information on foraging habitat and behaviour, nest-site selection, general habits and jizz, all of which increasingly feature as evidence in the taxonomic decision-making process. Otherwise there remains photography and in particular tape-recording. Indeed, it is probably mostly in the matter of voice that this army of avian "parataxonomists", as Janzen *et al.* (1993) call them, holds the greatest influence. It is now common for birdwatchers confidently to pronounce on the presence of species on the basis of vocalisations which to the untutored ear remain indistinguishable; the rare few, starting with the late Ted Parker, have even picked out new species to science merely on this feature.

Species limits: the key issue

The area of taxonomy which most preoccupies both international birdwatchers and conservationists is that of species limits. Generic, genetic and other levels of discrimination are largely (at present) uncontroversial. The birdwatcher and the conservationist both use the species as their unit of currency, and they both therefore have a vested interest in knowing what species there are and where, and therefore ultimately *what a species is*. Their natural diffidence over playing at taxonomy, which is widely felt to be a demanding full-time specialisation, is being forced out of them by the plain unavailability of taxonomists, and perhaps also by the growing realisation that a good proportion of current taxonomic arrangements is actually the result of past amateur (and evidently not always full-time) endeavour.

Among the obstacles they face is the quality of evidence needed to justify the splitting (or indeed lumping) of species. Particularly when a form is known to be at significant risk, and if its splitting is justifiable, then the case ought never to rest simply on an unsupported opinion, and most people would probably agree with (e.g.) Dowsett & Dowsett-Lemaire (1993) and Knox (1994) that any such decisions, irrespective of conservation considerations, require publication of the evidence. This being so, there is additional pressure on the birdwatcher and the conservationist to articulate very clearly any views they wish to see taken seriously, particularly when there *are* still taxonomists, most now in the U.S.A., well qualified to judge their efforts. This is a particularly exasperating circumstance in cases where the original professional evaluations under scrutiny (mostly dating from the era of taxonomic synthesis in the first half of this century) were themselves entirely unexplained and seemingly arbitrary.

Ideally, therefore, considerable technical detail is desirable, as for example has been adduced for Anjouan Scops-owl *Otus capnodes* (Safford 1993) and Wied's Tyrant-manakin *Neopelma aurifrons* (Whitney *et al.* 1995). On the other hand, time and resources may not easily permit such work, so that the rapid articulation of an opinion, as in the case of Visayan Flowerpecker *Dicaeum haematostictum* (Brooks *et al.* 1992), or its containment in a footnote, as with the Chinchipe Spinetail *Synallaxis chinchipensis* (see Ridgely & Tudor 1994), or even indeed an assertion as flimsy and unrefereed as that for Sumatran Cochoa *Cochoa beccarii* (Collar & Andrew 1987), may have to suffice. Sibley & Monroe (1990) took the unusual step of consulting over species limits with fieldworkers, and accepted many splits merely on their say-so. This is understandable, given the high degree of competence of many birdwatchers and the increasing use of non-morphological identification features as taxonomic characters. Indeed, the great number of further seemingly merited splits, particularly in the Oriental and Pacific regions, threatens to occupy so many years in documentation that there is clearly a temptation—all the stronger if the form is threatened (though not without the danger of distracting from other, more certain priorities)—to behave in the same apparently cavalier manner as many lumpers did earlier this century.

The birdwatcher may have more immediate interest than the conservationist in splits that involve common forms. The conservationist will have a far greater interest than the birdwatcher in splits that result in significant changes in conservation status; and it is precisely because there are potentially major financial and logistical consequences that such splits should be properly documented, although this is not automatically to admit that less rigour is acceptable where conservation is not at stake—indeed, a crucial point is that all such decisions should be made as far as possible according to the same basic criteria. So it matters relatively little to the conservationist that the two subspecies of Red-fan Parrot *Deroptyus accipitrinus* either side of the Amazon might better be treated as two species (Whitney 1996), or that White-headed and Plum-crowned Parrots *Pionus seniloides* and *P. tumultuosus* might better be treated as one (O'Neill & Parker 1977). On the other hand, it matters a great deal whether the rare Andean representative *luchsi* of the abundant Monk Parakeet *Myiopsitta monachus* has a claim to species status (Lanning 1991), and that Indonesia's Yellow-crested and Australia's Sulphur-crested Cockatoos *Cacatua sulphurata* and *C. galerita* might not merit their current specific separation, particularly if a decision to lump them (the Indonesian form being threatened) were to be accompanied by one to elevate the highly distinctive *C. s. citrinocristata*, confined to the island of Sumba.

It is in particular regard to the fate of such small-island isolates and their continental equivalents that conservationists have to be at their most sensitive and disciplined, since (a) small-island isolates are intrinsically the most susceptible to extinction (King 1985), and (b) consistency in decisions over species status is essential for long-term confidence and credibility. Thus on the one hand there is pressure, for the sake of enhanced conservation interest, to allow specific status to distinctive isolates, but on the other there is the inherent inertia of established arrangements where the elevation of one subspecies cannot wisely proceed without a revision of the entire species or indeed—where patterns of subspeciation are judged to reflect biogeographic evolution—of an entire local avifauna.

Some splits, of course, are relatively simple procedures, involving no more than two taxa and with no further ramifications, as in the case of the Visayan and Mindanao Broadbills *Eurylaimus samarensis* and *E. steerii* (split by Lambert 1996) or the Bornean and Sumatran Ground-cuckoos *Carpococcyx radiatus* and *C. viridis* (split by Collar & Long 1995). The problem is less negotiable when concern focuses on forms at geographical extremities, which sometimes (owing perhaps to founder effects or unusual environmental pressures at the very edge of a species's tolerance) exhibit the most distinctive differences from parental stock, for example the curly-tailed, dull-plumaged Tablas (Philippines) race *menagei* (see Vaurie 1949)—alas, probably already extinct—of the widespread Asian Spangled Drongo *Dicrurus hottentottus*, or the dull red Sumatran race *dedemi* of the (elsewhere mainly green) Grey-headed Woodpecker *Picus canus* (see Winkler *et al.* 1995). Most problematic of all are highly distinctive forms located geographically within a suite of generally less well-marked subspecies, like the yellow and red Visayan representative *xanthocephalus* of the normally red, green, black and white Asian Greater Flameback *Chrysocolaptes lucidus*, or the small green Flores form *weberi* of the multicoloured Rainbow Lorikeet *Trichoglossus haematodus*: splitting in such cases could not easily be done without consideration of the consequences for species limits in the rest of the complex. These types of problem are challenges for those with an interest in order and hierarchy and a great deal of time to spare, which is doubtless why so many of the earliest taxonomists were aristocrats. The hard-pressed conservationist can barely spare two hours, let alone two weeks, simply on the effort to establish the taxonomic eligibility of one or two forms to join lists of threatened species.

There are also cases where the effects of taxonomic decisions are internal to the complex under review. The Bearded Tachuri *Polystictus pectoralis*, for example, has been judged a near-threatened species (Collar *et al.* 1992, 1994), an evaluation vindicated when a full assessment of the evidence was made (Collar & Wege 1995). However, the situation only holds while it is agreed that the bird's three subspecies (one Andean, one lowland north of the Amazon, and one lowland south of the Amazon) remain as such, since each subspecies, if considered separately, would satisfy the new IUCN criteria for threatened status (the Andean form may already be extinct). Collar & Wege (1995) used this circumstance to illustrate conservation's continuing dependence on taxonomic research and on museum collections of birds. In mirror-similar fashion, the New Zealand Brown Teal *Anas aucklandica* meets the new IUCN criteria as threatened only while its three races are *not* upgraded to species level (though this is a step already taken by Marchant & Higgins 1990): once they are, two of the forms move into a higher threat category than the "parent" species, while the third (the one that continues to take the name *A. aucklandica*) drops out as threatened altogether (the reasons for this are, of course, a function of the new criteria and are discussed in Collar *et al.* 1994: 19–20).

In all these cases, of course, we are dealing with a phenomenon—allopatric disjunction—with which the biological species concept, governed by the principle of reproductive incompatibility in sympatric situations, is, on its own admission, ill-equipped to deal. The best it can do in this circumstance is to invoke criteria based on certain measures of differentiation in related taxa, whether within individual species or outside them (see, e.g., Mayr & Ashlock 1991: 104–105); but frequently no such taxa exist. Illustration of the resulting variability of treatments lies in a review of birds at risk on Negros, Philippines, by Brooks *et al.* (1992). Three of the most threatened are Writh-billed Hornbill *Aceros* *(leucocephalus) waldeni*, a split recommended by an earlier authority, adopted by Sibley & Monroe (1990) and rejected by Dickinson *et al.* (1991) despite the "admittedly considerable" differences involved; White-throated Jungle-flycatcher *Rhinomyias (gularis) albigularis*, lumped by an earlier authority but split by Sibley & Monroe (1990) and Dickinson *et al.* (1991) "on the basis of its plumage differences, dependence on lowland forest and disjunct distribution"; and *Dicaeum (australe) haematostictum*, lumped by Sibley & Monroe (1990) and Dickinson *et al.* (1991) but split by Brooks *et al.* (1992) themselves on the basis of (considerable) plumage differences, unclear vocal distinctions and absence of intermediate subspecies. Here then we have one major authority (Dickinson *et al.* 1991) accepting plumage differences, allopatry and even habitat to split a species, but unwilling to employ the first two of these criteria alone in two other cases, even though the differences that mark *A. waldeni* and *D. haematostictum* from their closest relatives are arguably far more obvious than those that so distinguish *R. albigularis*.

This variability of taxonomic treatment is an almost inevitable result not only of the predispositions and principles of taxonomists themselves—in spite of Mayr's best endeavours over 60 years—but also of the patterns of their activity and interest within taxonomy, whereby their attention can be concentrated "vertically" on particular (bio-)geographic groupings (e.g. national or subregional avifaunas), and "horizontally" on particular taxonomic groupings (e.g. families, genera). The resulting grid tends to leave some groups of species well illuminated (not necessarily *elucidated*, of course) from both directions (the Neotropical ovenbirds spring to mind) while others (for example, the Oriental babblers) remain in near darkness. The disparities of standard, judgement and focus among taxonomists only really emerge when their various works, originating at many different points in space and time, are synthesised into larger geographical reviews. Indeed, the taxonomies of the less worked regional avifaunas commonly display inconsistencies based on excessive reverence for stability on the one side and overzealous innovativeness on the other. For the conservationist at the end of the twentieth century, attempting to deal evenhandedly with such unevenness can prove to be a decidedly unrewarding and lonely task.

The challenge of the phylogenetic species concept

The biological species concept (BSC), because of the inherent arbitrariness of its treatment of allopatric forms, has been greatly vilified as the source of much of this taxonomic doubt and confusion. A phylogenetic species concept (PSC), in which a species is simply measured as "the smallest diagnosable cluster of individual organisms within which there is a parental pattern of ancestry and descent", is being promoted, with increasing insistence, as the one clinically objective system that can resolve the problem of allopatric forms (e.g. Cracraft 1983, 1992, McKitrick & Zink 1988, Hazevoet 1994, 1996, Zink & McKitrick 1995). It is moreover claimed that "because phylogenetic species are irreducible, basal taxa, the PSC provides a better tool for assessing biological diversity'' (Hazevoet 1994). Clearly, therefore, conservationists need to consider the evidence with care.

The first thing the PSC does is obviate the problem of reproductive isolation in diagnosable allopatric forms, by pronouncing them all to be species; the next thing it does is synonymise BSC trinominals representative of clines, on the basis that all clinal populations are inherently undiagnosable as separate entities. The upshot is an anticipated net increase in the total number of bird species and the effective total elimination of subspecies. It is, in essence, as simple (and, to many, as attractive) as that: the fudge and blur of the BSC disappears, and avian diversity emerges as a sanitised, standardised construct that allows equal access to all interested parties.

Sadly, however, the simplicity is illusory. The abiding difficulty of this concept is diagnosis. Hazevoet (1994) asserted that there appears to be no theoretical limit on the number of species; but this must in part be because under the PSC there appears to be no theoretical limit on the triviality of the characters used to define them. McKitrick & Zink (1988) readily accepted this:

> scrutiny of morphological, behavioral, or biochemical characters on the ''microgeographic'' level will reveal the existence of many more phylogenetic species . . . There is no theory to suggest that a trait must be of a certain quality or magnitude to provide historical information or to describe species.

On this basis they would admit species status for a population of Trumpeter Swans *Cygnus buccinator* from a ''well-circumscribed geographic region'' if appropriate levels of sampling showed that their consistent possession of ''one extra hooklet on a barb of the seventh primary'' could diagnose them as an independent evolutionary unit. Since they admit the relevance of biochemical characters here, even absolute morphological conformity is no sanctuary from the possibility of phylogenetic splitting. Cracraft (1992) likewise comments about two forms of *Manucodia*:

> Mayr . . . notes that *trobriandi* is smaller than *comrii* and indeed most specimens fall into two distinct size groups . . . There are, however, some specimens from each form that are essentially the same size. Accordingly, only one species is recognized here, but future genetic analysis may reveal that the populations are in fact different phylogenetic species.

Here he confirms that diagnosability of characters is indeed a pursuit that can draw the taxonomist well below the level of morphology. The fact that these two forms happen to *show* some differences is only incidental: biochemistry—despite deepening scepticism in some quarters over the efficacy of its methods and hence the validity of its results—may legitimately be used to establish phylogenetic species even in cases where there are no qualitative morphological indications. Hazevoet (1996) makes a similar remark about *Pterodroma feae deserta*.

The implications of all this are that many phylogenetic species run the permanent risk of representing not ''irreducible, basal taxa'' but, on the contrary, merely the point at which the search for further diagnosable characters has been abandoned. It appears, therefore, that we are dealing with a species concept which, like the one it seeks to replace and in contrast to the claims of its proponents, can offer no actual finality or stability and which, no less than its rival, has arbitrariness and subjectivity built into its fabric. Worse yet, we are being required to place our trust in its reliance on ever more specialised and inaccessible systems of analysis, and we are presumably also expected to allow another few centuries while it works its weary way through every allopatric population of bird that man can trace and scrutinise: every inshore island population of (for example) wren (various species of *Troglodytes*), every resident landbird and breeding seabird population of every oceanic island (nearly 2000 "significant" such locations listed in Dahl 1991), every montane isolate even within the same mountain range, and so on.

Running parallel is the complex issue of voice and habitat choice as characters. It is increasingly frequent for fieldworkers to suggest taxonomic revaluations on the basis of these two elements. In particular I suspect that because North America leads the world in the realm of taxonomy, and because the Americas are so dominated by suboscine passerines with their highly stereotyped (i.e. inherited, not learnt) vocalisations, the impression across the world is that voice can be trusted as a diagnosable character, even though it is well established that for the oscine passerines environment—in terms of both conspecific singing and local habitat—is a major determinant (Hunter & Krebs 1979, Payne 1983, McGregor & Thompson 1988). Thus if the Timberline Sparrow *Spizella taverneri* is allowed species status from the allopatric Brewer's Sparrow *S. breweri* (Byers *et al.* 1995) on the basis of habitat and voice only, despite its extreme morphological similarity, this clearly has implications for any number of other allopatric populations of birds which happen to display differences in these two parameters: inevitably, again, one is compelled to ask how trivial such differences might need to be, and how they might objectively be measured. (Indeed, it is time that ornithologists considered in depth the entire question of the scientific measurement of vocal difference in relation to taxonomic valuation.)

Scrutiny of an apparently intended model of practical application of the PSC—Cracraft's (1992) review of the Paradisaeidae—only compounds these uncertainties. This analysis starts with the affirmation that, in principle, phylogenetic species are 100% diagnosable, but it transpires at once that he commonly lacks the evidence to make his judgements conclusive, and thus they often stand as "postulations"; all new species, of course, may be considered hypotheses, but the sheer degree of provisionality here rather discredits the notion that "a better tool for assessing biological diversity" is in play. Notably, Cracraft's account of one of two new species his paper describes, *Phonygammus diamondi*, reveals not only the tentativeness of his divisions but also the triviality of the characters he allows in making them. In comparing it to *P. purpureoviolaceus* he finds

> the two forms are distinct in that *diamondi* has the breast and belly dark metallic blue with no or relatively little violet-purple suffusion whereas the breast and belly of

> *purpureoviolaceus* is strongly suffused with violet-purple. In addition, the lanceolate head feathers of *diamondi* are bluish green in coloration whereas those of *purpureoviolaceus* are greenish blue often with a violet-purple tinge . . . [However] two caveats are required. First, there is considerable variation within the taxonomic entity *purpureoviolaceus* and some individuals tend towards *diamondi*. One specimen of *diamondi* . . . more nearly matches some *purpureoviolaceus*. [Second] we lack sufficient material to say whether *diamondi* and *purpureoviolaceus* are really disjunct or whether variation between these areas is clinal.

These admissions hardly confirm the inherent superiority of scientific rigour in the PSC; and one's scepticism only intensifies by reference to the start of the paper, where it transpires that the number of specimens of *diamondi* used in its diagnosis was five. This—on the basis of the passage quoted—reduces its diagnosability to no more than 80%, so that it clearly fails the test of Cracraft's own criteria, and cannot conscionably qualify even as a phylogenetic species, let alone any other kind.

To query the application is not, of course, to invalidate the principles, but I think it emerges here how little the PSC differs from the BSC in depending, ultimately, on human interpretation of the evidence, which at some point inevitably requires reasoned subjectiveness. Moreover, it is, I think, legitimate to speculate on its efficacy if it performs so inconclusively in the hands of its longest-standing and most insistent proponent in ornithology. The 40–42 birds of paradise under the BSC become, in this particular exercise, anywhere between 80 and 120 under the PSC (Cracraft actually established 90, but predicted that, while some of these would prove invalid, a good proportion of 30 additional races and even some unnamed populations would in due course prove "diagnosably distinct"). Extrapolation from these figures to the global avifauna produces 20,000–30,000 species, leaving no fewer than 10,000 forms whose taxonomic status would remain unresolved. Apart from this problem, it appears that the admission of increasing levels of triviality opens up the field for allcomers to start making their own assessments; where under the BSC such parochialism would be contained by the use of subspecies, in this scenario full species can in theory be conjured out of next to nothing by next to anybody, which will be enduringly contentious, unstable and impractical.

The absence of information on linking populations, of minor significance under BSC evaluation, here emerges as crucially important to the "ontological status" (i.e. real-world existence) of a PSC species; so for continental isolates, where intervening terrain may hold intermediate populations, PSC evaluation must remain provisional and hence seriously undependable in the short to medium term. One may even ask whether biological diversity is increased or decreased if such intervening populations are found to occur: it could not, it seems to me, do anything but increase—more populations *must* mean more diversity—yet under the PSC, by its disallowing the taxonomic subdivision of clines (which the BSC often arbitrarily breaks down into several vaguely bounded subspecies), it would be most likely, curiously, to *decrease*. Conversely, the PSC is exposed to the extraordinary situation in which the man-induced extinction of all intermediate populations in a cline would permit—indeed, I think probably *require*—the diagnosis of the two polarised populations as phylogenetic species (an increase in measured biological diversity based on a decrease in actual biological diversity). There may be cases where this kind of thing is already happening, since any break in a cline of a highly sedentary species will isolate common patterns of ancestry and descent within the resulting populations. This seems an entirely inappropriate yet inescapable upshot—two species, perhaps even three or four if enough breaks are made, where recently there was one—whereas under the BSC no change would be expected or registered.

Conservation, of course, will be more affected than any other discipline by further progress of the PSC. Apart from its fundamental long-term inconclusiveness, the fact that it would inevitably be very patchy in its adoption over time, particularly while it negotiated "ontological status" within the more complex polytypic species, would cause serious inequalities in world lists, with parts determined under one species concept and parts under another. Then again, even if the switch could somehow be effected overnight, there would remain the enormous task of distinguishing the threatened species from the secure, and of coping with the sheer volume of the former. While it is true that some threatened island forms would gain new identity as PSC species, the weight of the total number of threatened phylogenetic species (not simply proportional to the number of phylogenetic species: Collar 1996b) would tend to devalue their individual status and "jam" existing priorities with an extensive array of near-lookalikes, drawing attention away from the most distinctive species (which, I think, further compromises the PSC claim to be "a better tool for assessing biological diversity"). Conservationists would then doubtless find themselves under pressure (much of it internally generated) to make some kind of higher taxonomic prioritisations, which for the most part would lead them back towards biological species limits, and which would unquestionably absorb a great deal of their very precious time and already wilting stamina.

There is at least one further operational (although not necessarily insurmountable) drawback to the PSC for conservationists. This concerns the law. For one thing, adoption of the PSC could create chaos, at least in the short term, for trade regulation. A PSC revision of a family represented on the CITES appendices by many polytypic species would, for example, provide an opportunity for traders to test the law by trapping all subspecies (now different species) other than the nominate, whose name alone would stand as the form (species) protected under the convention. Taxonomic updates in CITES take several years, and the window of opportunity would be considerable. Certain other conventions like the Bonn and Bern likewise possess no provisions for rapid taxonomic updates, so again the scope for substantial confusion and destabilisation exists; national legislation would be similarly vulnerable. As Geist (1992) observed, once names are inscribed in law taxonomists forfeit to judges the power to decide on matters relating to the definition of species and the criteria for their establishment; some unwelcome misalignments could result. Moreover, in many countries the emergence of hundreds of new species meriting protection—these would not necessarily all be *globally* threatened—might prove highly damaging to the cause of those species already stretching the capacity and budgets of national conservation agencies.

Towards a new partnership in avian taxonomy

The PSC/BSC debate matters to conservation because it has generally been standard practice for the species rather than the subspecies to be the unit of concern (as is reflected in much national and international legislation). The PSC's greater championing of island isolates and other allopatric forms has considerable appeal but, as I have sought to show here and elsewhere (Collar 1996b), because of (a) the imbalances it would make during the long haul into global application, (b) the logjam of (often near-identical) threatened species it would create, and (c) the sheer open-endedness of its operation, the PSC appears to have little to offer as a conservation tool. My guess is that, once the search for diagnosable characters goes biochemical, the entire concept will disintegrate as an intended global standard.

Nevertheless, understandable dissatisfaction with the way lumping can mask the "true" status of various forms (e.g. Whitney *et al.* 1995) requires a response. It seems to me that there are many cases where lumping was justified and some where it was not, and that the prime task is to concentrate both field and museum studies as much as possible on likely instances of the latter, and not to allow frustration with the misapplication of one concept to result in complete dependence on another. So while the exploration of unknown or recently unvisited areas is a continuing ideal of much modern field ornithology, the rechecking of "subspecies"—all well-marked (or indeed vocally distinctive) allopatric forms—for the teasing out of false polytypic amalgams is a parallel incumbency. Objective criteria by which such forms should be identified and rechecked are themselves in need of development beyond those in Mayr & Ashlock (1991): I would imagine that habitat and elevation, and perhaps even biochemistry, would normally only be used as supplementary elements, but a way must now be found formally to invest vocalisations with the same *potential* taxonomic relevance (and I repeat there are still important caveats here too) that morphology has until now exclusively enjoyed.

A second step is the greater familiarisation of dedicated amateur birdwatchers with the principles and practices of taxonomy, which is something that both taxonomists and conservationists could encourage (perhaps a cheap manual would help demythologise the subject). Such people are, after all, the representatives of a greater, more general body of nature lovers and wildlife enthusiasts to whom conservation and, to some extent at least, modern taxonomy owe their existence. The democratisation of taxonomy, through the involvement of the growing body of highly skilled field experts, would harness new forces in the rejuvenation of this most essential and basic of biological disciplines (although I should emphasise, particularly in respect of an earlier concern about next to anybody being able to conjure up phylogenetic species, that I see taxonomic democracy as a privilege and responsibility that the entire ornithological community should commit itself jealously to guard).

Third, the challenge can partly be met by considered input into national conservation strategies, which can and should involve the identification (by national agencies) of globally threatened subspecies (Collar 1987). These forms can be allotted independent attention (including investigation of taxonomic status) chiefly when they prove not to be sympatric with "endemic" or threatened species in areas such as those identified by ICBP (1992) and Wege & Long (1995), i.e. when they fail to find sanctuary within the main suite of a country's conservation target areas. Such an approach at least promotes vigilance for the more vulnerable among less differentiated forms, without compromising either the standard use of the BSC or the global priorities that result from such use.

This agenda gives a new impetus to the chicken-and-egg cycle of (expressly avian) taxonomy and conservation. Clearly it requires coordination and consistency to be effective, and in displaying these things it might make its most valuable contribution to the growth of relations between taxonomists and conservationists concerned with non-avian life-forms, where neither side can boast a distinguished track record in strategic planning to optimise the value and impact of its work (Mound & Gaston 1993, Collar 1994). Such is the weakness of both taxonomic and conservation knowledge in most of these life-forms that conflict of interests is permanently likely, especially if taxonomy becomes thought of as a service industry whose costs should be covered by conservation or at least by the sources that fund conservation. Indeed, this is already happening: cutbacks in the core budget of the former British Museum (Natural History) have already partially been offset by its eligibility to compete, in humiliating sit-up-and-beg fashion under its new downsized identity ("Natural History Museum"), for support from the "Darwin Initiative" (the British government's Earth Summit contribution towards the conservation of global biodiversity); while the recent Systematics 2000 initiative (for which see, e.g., Cracraft 1995) shows every sign of developing into a major competitor for big-time biodiversity funding elsewhere in the world.

What is needed in this situation is redoubled government support for the institutions of taxonomy (not just in the U.K. but in every country with a museum tradition) coupled with a requirement that, rather than just resuming their timeless remit to fill out tiny random areas in the global biodiversity patchwork, they select and plan out their research priorities and activities in a serious, sustained *partnership with conservationists*, to ensure adequate and representative sampling across the planet within a time-frame (the next quarter-century) to be of maximum benefit to the preservation of biological diversity. The more such initiatives are modelled on the use of manageable, relevant subsets like those used by BirdLife in its threatened and endemic species analyses, the greater the chances that taxonomy can make a genuine contribution to the process of preserving the largest possible number of the earth's current complement of animal and plant species.

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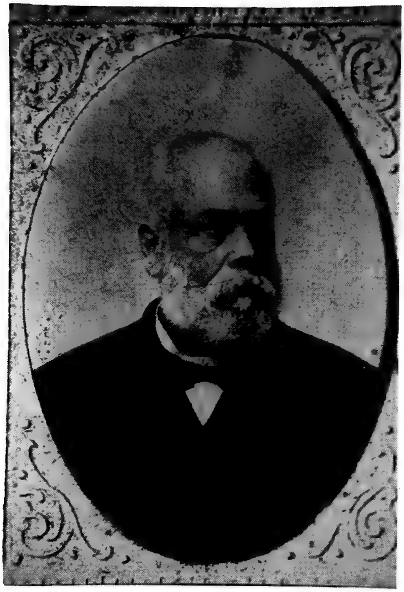

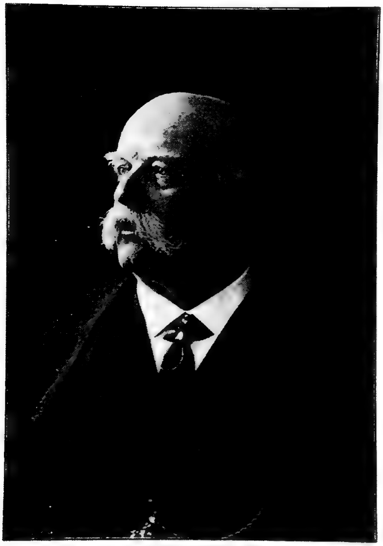

Plate 2. Protagonists in the trinomial controversy in Italian ornithology. Top: Tommaso Adlard Salvadori (courtesy of the Salvadori Muzzarelli Family). Lower left: Enrico Hillyer Giglioli (from: *Annali di Agricoltura*, no. 268, 1912). Lower right: Ettore Arrigoni degli Oddi (courtesy of Donna Fabrizia Ruffo di Calabria).

Salvadori, Giglioli and Arrigoni: aspects of the trinomial controversy in Italian ornithology

by Carlo G. Violani & Fausto Barbagli

After the publication of the 10th edition of *Systema Naturae* (1758) by Linnaeus, the adoption of his zoological nomenclature was favoured by several eminent naturalists of the 18th century in Italy, such as Giovanni Antonio Scopoli (1723–1788) and the Abbé Giovanni Ignazio Molina (1740–1829). The former, as a correspondent of Linnaeus, started using the binomial nomenclature in *Entomologia Carniolica* (1763) and, later, in 1769, as far as ornithology is concerned, in *Annus I. Historico-Naturalis*. He was the first author to describe the Little Owl *Strix noctua*, the Barn Owl *Strix alba* and the White-fronted Goose *Branta albifrons*, amongst other birds (these and other scientific names here given in their original form).

The second naturalist, Giovanni Ignazio Molina, was the librarian of the Jesuit College in Santiago de Chile; he arrived in Italy after the expulsion of the Jesuits from Chile in 1767 and lived in Bologna for the rest of his life, where he was ordained priest. In his famous essay "Saggio sulla storia naturale del Chili" (1782) he described for the first time the Chilean Flamingo *Phaenicopterus Chilensis*, the Black-necked Swan *Anas Melancorypha*, the Patagonian Kelp Goose *Anas Hybrida* and other new bird species, as well as, among mammals, the Coypu *Mus Coypus*, basing the diagnoses on his recollections. However, unlike Scopoli, Molina was not a whole- hearted supporter of Linnaeus. In the introduction of his "Saggio" he admitted:

> ". . . I have conformed to the Swedish Naturalist, not because I believe that his system is superior to all the others, but because I see that at present it is almost universally followed. Although my esteem for his knowledge is great, I cannot help saying that I do not like his very clever nomenclature in many essential points. I would have rather followed Wallerius or Bomare in Mineralogy, the great Tournefort in Botany, and Brisson in Zoology, as they seem to me easier and more appropriate for the common comprehension . . ." [transl.] (Molina 1782).

By the beginning of the 19th century, the use of binomial nomenclature was consolidated thanks to Paolo Savi (1798–1871) and Carlo Luciano Bonaparte (1803–1857). At the instigation and leadership of Prince Bonaparte, the Quarta Riunione degli Scienziati Italiani (Fourth Congress of Italian Scientists) was held in Padua in September 1842, and on this occasion the "Strickland Code" was presented to the Italian scientific community of the day, and was duly translated into Italian for the following year's meeting at Lucca. The use of the "Strickland Code", which had been successfully proposed during the Manchester Congress of the British Association for the Advancement of Science in 1842, aimed at unifying the rules of nomenclature, applying the law of priority and sanctioning any possible changes when considered necessary. The regulations fixed the 12th

Edition of Linnaeus' *Systema Naturae* (1766) as the starting point for nomenclature; the Code also had the task of preventing the kind of nomenclatural anarchy promoted by zoologists such as Illiger and Swainson (Stresemann 1975). During the following years, exploratory voyages and the systematic collecting of zoological material started the golden era of descriptive zoology, which saw Tommaso Salvadori (1835–1923) and Enrico Hillyer Giglioli (1845–1909) as its most distinguished representatives in Italian ornithology.

At Pisa University both scientists, though in slightly different times, had been pupils of Professor Paolo Savi, whose concept of nomenclature is clearly expressed in his "Ornitologia Toscana" (1827–1831):

> ". . . Names should be considered as indisputable, and they must not be changed for any reason at all; the first name which has been bestowed on a species is its true one, and it must be kept consistently and carefully; in case that the same species—due to the progress of science—needs to be placed in another genus, only then should a change in the generic name be permitted; the specific name however shall remain unchanged. . ." [transl.].

Because of their scientific influence, and the fact that they were in regular contact with the British school (Philip Lutley Sclater, Alfred Newton and Richard Bowdler Sharpe), Giglioli and Salvadori were soon considered the most authoritative ornithologists in Italy. Furthermore, Giglioli had studied at the Royal School of Mines in London and was in close contact with the cultural entourage surrounding Darwin and Huxley at the time of the great debate on the origin of species (Barbagli & Violani 1996). The work of Giglioli both as author and as museologist was based on the study of adequate series of specimens, for a better understanding of zoogeography in the light of the evolutionary theories.

In Germany the ideas of Otto Kleinschmidt, followed in Austria by Victor von Tschusi zu Schmidhoffen, and in Great Britain by Ernst Hartert, soon began to gain ground; these authors started to describe subspecies and used trinomials, whose definition was summarized by Hartert in "Vögel der Paläarktischen Fauna" (1903):

> ". . . We describe as subspecies the geographically separated forms of one and the same type, which taken together make up a species. Therefore not just a small number of differences, but differences combined with geographic separation, permit us to determine a form as subspecies, naturally when there is general agreement of the main characters . . ." [transl.].

The scientific establishment in England dominated by Sclater with Newton, Saunders, Salvin and Sharpe, was firmly opposed to such a definition and to the introduction of a trinomial nomenclature (see Stresemann 1975, Haffer 1992). In Italy too, Giglioli disagreed with Hartert, as can be seen from his famous speech delivered in 1908 in Florence, during the inauguration of the Central Collection of Italian Vertebrates; its translated quotes include:

> ". . . At this moment when a wind of analysis at all costs is blowing among the connoisseurs of natural sciences, while synthesis is either neglected or people do not know how to do it, a great danger for the descriptive and systematic aspect of science rises with the institution, let us say so, of the subspecies as new forms are being created with new

names willy-nilly more, I fear, to satisfy puerile vanity, than to establish new facts and report new cases. This, in addition to the very minute description of *individuals*, the confusion of *individual characteristics* with *specific characteristics*, is fragmenting wrongly even the common and more clearly distinguishable species, and multiplying scientific names in an incredible way; and, I am very much afraid, will lead us to total chaos . . . . If, as I always have, one accepts Darwin's grand hypothesis, one must recognize that an absolute definition of the *species* is no longer possible; what naturalist would nowadays attempt to give the *quantity* of the *species*? Nevertheless, the species exists in nature, as no one can seriously deny; but it is variable within certain limits, and is not as was once believed, a fixed and determinate entity. It is hence obvious that some species are *more* distinct, others are *less* so; the former are further removed from the congeneric species, while the latter, which are less well-defined, remain close—sometimes very close—to one or more congeneric species, being, nevertheless always detached; under normal circumstances, the former will have moved away from the ancestor species sooner than the latter. According to some, the latter hence constitute the so called *subspecies*, while others see the subspecies as a *lesser entity* lying somewhere between the species and the individual.

I would agree with the second definition, but it must be clearly stated that these subspecies are not entirely detached from the species they derive from: that is to say, some individuals will have the intermediate characteristics both of the parent species and of the new form in evolution. I could cite not a few examples of such cases; for obvious reasons, to these and these only, and even then with a great deal of circumspection, should trinomial nomenclature be applied. In my opinion the danger lies precisely in the incorrect definition of the subspecies and in the abuse of trinomial nomenclature to name the species mentioned above, which are *detached* from, but very similar to other congeneric species; therefore I use binomial nomenclature for these, since one has to be careful not to distort the grand, simple and natural Linnean concept, expressing itself in its binomial nomenclature.

. . . I would like to point out that, besides the damage due to the useless multiplication of terms, the trinomial nomenclature would necessarily imply the concept of descent, and I do not think it is easy to deduce, in most cases, which is the parent form and which the daughter. Therefore when I speak of *subspecies*, or geographical races, or *incipient* species, that is, species which are still developing, I mean the forms which have varied in a certain sense, due to the effects of the environment and of pressure from their ancestor, e.g. the species which they derive from, and they pertain to, for the presence of individuals with intermediate characteristics connecting them to that species. Since these subspecies are not yet separate from the mother species, they cannot be treated or enumerated separately, and it is only to them that trinomial nomenclature should be applied. I hope I made myself clear on this important matter. The subject deserves this. Hybrids and individual variations are, of course, a different matter, not to be confused with subspecies or incipient species, much less with the cases of neogenesis which, in my opinion, can give rise to a real and proper species, distinctly detached from its parent species. It must be remembered, furthermore, that in zoology as in the other biological sciences, nomenclature is a means, not an end. Today, the very same blessed nomenclature coined by Linnaeus to facilitate and clarify the work of the naturalist has become the greatest obstacle and the greatest source of confusion to scholars. I would add that the continual changing of the names long used up until now for common species and genera in favour of unknown or forgotten names, with the excuse of rigidly applying the law of *priority*, as well as the consequent repetition of the same name for the generic, the specific and the subspecific, has reached an intolerable paroxysm; not to mention that such puerile incongruity is revolting to even the most basic common sense. As regards myself I am also opposed to the simple repetition of the same name with generic and specific value. The enormous damage to the confusion in zoological nomenclature, to which some have even tried to make the great Linnaeus himself accomplice by using the Xth edition of *Systema Naturae* rather than the classical XIIth edition amended and corrected by himself, rightly used as the source for binomial nomenclature, prompted the discussion of a motion in section D (zoology) at the recent meeting in Dublin of the British Association for the Advancement of Science, to establish that the names in general use and which were used by the great biologists of the last century be unalterable. The proposal was therefore backed by the most illustrious British zoologists. (Cf. *Nature*, 27 August 1908). Even in the United States, where much has been committed in the name of trinomial nomenclature, last spring saw the beginning of an attempt to ward off the serious danger caused by the excessive multiplication of forms with specific value based on insufficient characteristics. (Cf. *American Naturalist*, April 1908)." [transl.].

Elsewhere, in the last volume of his "Inchiesta ornitologica", Giglioli (1907) published some witty remarks, always on the same theme. Two of these, on the Corsican Nuthatch *Sitta whiteheadi* and on the Jay *Garrulus glandarius*, are particularly interesting in this respect. While dealing with *S. whiteheadi* he argued with the bird curator of the Rothschild Museum:

> ". . . Hartert considers the *Sitta whiteheadi* as a mere subspecies of *Sitta canadensis*, to which it is doubtless remarkably similar; but in this case it seems to me that my friend has been driven by his fatherly love for subspecies." [transl.].

Even for the Jay, Giglioli disagreed with his transalpine colleagues; after the comparison of hundreds of specimens obtained from everywhere in Italy, he became convinced that it was a very variable species and therefore it was impossible to distinguish not only a subspecies, but even some "local varieties" of it. So he specified:

> ". . . For this reason I believe it simply absurd to have separated, even subspecifically, jays collected in Sardinia from those of our mainland, as Kleinschmidt, Tschusi and—unfortunately—the able Hartert have done. And so, at a distance of one month, the former author christened his great discovery as *Garrulus ichnusae*, the latter one as *Garrulus glandarius sardus*! I feel I am watching a puerile competition on a greasy pole!. . ." [transl.].

The thoughts of Salvadori ran along similar lines, but emerged in less emphatic tones, mainly in private documents such as his correspondence with R. B. Sharpe. In a letter dated 10th March 1904, written in a spell of low spirits, he blamed the German authors:

> ". . . I must say that I am rather disgusted with the recent work of many ornithologists. When the trinomial system has the consequence of adopting such names as *Coccothraustes coccothraustes coccothraustes*, *Oriolus oriolus oriolus*, *Pica pica pica*, I conclude that the system is absurd! No less absurd is Hartert's system of using the names *Carpodacus* (mas.) *rhodochroa* (fem.), *C. rhodopepla*, *C. rosea*, *C. erythrina*, *C. synoica*. Sensible people will laugh at us if we continue in this way . . ." (Violani in: Anon. 1993).

In the paper written for *The Ibis* Salvadori (1904) carried on a controversy with his friend Hartert concerning the choice of the 10th edition of Linnaeus' *Systema Naturae* as the starting point for zoological nomenclature and its consequences in the case of the Latin naming of two common species of European thrushes, *Turdus musicus* and *Turdus iliacus*.

The first Italian author of the new generation, 22 years and 32 years younger than Giglioli and Salvadori respectively, who did not oppose the trinomial nomenclature is Count Ettore Arrigoni degli Oddi (1867–1942), owner of an extraordinarily rich private collection of birds (Barbagli *et al.* 1996), and in touch with Tschusi and Hartert as a collector. He adopted trinomial nomenclature, when in 1902 he described seven subspecies of birds (five from Sardinia, one from Corsica, one from mainland Italy), thus publishing avian trinomial names for the first time in Italy (Arrigoni degli Oddi 1902a, 1902b).

Although Arrigoni degli Oddi had joined the new school as far as trinomial nomenclature was concerned and used it in his "Elenco degli uccelli italiani" (1913), in the same book he made it clear that:

> ". . . As regards subspecies, I did not omit to mention them under each single species, mostly in order to keep my work updated; as for myself in most cases I am not even able to distinguish them and I consider an analysis carried to the extremes to be a very serious damage to science. With the greatest thoughtlessness new names are given to new forms almost always based on individual, not specific, characters; in this way, such a confusion of technical names and of forms is created, that sometimes one is at a complete loss . . ." [transl.].

The same concept was taken up again in greater detail by Arrigoni degli Oddi in "Ornitologia italiana" (1929), when the author explained his objection to the contemporary significance and usage of the subspecies:

> ". . . The name "subspecies" was given, adopting trinomials, to those small variations which depend on habits, life environment, locality or other factors, emanating from a close origin, and, if not in all, consistent in their complex and to which they are connected thanks to intermediate individuals. Today, however, the subspecific distinctions multiply continuously, and in such way that they give birth to great confusions, and make scientific researches less serious. Different names were also proposed in order to indicate the various modifications undergone by the type species in the different countries, and excessively fanciful or unimportant features were fixed. "This according to myself [M. Paulucci 1879, p. 79] cannot be undertaken seriously, as these modifications pass imperceptibly from one to the other, and through innumerable tiny changes unrolls and develops a chain formed by a quantity of small links all connected together." Many of these modern distinctions were established upon a single specimen, comparing it with some similar ones from a very distant locality, without paying attention to the fact that in the intermediate countries the various links could be found, and without considering that it is with large series that species must be established. . ." [transl.].

As far as trinomial nomenclature was concerned, the controversy in Italy was a matter more of form than of content; indeed, during his studies on the Moluccan and Papuan avifaunas Salvadori did describe a *Semioptera wallacei* var. *Halmaherae*, as well as a *Paradisaea apoda* var. *novae guineae*, signifying his intention to point out morphological differences when perceptible and consistent (Salvadori & D'Albertis 1879, Salvadori 1882).

In reality, Salvadori rather often employed the term "variety" in order to indicate individual variations, as for instance *Eos riciniata* (Bechst.) var. *cauda viridi* (Salvadori 1881). In the above cases of birds of paradise, however, as is shown by the geographical names adopted and by the considerable number of syntypes examined (40 specimens of var. *novae guineae* and 50 of var. *Halmaherae*), he intended to designate two entire morphologically consistent local populations; thus he used the term "variety" in the same way as the new school of his time was using the word "subspecies". The step between "variety" and "subspecies" was short, as is apparent from the ruling of the I.C.Z.N. (1985) to consider the term "variety" as of subspecific rank, if published before 1961, unless the content of the work reveals that infrasubspecific rank is meant [Art. 45(g)].

The reluctance of Giglioli to use "subspecies" derived from the impossibility of arranging trinomials according to phylogenetic descent; consequently, he indicated as species different forms even "very little detached'' from each other, on condition that all the individuals belonging to these forms could be separated on the basis of morphological characters. His belief is well expressed in a passage on the Black-eared Wheatear *Saxicola melanoleuca* (now *Oenanthe hispanica melanoleuca* Guldst.).

> ''. . . The difference between these two forms [*Saxicola melanoleuca* and *S. occidentalis*] is not great, but it is constant, therefore they should be kept as distinct. According to modern criteria they must be considered as *subspecies* or incipient species, as it is better expressed; but it is not possible to tell which of the two is the more ancient, or from what ancestor the other has derived. Such a fact illustrates very clearly the fallacy of burdening the already overloaded ornithological terminology with a trinomial nomenclature. Who could prove to me in this case (and almost all the so-called subspecies are in such a condition) that it is correct to write: *Saxicola occidentalis melanoleuca* or *Saxicola melanoleuca occidentalis*, in order to distinguish the two forms; or, on the contrary, using the incongruous and monstrous repetition of the specific name in order to designate the mother form, to write: *Saxicola melanoleuca melanoleuca* or *Saxicola occidentalis occidentalis*? For obvious reasons of order and logic, I prefer to maintain the admirable and very simple binomial nomenclature of the most celebrated Linnaeus; affinities, as well as divergencies between two forms (let us call them ''species''), are variable quantities and easily measured very differently by the various scholars, so that we cannot always have a sharp and precise definition to distinguish *species* from *subspecies*; still less easy is it to establish which is, between two related forms, the (mother) *species*, or the (daughter) *subspecies*; since such should be their true and phylogenetic relationships . . .'' [transl.] (Giglioli 1894).

After the death of Giglioli and Salvadori, the use of trinomial nomenclature in ornithology was accepted in Italy without further controversy; Arrigoni degli Oddi used trinomials in his textbook ''Ornitologia italiana'' (1929), though remaining sceptical, as we have seen, to the so called ''manufacturing of subspecies'' by his German colleagues.

As a curiosity it may be recalled that, during the 1950s and 1960s, Antonino Trischitta (1892–1966), an eccentric Sicilian naturalist, proposed a bizarre nomenclatural system, which he called ''Nomenclatura Biologica ternaria plurinominale'' (Ternary plurinominal biological nomenclature). This system (Trischitta 1950, 1967) was intended to reveal the exact position of the living being, which the name referred to, within the systematic frame. The three terms indicate: the first, the kingdom, the phylum, the class and order which the organism belongs to; the second, the family and the genus included in the same family; the third, the species and, possibly, the subspecies. For instance, applying Trischitta's system the scientific name of Bonelli's Eagle would be:

Zochoaviaccipitrides accipitriihieraaetus fasciatus

resulting from:

Regnum: Animale (Zoo)	*Zo*+
Phylum: Chordata	Zo*cho*+
Classis: Aves	Zocho*avi*+
Ordo: Accipitriformes	Zochoavi*accipitrides*
Familia: Accipitridae	*accipitrii*+
Genus: Hieraaetus	accipitrii*hieraaetus*
Species: fasciatus	*fasciatus*

This method had no followers, but nevertheless it stimulated a short-lived interest and its mechanism was published in the pages of the authoritative "Bollettino di Zoologia" (Trischitta 1952) edited by the Unione Zoologica Italiana.

Summary

After the publication of Linnaeus' *Systema Naturae* (1758) binomial nomenclature was also introduced in Italy and adopted by several famous naturalists of the 18th century, such as Giovanni Antonio Scopoli and the Abbé Giovanni Ignazio Molina. By the beginning of the 19th century its use was consolidated thanks to the work of Paolo Savi and Carlo Luciano Bonaparte. Under the leadership of the latter scientist the Quarta Riunione degli Scienziati Italiani was held in Padua in September 1842 and, on this occasion, the Strickland Code, subsequently translated into Italian, was recommended since it fixed the 12th edition of *Systema Naturae* as starting point for scientific nomenclature.

Subsequently, voyages of exploration and the systematic collecting of zoological material started the golden era of descriptive zoology, which had Tommaso Salvadori (1835–1923) and Enrico Hillyer Giglioli (1845–1909) as its most distinguished representatives in Italian ornithology. Between the 19th and the 20th century the German-speaking ornithologists Ernst Hartert, Otto Kleinschmidt and Victor von Tschusi introduced the subspecies concept and began to use trinomial nomenclature consistently in their writings. In Italy this new school found an eminent supporter in Count Ettore Arrigoni degli Oddi (1867–1942), who in 1902 described his first new subspecies of Italian birds using trinomials, in conflict with the old school of Salvadori and Giglioli.

At about the same time in England a similar situation occurred, between the younger Hartert and the older ornithologists such as Richard Bowdler Sharpe, Philip Lutley Sclater and Alfred Newton. The controversy which ensued lasted for about twenty years and is still remembered thanks to private correspondence and articles in scientific periodicals by the authors involved; though sometimes extremely polemic, their tone was frequently enlivened by humour as is shown, for instance, in Giglioli's writings.

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Scopoli, Linnaeus and the Wallcreeper *Tichodroma muraria*

by Fabio Barbagli, Fausto Barbagli & Carlo Violani

While examining letters written to Carl Linnaeus (Råshult 1707–Hammarby 1778) by Giovanni Antonio Scopoli (Cavalese 1723–Pavia 1788) now preserved in the Linnean Society's Library, London, and the respective replies published by Cobelli & Delaiti (1889) and recently by Soban (1995), we found interesting details on the nomenclature of some animals including the Edible Dormouse *Myoxus glis* (Violani & Zava 1995) and the Wallcreeper *Tichodroma muraria*. This bird was not included in the tenth edition of *Systema Naturae* (1758) probably because being a species foreign to Sweden it was unfamiliar to Linnaeus. Scopoli was a faithful correspondent of Linnaeus. He was employed by the Austrian Imperial Government as a physician to the quicksilver miners of Idria in Carniola (the region around Ljubljana in Slovenia) and his salary was supplemented by the tax money collected on wine sold in the area (Scopoli 1786–1788). Although isolated, Scopoli cultivated interests in many fields of the natural history of Carniola, botanizing, collecting insects and making observations on the local birds, during a long residence in Idria and on his trips through Slovenia and Friuli.

He wanted to send a specimen and communicate first-hand details of the Wallcreeper to Linnaeus so that his Swedish correspondent could include it in a future revised edition of *Systema Naturae*. In a long letter to Linnaeus, dated 28 January 1762, Scopoli announced that he had sent a *Upupa muraria* in a box together with other scientific material. However Linnaeus was unable to find the bird in the consignment when he opened the box, and so noted down on the left margin of Scopoli's letter: "*Hanc non reperi in cistula; certe neglexit imponere Scopoli* . . . " ["I did not find this in the box; certainly Scopoli must have forgotten to put it in . . . "].

On 11 February 1762, the Italian author apologized for his negligence and wrote: " . . . *In cysta, pro Te, Cl. Gronovio missa, non invenies Picum murarium Aldrov . . . Nescio enim quo fato, apud me denuo remanserit, mittam tamen alia vice. Avis haec non est Picus, sed meo iudicio Upupa corpore supra cinereo, gula alba abdomine cauda alisq. nigris: basi remigibusq. primariis semirubris: tribus primis maculis duabus albis* . . . " [" . . . In the box, sent to you through the celebrated Gronovius, you will not find the *Picus murarius* of Aldrovandi . . . I do not know by what mischance it remained with me, but I will send it some other way. This bird is not a woodpecker, but in my judgement an Hoopoe, with ash grey upperparts, throat white, belly, tail and wings black with the base of the primaries half-red, the three outer ones with two white spots . . . "].

At last, with a long letter written by Scopoli on 7 April 1763, Linnaeus received a specimen of the bird accompanied by an accurate description of *Merops murarius*. Scopoli wrote: " . . . *En descriptionem*

Gliris Romanorum et Pici murarii, quibus nonnullas alias observationes adiungo. . . . Merops (murarius), cinerascens, rostro abdomine cauda alisque nigris, remigibusque primariis semicoccineis, rectricibus apice albentibus . . . Habitat et nidificat in Arcibus elatioribus et desertis, nec non in turribus . . . " ["Here is the description of the Dormouse of the Romans and of the Wallcreeper, to which I am adding some other observations . . . *Merops murarius*, ashy coloured, bill, abdomen, tail and wings black, the primaries half scarlet, the rectrices white-tipped . . . It inhabits and nests on the higher solitary fortresses, as well as on towers . . . "].

A longer, detailed description followed. This was meticulous when giving body characters, and he obviously had a freshly killed specimen in winter plumage in front of him when writing the letter, since he was able to describe the shape of the nostrils, of the tongue and of the palate. A vivid report of the Wallcreeper's behaviour revealed that Scopoli had observed the bird in life personally: "*Sub finem Autumni migrat solitarius, volatu vago, remigante, muto. Aedificia elatiora, turres et Arces adit, muris insidet, super hos saltitando reptat, fenestras et latebras recognoscit, araneas devorat, muscas segniores capit, inquietus, frigoris amans, numquam pinguescens.*" ["Towards the end of Autumn it migrates alone with a wandering, flapping, silent flight. It visits the higher buildings, towers and fortresses, sits on the walls, creeps on them hopping, explores windows and concealed places, devours spiders, catches the slower flies, restless, loving cold weather and never getting fat"].

On 17 May 1763 an enthusiastic Linnaeus replied from Uppsala, gratefully acknowledging Scopoli's helpful information: "*Epistolam tuam V. A. d. 7 aprilis data rite accepi, . . . perplacuit pulcherrima avis europaea Picus muralis dicta . . .* " ["I have safely received your letter dated 7th April, . . . I liked very much the beautiful European bird called *Picus muralis* . . . "].

Linnaeus included it as a new species under the name of *Certhia muraria* in his 12th edition of *Systema Naturae* (1766), where he acknowledged the information received. Later, Scopoli (1769) published a very similar diagnosis for *Certhia muraria*.

An interesting point concerns the type-locality of *Certhia muraria* Linnaeus 1766. Although briefly mentioning other authors, such as Gesner, Aldrovandi, Kramer and Brisson, Linnaeus clearly relied on Scopoli's contribution for the printed description of the Wallcreeper. Since Scopoli's specimen is stated to originate from Carniola, according to correspondence with Linnaeus, we believe that the Linnean type-locality ("*Habitat in Europae australis turribus, arcibus*") of *Tichodroma muraria muraria* (L.) can be restricted to Carniola in Slovenia.

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The Authors wish to express their gratitude to Miss Gina Douglas, Librarian, and to the Linnean Society of London, for their kind permission to study and transcribe the Scopoli–Linnaeus correspondence, held in their care.

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Molecular probes for identifications of raptors

by D. Parkin

Research into the Red Kite *Milvus milvus* at Nottingham resulted in the isolation of a clone DNA that is inherited in a sex-limited fashion. It reveals a multi-band profile that is transmitted *more or less* faithfully from mother to daughter. This 'matrilineal' pattern is typical for DNA that is sited on the female-specific (W) chromosome. Analysis of a series of unrelated female kites from Germany and Spain revealed that there were 20 different patterns among 27 nest sites. There was no evidence of a common pattern between the two regions.

A long series of females from Wales revealed only two profiles, suggesting that this population is distinctly less variable. This finding is supported by the analysis of multi-locus DNA profiles in kites from these three regions.

A single locus was analysed using an oligonucleotide probe. The number of alleles detected was significantly less in the birds from Wales, whereas those from Germany and Spain did not differ.

All these results suggest that Red Kites from Wales are genetically depauperate.

Interestingly, a southern isolate of the Welsh populations revealed a significant difference in genetic structure. First, the two matrilines differed in relative frequency, and second, the single locus data differed. The rarer of the matrilines was very similar to a German profile, suggesting the possibility that a bird from this region had colonised South Wales at some time close to the date of spread from the traditional range in mid-Wales.

In the late 1980s, it was decided to attempt to re-establish the Red Kite into an area of southern England from which it has been absent for over a hundred years. Blood samples were taken from the released birds which were also marked with rings and patagial (wing) tags. When breeding commenced, the identity of pairs was determined visually, and their success monitored. Blood samples taken from the nestlings permitted confirmation of identity and parentage.

Although numbers were very small, evidence suggested that birds from Wales bred later and were less successful than the main release from Spain. This supports the hypothesis that the Welsh birds are not only less variable (inbred) but also less successful (inbreeding depression). Supporting evidence will be presented, and recommendations made for future releases in any re-introduction programme.

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X-raying the Gods: what were the mummified Horus falcons of Egypt?

by D. A. Russell, B. Galeb & R. Hoath

As part of the Egyptian Exploration Society (U.K.) investigation of the social and temporal context of the Sacred Animal Necropolis at Saqqara, Egypt, in 1992, 1994 and 1995, identification to species level was attempted for some 200 mummified 'falcons'. These were amongst the hundreds of thousands deposited in underground galleries from c. 600BC to 100AD by devotees of the religious cult of Horus worship. Many of the remains were in poor condition, partly as a result of the 'hot dipping' method of mummification used and partly because of the age and condition of the material at the time of its mummification (many specimens were partial skeletons, mixed species or other material, e.g. eggshells, twigs or shrews).

Identification by manual unwrapping was both laborious and destructive, owing to the friable nature of the material, and the wrapping of some specimens was too fine to permit destructive sampling. Consequently, a sub-sample of mummies was X-rayed on site. A portable army field machine, manufactured by the Massiot Society, was operated at 10 mA and 60 kV by Drs R. and M. Lichtenberg with the kind permission of the Mission Archéologique Française du Bubasteion. Apart from the need for accurate scaling, most of the difficulties in resolution of the bones turned out, on subsequent unwrapping, to be unresolvable problems related to the charred, broken or non-skeletal nature of the material. Determinations were made mostly on the basis of long-bone (especially tarsal) and skull measurements, as these showed reduced dependency on the precise conformation of the bird within the mummy, which was often not as indicated by the external wrapping. Simple proportionality indices were utilised where there were gender overlaps in size range between related species.

Perhaps surprisingly, considering the enormous numbers of birds mummified at the site, most identified remains were of birds of prey (both residents and passage migrants) likely to have been common in the immediate area. Most were Kestrels *Falco tinnunculus*, Lanner *F. biarmicus* and Barbary Falcons *F. pelegrinoides*, though species of hawks, harriers *Circus* spp., eagles, vultures and some other species of falcon were also found. However, species only utilising the migration pathway along the adjacent Red Sea coast (e.g. Lesser Spotted Eagle *Aquila pomarina*) were absent, as were the expected three species of kite. The latter, including the falcon-like Black-shouldered Kite *Elanus caeruleus*, must have been common in the area at the time and have been recorded from other archaeological sites in Egypt.

Allied with the burial of some individuals with appropriate 'food-parcels' (including a Marsh Harrier *Circus aeruginosus* with a small mummified snake), the mummies show that the ancestral inhabitants of the Nile valley had considerable, detailed, knowledge of the birds of prey of the region. A wide range of birds of prey (but possibly not all) appear to have been sacred to Horus, the sky God, son of Osiris, with whom the living King was closely identified.

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Bird taxonomy based on eggshell structure

by K. E. Mikhailov

In terms of evolution, the taxon is the result of a particular morphogenetic trajectory: it is an objective category which is independent of phylogenetic (=genealogical) hypotheses and logically precedes them. Major distinctions between taxa, such as eggshell structures, are very important since they enable the recognition of different trajectories amongst a mosaic of similarities. A working assumption is that two families of birds within the same order should not exhibit different eggshell structures, since such differences indicate substantial morphogenetic separation. It is also assumed that similarities in the basic eggshell structure suggest that the families being compared are members of a single evolutionary trajectory.

Comparisons of eggshell structures have led to the following conclusions. Ratite, galliform and anseriform birds show ratite-like eggshell structures; therefore each of these groups is taxonomically very distinct from the neognathe bulk of families. The casuariiform birds (emu and cassowaries) are separate within the traditional paleognathes, and the Cracoidea (Megapodiidae and Cracidae) are separate from the other galliform birds. Three orders of aboreal neognathes, namely Cuculiformes, Coraciiformes and Piciformes, also exhibit somewhat ratite-like eggshell structures. A group consisting of the Psittaciformes, Strigiformes and Caprimulgiformes, and another including the Apodiformes, Coliiformes and Trogoniformes, form separate structural assemblages of arboreal orders, as do the Passeriformes. All gruiforms and charadriiforms (amongst which the jacanas are most distinct) have generally similar eggshell structures. The unusual suborder Ciconii *sensu* Sibley and Ahlquist is an assemblage of high ranking taxa, including the Pelecaniformes (which may be separate from the Phaethontes, but allied with the Balaenicipitidae) with the Ardeiformes (Ardeidae, Threskiornithidae, Scopidae), Falconiformes, Accipitriformes (Accipitridae+Pandionidae), Ciconiiformes (Ciconiidae only), Procellariiformes, Gaviiformes, Sphenisciformes, Podicipediformes and Phoenicopteriformes as very separate groups. The Dromaiidae+Casuariidae, Accipitridae+Pandionidae, Ciconiidae and Bucerotidae (possibly all Upupiformes) have eggs with the most aberrant eggshell structures among avian families.

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BOOKS RECEIVED

del Hoyo, J., Elliot, A. & Sargatal, J. (eds) 1996. *Handbook of the Birds of the World.* Vol. 3, Hoatzin to Auks. Pp. 752, 60 colour plates, 389 colour photographs, 577 distribution maps, *c.* 8000 bibliographical references. Lynx Edicions, Barcelona. ISBN 84-87334-20-2. *c.* £105 (plus p. & p.). 31 × 24 cm.

This superbly illustrated volume is the third part of the *HBW* series now structured to be published in 12 volumes, subsequent parts planned to be published every 18 months and eventually at shorter intervals. With publication of Vol. 3, the first 69 families of birds have been dealt with out of the envisaged world total of 176, in less than 4 years. *HBW* benefits from having been supported by BirdLife International from the very early days, with the provision of up to date information on the conservation status of many species.

The foreword and frontispiece by Robert Bateman are followed by a relatively short 4-page introduction. Readers are referred to the detailed general introduction to the series in Vol. 1 (pp. 15–33), the guiding taxonomic principles of which are summarised briefly as fairly conservative at the macrosystematic level, increasingly flexible at lower levels, and subspecifically aiming to follow latest developments appearing to have gained reasonable acceptance. Vol. 3 is stated, however, to probably represent the single most significant taxonomic deviation from traditional usage in the series, e.g. the Plains-Wanderer *Pedionomus torquatus*, endemic to Australia, is placed in Charadriiformes; the taxonomically controversial Hoatzin *Opisthocomus hoazin* is placed in the monotypic order Opisthocomiformes; the sandgrouse (Pteroclidae) have been awarded a separate order, Pterocliformes. Mention is also made of the new IUCN criteria for threat (the Mace-Lande categories being no longer used): Vulnerable, Endangered and Critically Endangered.

The family and species accounts generally retain the style, layout and headings of the first two volumes of the series, the family accounts continuing to be illustrated by a superb range of colour photographs. One significant innovation is the inclusion of notes on voice in the Descriptive Notes section (originally intended only for the passerines) for all species in the Gruidae and Rallidae. An example of the level of detailed information given is, for Status and Conservation of the Rallidae, the list of rail taxa (including subspecies) extinct since 1600 linked to the high incidence of flightlessness, their status as island endemics and the probability of their having succumbed to predators introduced by man.

Species names are also given in French, German and Spanish (publication of recommended Spanish names continues elsewhere) in addition to the scientific and adopted English names. Several examples of more recent developments affecting taxonomy and terminology retained by Vol. 3 are: *Turnix sylvatica* (9 subspecies recognised) rendered as Common Buttonquail but in the other 3 European languages more nostalgically as Turnix d'Andelousie/Laufhühnchen/Torillo Andaluz; *Haematopus ostralegus* becomes Eurasian Oystercatcher/Huîtrier pie/Austernfischer/Ostrero euroasiático; *Catharacta antarctica* (3 ssp.) becomes Brown Skua with *C. skua* separated as monotypic; for the Laridae, the so-called white-headed gulls group is identified as having proved extremely challenging (species limits among species pairs in the Herring Gull complex being controversial). *Larus argentatus* (4 ssp.) is retained as Herring Gull/Goéland argenté/Silbermöwe/Gaviota argéntea: *L. cachinnans* (5 ssp.) becomes Yellow-legged Gull/Goéland leucophée/Weißkopfmöwe/Gaviota patiamarilla: *L. armenicus* (monotypic) becomes Armenian Gull/Goéland d'Arménie/Armenienmöwe/Gaviota Armenia; *L. fuscus* is allocated 4 ssp. including *heuglini*.

The list of the 60 beautifully reproduced colour plates illustrating plumage characteristics (including most subspecies) credits the individual artists, the complete international Vol. 3 team being Norman Arlott, Hilary Burn, Angels Jutglar, Francesc Jutglar, Ian Lewington, Chris Rose, Lluís Sanz, Etal Vilaró and Ian Willis. The plates also incorporate a simple graduated scale allowing size to be appreciated. Vol. 3 ends with a list of references to the original scientific descriptions, a general list of all references and an index.

Vol. 3, as the previous two volumes, is such excellent value for money (particularly if special publication offers are taken up) that it is highly recommended for all devotees from the enthusiastic amateur to the dedicated professional.

S.J.F

Feduccia, A. 1996. *The Origin and Evolution of Birds*. Pp. x+420, numerous text-figures. ISBN 0-300-06460-8. Yale University Press. £45.00. 28.5 × 21.5 cm.

Tremendous advances have been made in knowledge of avian evolution in the last 20 years, from the study of new fossil material. Much of it has appeared in publications not readily available to general ornithologists. A broad, up to date survey by a leading researcher in the field thus fills a major gap in the bird literature. Indeed, keeping completely up to date in a book of this scope is scarcely possible; Feduccia was not able to provide a full account of important Jurassic and Cretaceous fossils that were still under study at the time of his writing.

A great merit of this book is that the necessary technical details are made intelligible to a non-specialist, and for the most part the whole text is highly readable. Considerations not only of zoogeography and continental movements, but also of ecology and behaviour, are brought to bear on the task of presenting a historical and functional interpretation of the whole course of avian evolution. Readers unfamiliar with what has been revealed by recent research will be amazed by the extraordinary diversity and succession of independently evolved adaptive types over tens of millions of years. Tentative interpretation of avian evolution on the basis of present-day distributions turns out to be almost wholly fallacious. Families now endemic to a continent and so thought to have evolved there, for example colies in Africa, were once widespread. Early forms of todies have been found in North America and France, showing that the five species in the West Indies are a surviving remnant and throw no light on the origin of the family. An overwhelming impression, from Feduccia's survey, is that our present world avifauna, judged by body size and structure alone, is rather a diminutive and impoverished one by comparison with what there once was; but there has been compensation in the recent proliferation of the passerines, which may have reached a level of sophistication of behaviour in advance of anything that preceded them.

The illustrations are excellent, adding greatly to one's appreciation of the text. The latter is slightly marred by minor errors and misprints that seem to be due to inadequate proof-reading. Further, some of the interpretation, especially concerning the very early evolution of birds, is controversial, and this will not always be apparent to the non-specialist reader; but this hardly detracts from an overall judgment that this is one of the most interesting books on birds to have appeared for years.

Woods, Robin W. and Anne. 1997. *Atlas of Breeding Birds of the Falkland Islands*. Pp. 190, 73 maps. Anthony Nelson Publishers, in association with Falklands Conservation. ISBN 0-904-614-60-3. £25.00. 25 × 17 cm.

This is the first breeding bird atlas published for a South American country, and shows the importance of the Falkland archipelago for thriving populations of species that have declined dramatically in southern South America. The authors have 40 years personal knowledge of these islands, and this book is the outcome of contributions from about 160 observers, who sent in survey forms over a period of ten breeding seasons between 1983/84 and 1992/93. The delightful line drawings for each species are by Staff Sergeant Geoffrey McMullan.

This work is a classic example of how the observations of a wide range of birdwatchers, both professional and amateur, can be combined to produce a reference of real value. About 80 (51%) of these were Falkland Islanders or contract workers; 47 (30%) were military personnel, temporarily stationed on the islands, or visiting in RN/Royal Fleet Auxiliary ships; 29 (19%) were visiting tourists to the Falklands.

This is an important book, and with continuing exploitation of fishery resources, and the threatened development of off-shore oil now imminent, its publication is very timely. The excellent maps provide unique distributional data of all established breeding species and, more importantly, show where current knowledge is incomplete, and where further surveys are necessary. The Atlas will be of interest to Falkland Islanders and will be a key reference for future visitors and tourists, because there is much work still to be done. It will also be of interest to ornithologists worldwide, to anyone studying island faunas, and to people who are concerned about the environment. Maps included show the distribution of introduced mammals, including domestic/feral Cat, Common and Black Rat and European Rabbit.

The result is well-produced, and compares very favourably with the previous work from the same stable, Robin Woods' *Guide to Birds of the Falkland Islands* (1988).

M.B.C.

NOTICE TO CONTRIBUTORS

Papers, from Club Members or non-members, should be sent to the Editor, Dr D. W. Snow, The Old Forge, Wingrave, Aylesbury, Bucks HP22 4PD, U.K., and must be offered solely to the *Bulletin*. **After 15 September 1997, they should be sent to Dr C. J. Feare, 2 North View Cottages, Grayswood Common, Haslemere, Surrey GU27 2DN.** They should be typed on one side of the paper, with **treble**-spacing and a wide margin, and submitted in duplicate. The style and lay-out should conform with usage in this or recent issues of the *Bulletin*.

A contributor is entitled to 10 free offprints (16 if 2 or more authors) of the pages of the *Bulletin* in which his contribution, if one page or more in length, appears. Additional offprints or offprints of contributions of less than one page may be ordered when the manuscript is submitted and will be charged for. Authors may be charged for proof corrections for which they are responsible.

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Only Members of the British Ornithologists' Union are eligible to join the Club, and to receive (postage free) four quarterly issues of the *Bulletin*, and the annual index, for an annual subscription of £12 (or U.S. $26). Applications, enclosing the annual subscription, should be made to the Hon. Secretary (address as below).

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The *Bulletin* (for 1997 onwards), together with annual index, may be purchased (postage free) by non-members on payment of an annual subscription of £22 (or U.S. $45) on application to The Publications Officer, S. J. Farnsworth, Hammerkop, Frogmill, Hurley, Maidenhead, Berks SL6 5NL, U.K. Single issues, and back numbers of the *Bulletin*, and also books in the *BOC Occasional Publications* series may similarly be obtained, on request to him.

PAYMENTS

All amounts quoted are net and should be paid in £ sterling, if possible. Payments in other currencies must include a further £4 for UK bank charges (except for annual rates in U.S. dollars, which are inclusive). All cheques or drafts should be made payable to the British Ornithologists' Club. If preferred, remittances may be made by bank transfer direct to the Club's bank account—Barclays Prime Account, Dale House, Wavertree Boulevard, Liverpool L7 9PQ, U.K. (Sort Code 20-00-87 Account No. 10211540), with confirmation to the Hon. Treasurer, D. J. Montier, Eyebrook, Oldfield Road, Bickley, Bromley, Kent BR1 2LF.

CORRESPONDENCE

Correspondence on membership, changes of address and all other matters should be addressed to the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants GU31 5PA, U.K. For details of Club Meetings see inside front cover.

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British Ornithologists' Club

Edited by
Dr D. W. SNOW

Volume 117 No. 3 September 1997

FORTHCOMING MEETINGS

Advance notice of meeting dates for 1998. Nine meetings are being arranged for the following Tuesdays: **20 January** (Ian Burrows on *Birds of Papua New Guinea*—see below), **17 March** (Tony Prater on *Waders*), **21 April** (Dr W. R. P. (Bill) Bourne on *Birds and Islands*), **19 May** (AGM and social evening—with informal "mini-talks" as in 1997), **14 July**, **15 September**, **13 October** and **17 November**. Details of speakers on these dates will be published when finalised.

Tuesday 20 January 1998. Dr Ian Burrows *B.Sc., Ph.D.* will speak on **"The Birds of Papua New Guinea"**. Ian has been a keen birder for many years, with a passion for rare and elusive species. After spending a year as a Warden of Cape Clear Bird Observatory in 1975, he obtained a Ph.D. in Applied Microbiology from Aston University in 1980. He has spent ten years (1986–1995) in Papua New Guinea lecturing in Microbiology, Ecology and Biology at the University of Papua New Guinea, in Port Moresby. He has visited and watched birds in every province of PNG, apart from Bougainville, and has conducted extensive research and consultancy programmes on the Melanesian Scrubfowl, Macgregor's Bird of Paradise, and a wide range of rainforest birds. A fluent pidgin speaker, he has worked as an in-field consultant for the British and Australian Broadcasting Corporations and the World Wildlife Fund. In 1997, together with Phil Gregory, he has founded Sicklebill Safaris Ltd., specialising in tours to Melanesia and Australia in search of rare and little known species..

*Applications to the Hon. Secretary by **4 January**, please.*

Tuesday 4 November 1997. Tony Marr will speak on **"An Atlantic Seabird Odyssey"**. Tony has had a life-long interest in seabirds, especially through 'pelagics' in the eastern Atlantic, and he has pursued them from a wide variety of boats and craft, off Portugal, The Canaries, Madeira, West Africa, and the South Atlantic. Having retired early to devote more time to birds, he is well-known to many as a tour leader to many parts of the world, and as a lecturer and author of articles on seabird topics. He serves on the BOU Records Committee, and the Seabirds Advisory Panel for *British Birds*.

*Applications to the Hon. Secretary by **21 October** (Trafalgar Day!), please.*

Meetings are held in the Sherfield Building of Imperial College, South Kensington, London SW7, at 6.15 p.m. for 7 p.m. The nearest Tube station is at South Kensington, and car parking facilities are available; a map of the area will be sent to members, on request. The cash bar is open from 6.15, and a buffet supper, of two courses followed by coffee, is served from about 7.00. (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion.

Overseas Members visiting Britain are particularly welcome at meetings. For details in advance, please contact the Hon. Secretary, Cdr M. B. Casement, OBE, RN: Dene Cottage, West Harting, Petersfield, Hants GU31 5PA.

Tel/Fax: 01730-825280 for late bookings and cancellations.

Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

Vol. 117 No. 3 Published 19 September 1997

ANNUAL GENERAL MEETING

The Annual General Meeting of the British Ornithologists' Club was held in the Ante-room of the Sherfield Building, Imperial College, London SW7 on Tuesday 20 May 1997 at 6 p.m. with Mr D. Griffin in the Chair. Apologies had been received from R. E. F. Peal, S. J. Farnsworth, Professor C. J. Feare and Mrs Mary Muller. 23 Members were present.

The Minutes of the Annual General Meeting held on 21 May 1996, which had been published (*Bull. Brit. Orn. Cl.* 116: 201–202), were approved and signed by the Chairman.

The Report of the Committee for 1996, which had been published (*Bull. Brit. Orn. Cl.* 117: 1–3), was presented. The Chairman drew attention to the highlights: eight evening meetings, with an average attendance of 36; the highly successful joint meeting with the Linnean Society, in March, organised by Dr R. A. Cheke; the very enjoyable excursion to Gilbert White's house at Selborne on 31 May; and the publication of Vol. 116 of the *Bulletin*, containing a wide range of material, including colour plates of two new species. It is hoped that these colour plates will become a regular feature, and the Club is indebted to Tom Gladwin for arranging future sponsorship. Membership had increased to 567 (550)—322 U.K. and 245 overseas.

1996 also saw the publication of the second in the Occasional Publication series—*Manuscripts and Drawings in the Ornithology and Rothschild Libraries of the Natural History Museum at Tring*, by Mrs F. E. Warr. Several other publications were in the pipeline, and the Chairman thanked Mrs A. M. Moore and the Publications Sub-committee for all their work. Approval of the Report was proposed by Mrs A. M. Moore, seconded by Iain Bishop, and approved by all present.

The Chairman then thanked the Hon. Secretary for the arrangements for the evening meetings, and also for the additional tasks he had taken on, including the painful learning of the intricacies of word-processing, the updating of address lists, and the coordination of the handover of the Treasurer's tasks from John Farnsworth to David Montier. All Membership matters and subscription reminders were now handled by the Hon. Secretary, ably assisted by Helen Baker.

The Accounts for 1996 were presented by David Montier, who had taken over as Acting Hon. Treasurer, on the resignation of John Farnsworth, as from November 1996. The accounts covered the year ended 31 December 1996, and included a statement of Committee

Members' Responsibilities, and Independent Examiner's Report (Donald Reid & Co); copies of the accounts were distributed to all Members present.

David Montier drew attention to the main points. The Income & Expenditure Account for 1996 showed a surplus of £5,959 (£5,549 in 1995). Investment income included (with Income Tax recovered) a total of £9,912 from the Herbert Stevens Fund. £3,572 had been received from Sales of Publications, including £1,858 for sale of *Bulletin* back-numbers, much of which was from a single big order. Publication costs of the *Bulletin* were £10,118 (£8,526), the 1996 figure including £1,382 for the additional cost of colour plates. The cost of evening meetings was £3,454, whereas the income was £3,131, which represented a loss of £323 (£444 in 1995), but this figure would increase in 1997, due to the additional room hire charge of £120 per evening, as from December 1996. In general, the figures showed a fairly healthy state.

Details of the **Herbert Stevens Trust Fund** were given on a separate statement, showing an end of year balance of £172,575 (£162,791), and the investment portfolio a valuation increase of £10,886, over the year.

In answer to a question, Mr Montier replied that he would look into the suggestion that, since the 21 year term had now expired, the **Barrington Trust Fund** (valued at £577) should now be transferred to the General Fund, or possibly added to the (James Monk) Publication Fund. The **Bird Atlas of Uganda Fund** (£2,597) represented an advance sponsorship donation from Shell Uganda, and was being held in a separate deposit account, until the future costs and sponsorship plans were clarified.

Dr James Monk warmly congratulated David Montier on the clarity and timeliness of these accounts. Adoption of the Accounts was proposed by the Acting Hon. Treasurer, seconded by Stan Howe, and approved by all present.

The Chairman thanked David Montier for allowing himself to be persuaded to take on the task as Hon. Treasurer, and for presenting the audited accounts for this meeting. There had been many meetings between him and John Farnsworth during the past year, and the Club was very grateful to them both for achieving a smooth hand-over of responsibilities. David Montier, in response, paid tribute to the immense volume of work achieved by his predecessor during his term of office. Those tasks were now shared between three people.

The Chairman expressed the thanks of all to the Trustees of the Herbert Stevens Trust Fund, for their management of these funds during the year, and also to Dr James Monk for his further donations to the Publications Fund.

The *Bulletin*. Dr David Snow reported that the next issue, 117(2), to appear in June, would include five of the main papers, and several shorter papers presented at the joint meeting with the Linnean Society last year, which should attract wide interest. He had agreed with Chris Feare to hand over the Editorship in the course of September, and an appropriate notice to contributors would be included inside the rear cover of 117(2). There was a good supply of contributions sufficient to the end of this year, and into 1998, and he was pleased with the policy to include regular colour plates. Dr Robert Prŷs-Jones said it was important to continue this, and Tom Gladwin saw no problem in finding the sponsorship necessary for the future.

The Chairman warmly thanked Dr Snow, on behalf of the whole Club, for another excellent volume last year, and for his wise Editorship since 1991. He was grateful for his agreement to continue until Chris Feare was available to take over, in September. Thanks were also due to Mrs Mary Muller for her work in again producing the Annual Index for 1996, which would appear in June.

Election of Officers and Committee. As retiring Chairman, and before proceeding to the election of Officers, David Griffin expressed his personal thanks to all those who had so readily helped in the running of the Club during his four-year term of office. In addition to those already mentioned, special thanks were due to Ronald Peal, who had been one of the leading lights of the Club ever since he became Hon. Secretary in 1971, and had been Chairman in the Club's Centenary Year. In the past four years as Committee Member, we had all benefited greatly from his wealth of experience. Francis Stone, who continues on the Committee, is very active in sorting and cataloguing the Club's archives. Effie Warr, who is the author of this years's Occasional Publication No. 2, has for many years stored and managed our stock of *Bulletin* back-numbers. Professor Richard Chandler had kindly looked after our interests, and stored our equipment in Imperial College. Thanks are also due to Ron Kettle and Pat Sellar for organising the projector and audio equipment at our meetings.

The Committee's proposals had been published in *Bulletin* 117(1): 3, and no other nominations had been received. He proposed that Michael Casement be re-elected as Hon. Secretary, and David Montier be confirmed as Hon. Treasurer. This proposal was seconded by Dr James Monk and agreed by all present.

The Committee proposed that Dr David Snow be re-appointed as Editor, until September, and Professor Chris Feare as Editor, on a date to be mutually agreed, Iain Bishop seconded this proposal, which was agreed by all present.

The Committee proposed the election of Mrs A. M. Moore as Vice-Chairman, to replace Tom Gladwin, and is very glad that she has accepted this nomination, in view of her long-standing service to the Club, as Secretary 1989-95, and since as Chairman of the Publications Committee. Ron Kettle seconded this proposal, which was agreed unanimously.

David Griffin said that his final pleasant duty, as retiring Chairman, was to propose the election of the Reverend T. W. Gladwin to succeed himself as Chairman. Tom had been a tremendous support during his own term of office, and had been very active in encouraging new activities for the Club. He had inspired and organised the two visits by members to the Natural History Museum at Tring, and the visit last year to Selborne. He had also arranged sponsorship for the colour plates now appearing regularly in the *Bulletin*. This proposal was seconded by Stan Howe and agreed unanimously.

The Revered Tom Gladwin was declared elected as Chairman, and he received the good wishes of all, for his term of office. In response, he thanked David Griffin for his Chairmanship of the Club, throughout a period of considerable change, and for his encouragement for new ideas and re-organisation of Club business. He was especially pleased that the Committee could count on his continued support and advice, as a member of the Committee.

He proposed that N. J. Redman be elected to fill the vacancy on the Committee, on the retirement of R. E. F. Peal. This was seconded by Iain Bishop, and agreed by all.

No other items for discussion had been notified in accordance with Rule (12), and meeting closed at 6.30 p.m.

The eight hundred and sixty-seventh meeting of the Club was held on Tuesday, 8 April 1997, at 6.15 p.m., in the Senior Common Room at Imperial College. 31 Members and 8 guests attended.

Members present were: D. GRIFFIN (*Chairman*), Dr C. J. HAZEVOET (*Speaker*), Miss H. BAKER, J. W. BARRINGTON, P. J. BELMAN, Dr W. R. P. BOURNE, Mrs D. M. BRADLEY, D. R. CALDER, Cdr M. B. CASEMENT RN, Professor R. J. CHANDLER, Dr R. A. CHEKE, D. J. FISHER, Dr L. D. C. FISHPOOL, Rev. T. W. GLADWIN, A. GIBBS, J. A. JOBLING, C. A. R. HELM, R. M. KETTLE, N. S. MALCOLM, Dr C. F. MANN, D. J. MONTIER, R. G. MORGAN, Mrs M. N. MULLER, R. E. F. PEAL, Dr R. P. PRŶS-JONES, S. J. R. RUMSEY, R. E. SCOTT, P. J. SELLAR, Dr D. W. SNOW, N. H. F. STONE, C. W. R. STOREY.

Guests attending were: M BRADLEY, Mrs J. B. CALDER, Mrs C. R. CASEMENT, Mrs J. M. GLADWIN, Mrs S. GRIFFIN, A. MARTIN, Mrs M. MONTIER, R. RANFT.

After dinner, Dr Cornelius Hazevoet gave a presentation, illustrated with colour slides, on "The Birds of the Cape Verde Islands".

After shorter visits in 1986–1987, the speaker was semi-resident in the Cape Verdes during the years 1988–1996 as project co-ordinator of the National Parks and Protected Areas Programme (NPPAP), an initiative carried out by the Instituto Nacionale de Investigação e Desenvolvimento Agrário of Cape Verde and the Institute of Systematics and Population Biology (Zoological Museum) of Amsterdam.

The Cape Verde Islands are an oceanic archipelago situated *c*. 500 km west of Senegal. There are ten islands (of which nine are inhabited) and a number of uninhabited islets. Situated at the latitudes of the Sahel zone, the climate is generally arid with unpredictable and irregular rains. Among the landbirds, desert types (such as larks of the genera *Alaemon*, *Ammomanes* and *Eremopterix*, and Cream-coloured Courser *Cursorius cursor*) take a conspicuous place in the avifauna. More significantly, there are several taxa endemic to the islands, many of which appear to be relics from Pleistocene periods, when the climate in both the western Sahara and the adjacent Cape Verde Islands was considerably more humid than today.

While the climate deteriorated and taxa disappeared on the mainland, circumstances in the Cape Verde Islands remained relatively favourable for a longer period, enabling taxa to survive there, in isolation. These include a heron *Ardea bournei*, kite *Milvus fasciicauda*, buzzard *Buteo bannermani*, and kestrels *Falco neglectus* and *F. alexandri*. Endemic taxa with a more problematic zoogeographical history include a peregrine *F. madens*, barn owl *Tyto detorta*, the enigmatic Raso Lark *Alauda razae*, Cane Warbler *Acrocephalus brevipennis* and sparrow *Passer iagoensis*. Although some of these are widespread (*T. detorta*) or abundant (*P. iagoensis*) in the islands, many of the endemics are extremely rare and seriously threatened. For instance, the total population of *A. bournei* does not exceed some 20 pairs (and perhaps less) in two colonies, each situated in a single tree, while numbers of *M. fasciicauda* are decreasing at an alarming rate. The latter was once widespread in at least five of the islands, but today dwindling numbers only survive on the island of Santo Antão, and it will be extinct if no effective action is undertaken for its preservation. In 1988–92, the population of *A. razae* was estimated at *c.* 250 birds but recent visits could locate considerably less. Although this may partly be due to natural fluctuations in population size, this breeding taxon is extremely vulnerable to ground predators (cats, rats and dogs) which may be inadvertently released in its only resort (uninhabited Raso islet; 7 km^2) by visiting fishermen. The Cane Warbler *A. brevipennis* once occurred on three islands but is now only found in a patchy distribution on Santiago, with a population not exceeding some 500 pairs.

The situation for the seabirds is equally, it not even more, drastic; numbers have been greatly reduced due to the constant and centuries-long persecution by local fishermen, who harvest eggs and young for food, and destroy adults for no particular purpose. Populations of Red-billed Tropicbird *Phaethon aethereus* and Brown Booby *Sula leucogaster* are estimated to have declined from *c.* 1000 and 10,000 during the late 19th century to *c.* 100 and *c.* 1000 respectively today. The Magnificent Frigatebird *Fregata magnificens* was still widespread in the islands during the late 19th century but today is restricted to two small islets, and only about five pairs are left. The traditional annual harvest of young Cape Verde Shearwaters *Calonectris edwardsii* has brought the total population down to *c.* 10,000 pairs (and probably less); it is estimated that 4–6000 young are taken every year. Cape Verde Petrels *Pterodroma feae* are taken locally because of the alleged medicinal properties of their fat. Apart from the Little Shearwater *Puffinus boydi*, the smaller procellariids are not actively persecuted but at times their colonies suffer greatly from the trampling of nesting burrows by fishermen who search the islets' shores for shell-fish and debris.

Due to the efforts of the NPPAP, some of the important sites for breeding seabirds were declared nature reserves by law in 1990. These include the islets of Raso, Branco, Ilhéus do Rombo, Curral Velho and Baluarte. Access to and utilization of these reserves are now subject to governmental authorisation, but law enforcement remains problematical on these remote and uninhabited islets. During the last decade, much effort has been directed at the implementation of educational and legislative programmes, aimed at the preservation of the remaining natural heritage of the Cape Verde Islands. But there is still a long way to go before an effective level of awareness of conservation issues is achieved, both among the general public and the responsible authorities of the country.

The eight hundred and sixty-eighth meeting of the Club was held on Tuesday, 20 May 1997 at 6.30 p.m., in conclusion of the AGM, in the Ante Room at Imperial College. 31 Members and 8 guests attended.

Members present were: The Rev. T. W. GLADWIN (*Chairman*), Miss H. BAKER, Captain Sir THOMAS BARLOW Bt. RN, I. R. BISHOP, Mrs D. M. BRADLEY, D. R. CALDER, Cdr M. B. CASEMENT RN, Professor R. J. CHANDLER, Dr R. A. CHEKE, D. J. FISHER, Professor C. H. FRY, F. M. GAUNTLETT, D. GRIFFIN, S. HOWE, J. A. JOBLING, R. M. KETTLE, Dr C. F. MANN, Dr J. F. MONK, D. J. MONTIER, Mrs A. M. MOORE, Dr G. J. MOREL, Dr M.-Y. MOREL, Dr W. G. PORTEOUS, Dr R. P. PRŶS-JONES, N. J. REDMAN, P. J. SELLAR, R. E. SHARLAND, Dr D. W. SNOW, N. H. F. STONE, C. W. R. STOREY, Dr R. WILKINSON.

Guests attending were: Miss G. BONHAM, Miss J. COOPER, S. DUDLEY, Mrs J. M. GLADWIN, Mrs S. GRIFFIN, Mrs M. MONTIER, P. J. MOORE, M. PALING, Mrs B. SNOW, S. TONGE.

After dinner, Members gave a series of short talks on subjects of topical interest. The following is a brief synopsis of the subjects discussed.

Professor Hilary Fry gave a short talk entitled "The amazing *Anthoscopus* nest". With the aid of a large sketch drawing, he described the unusual nest mechanics of the Penduline Tit. As co-author of *The Birds of Africa* (Academic Press), he has necessarily become involved in researching the literature ancient and modern, studying at the museum, and obtaining field data from colleagues. Integrating information from publications scattered in place and time enables him to give African birds a persona, often, it seems, for the first time.

Suspended kapok nests of Africa's *Anthoscopus* penduline tits, with their cryptic entrance slit at the end of the projecting spout, and snake-confounding false entrance, are one of the wonders of the bird world (P. le S. Milstein 1975, *Bokmakierie* 27: 8–9). How the parent bird effects an entry has been described by several ornithologists—always rather differently. However, detailed observations by C. J. Skead in 1959 (*Ostrich*, Suppl. 3: 274–288) have now been verified by photographs, mainly by P. Steyn (1996, *Nesting Birds, The Breeding Habits of South African Birds*, Vlaeberg).

A parent arriving at the nest may mislead any watching predator by half entering the false 'entrance' (D. H. Chadwick 1983, *National Geographic* 163, 3: 344–385). Then it stands on the thick rim of the false entrance and, using its bill and one foot, pulls down the floor of the 'real' entrance spout overhead; it then levers itself inside, turns around in the spout, and draws together the spout ceiling and floor with its bill, whilst scrambling backwards into the brood chamber (Skead 1959). The coarse cobweb lining of the spout seems to promote adhesion. On leaving, the bird pushes its way along the spout, swings down, perches on the false entrance rim and with rapid movements jabs the underside of the spout upwards, with forehead and opened bill. It prods all of the underside, and then sometimes jabs also at the walls and floor of the false entrance.

But this remarkable procedure prompts a number of questions: Does the false entrance concavity, with its greatly thickened 'stoep', also help to deform the spout entrance to a slit? Do structural stresses make the spout snap open or collapse, according to the bird's position on, or in, the nest? And, finally, the kapok nest fabric is not woven, but is made into an extremely durable felt, by the tit's jabbing and tweaking—how precisely is this achieved?

Professor Richard Chandler gave a brief illustrated talk entitled "Sooty Oystercatcher *Haematopus fuliginosus*: two forms or two species?"

Sooty Oystercatcher, an Australian endemic wader, like the other species of 'black' oystercatcher, is a bird of rocky shorelines. There are two forms, usually regraded as races, the nominate race occurring around much of western, southern and eastern Australia, while *H.f. ophthalmicus* occurs from Western Australia to Cape York. The status of the two forms is not clear. Hayman *et al.* (1986, *Shorebirds: an identification guide to the waders of the world*) suggest that "Differences are marginal . . . the species is probably best considered monotypic. Most individuals cannot be assigned to either race, and intergrading undoubtedly occurs." In contrast, del Hoyo *et al.* (1996, *Handbook of the Birds of the World*) suggest that there is no field evidence for hybridisation between the two; ". . . the marked differences, especially in the bare parts, suggest that they may well prove to be separate species." Recent field observations, in Victoria (*H.f. fuliginosus*) and at Darwin, N.T. and Broome, W. Australia (*H.f. ophthalmicus*) seem to support the latter view, and are presented here.

The literature separates the two forms particularly by the broader, rather fleshy orange-yellow (rather than yellow-orange) orbital ring and the broader bill of *ophthalmicus*. There are conflicting views on which of the two has the longer bill. The bill breadth is not a good field mark, nor is bill length which seems to vary between individuals in both forms, presumably as a result of sexual dimorphism. There are differences in bill shape, typically uniformly tapered in *fuliginosus*, but in *ophthalmicus* usually rather deeper, particularly at mid length due to the increased depth of the lower mandible, giving an impression of an upturn in the bill. However, there is some overlap in shape between the two forms. These difference can be seen in the accompanying photographs, and can also be seen in photographs in Pringle (1987, *The Shorebirds of Australia*).

Though the speaker admitted his experience is limited, these differences seem to be consistent. More fieldwork is clearly required, particularly to confirm (or otherwise) interbreeding between the forms. The differences are, in his view, sufficiently great to support the view that they may be two species; at the very least, given reasonable views, they are easily separable in the field.

Dr Robert Prŷs-Jones gave a short illustrated talk on "Richard Meinertzhagen and fraud." Following close examination of Meinertzhagen's redpoll *Carduelis* spp. specimens, Knox (1993, *Ibis* 135: 320–325) made explicit the long-standing anecdotal rumours that this renowned ornithologist had fraudulently acquired and relabelled at least part of his large bird skin collection, most of which is now held at The Natural History Museum, Tring. Follow-up studies, including extensive, independent, radiographic evidence of the internal structure and make-up of skins both have largely

Plate 2. (a) Sooty Oystercatcher *Haematopus fuliginosus fuliginosus*; Victoria, Australia, 1 September 1996. *Photograph*: R. J. Chandler. (b) Sooty Oystercatchers *Haematopus fuliginosus ophthalmicus*; Northern Territory, Australia, 19 September 1996. *Photograph*: R. J. Chandler. (c) Hornby's Storm-petrel *Oceanodroma hornbyi*; offshore southern Peru, 27 October 1995. *Photograph*: W. G. Porteous.

confirmed the results of Knox, and have extended his findings to encompass a diverse array of other species. As a result, locality and date of collection data attached to Meinertzhagen specimens should be treated with extreme caution.

Joanne Cooper (of the Department of Geology, Royal Holloway, University of London and Bird Group, The Natural History Museum) presented a short paper on "The Great Auk in late Pleistocene Gibraltar". Remains of the extinct Great Auk *Pinguinus impennis* are known in small numbers from several late Pleistocene archaeological sites on the Portuguese and north Mediterranean coasts (Mourer-Chauviré & Antunes 1991, *Geobios* 2: 201–205). The presence of the species in these sites has been interpreted as evidence of hunting by man on its breeding grounds, thus indicating its summer breeding range during the last glacial period. However, recent investigations of the late Pleistocene avifauna from Gibraltar have suggested a different scenario for the Great Auk's occurrence. Known from a total of five bones at three sites, it appears that the bones are more consistent with a pattern of scavenging of strandline carcasses by man or other mammalian predators, rather than hunting. It seems that this interpretation may be extended to other Mediterranean localities.

Hence, its remains at these southern sites cannot be used as evidence of its late Pleistocene breeding distribution. Indeed, the exact opposite may be true, with these finds indicating a wintering distribution for the species.

Dr Roger Wilkinson gave an illustrated talk on Vasa parrots. These are found only on Madagascar and nearby islands, and relatively little is known about their biology and behaviour. The genus *Coracopsis* comprises only two species: the Greater Vasa Parrot *Coracopsis vasa* and the Lesser Vasa Parrot *Coracopsis nigra*. Both are dull blackish or greyish brown. Vasa parrots are unique in showing seasonal changes in their bill, feather and skin colour, in everting their cloacas in the breeding season, and in their loud song-like calling. Studies of Vasa parrots at Chester Zoo have shown they have very short incubation periods, rapid chick development, and unusual sexual behaviour.

The female Greater Vasa becomes bald-headed when breeding, and the bare skin on the top of her head, around her eyes and on her throat then turns mustard yellow. The copulation behaviour of Vasa parrots is unique among birds. Both sexes may show cloacal protrusions, which are most obvious in the male. The cloacal masses, when everted by the males, were found to be egg-shaped, 50–55 mm long × 40–45 mm broad. The female less frequently everted her cloaca, which then appeared smaller than the male's. During copulation, the cloacal mass of the male enters the female's expanded cloaca, and the two birds remain locked together for lengthy periods—on one occasion this lasted over 100 minutes! The Vasa parrot's protracted cloacal contact is effectively a "tie" or "copulatory lock", similar to that which occurs in dogs. It seemed most likely that this is associated in some way with sperm competition, but the mating system of Vasa parrots in the wild remains largely unknown. Dr Wilkinson hoped that these studies may serve to stimulate field research in the wild.

Dr Bill Porteous showed a series of slides, which he believed to be the first taken of a Hornby's Storm-petrel *Oceanodroma hornbyi*, photographed in the hand. This was one of the highlights of a voyage down the Humboldt Current, from Guayaquil, Ecuador, to Puerto Montt, Chile, in late October/early November 1995. The ornithologist on board for this tour was Peter Harrison, so the bird enthusiasts were in good hands. Hornby's Storm-petrels were first seen near the Hormigas de Afuera islands, off the city of Lima at about latitude 12°S on 24 October, and were last seen off Arica in northern Chile at about 18°S on the 27th. One individual came aboard the ship on the evening of the 26th and was closely examined, before being released the next morning. No observations were made between 18° and 24°S, due to land trips by day and night sailings, so the bird may occur further south than Arica, in October.

From the literature sources he had consulted, it was clear that almost nothing is known about Hornby's Storm-petrel. Its congener Markham's Storm-petrel *O. markhami* is known to nest in southern Peru, but no active nest of *O. hornbyi* has ever been found. There is a report (but he had not been able to trace the original source) of mummified nestlings being found in holes in the northern Chilean desert at 1,500 m, 50 km from the coast. Hornby's Storm-petrel occurs occasionally in concentrations of some thousands in the Humboldt Current off southern Peru and northern Chile, but since its breeding grounds are unknown it is impossible to estimate its population size or trends, or to define conservation requirements. Further information about this elusive species would be welcome, from any source.

Martin Gauntlett showed a slide of a Wandering Albatross *Diomedea exulans*, in flight, taken aboard the ex-Soviet Union research vessel MV *Professor Multanovskiy* (*Marine Explorer*), now being operated by "Marine Expeditions" for Antarctic cruises, on a two-week trip to South Georgia and Antarctica, in 1995. It had long been his hope to see this species, and many were sighted on this trip, also numerous Black-browed, Royal, Grey-headed and Light-mantled Sooty Albatrosses. Since none of these kept a straight course for more than a few seconds, it was difficult to see how, in a recent paper in *Ibis* (139: 234–252) which purported to show a correlation between flight performance of seabirds and wind direction, this could be calculated to any degree of accuracy, from measurements of their course and speed. One of the highlights of the trip was the landing on Albatross Island, South Georgia, having dodged the belligerent fur-seals to get ashore. There was an albatross nesting colony, with adults at the nest and almost fledged young from the previous year. To the surprise of the non-ornithological expedition leader, what the birders really wanted to see was the endemic South Georgia Pipit *Anthus antarcticus*.

David Fisher decided that the next best thing to exhibiting a specimen of a new species, as used to be a tradition of the Club, was to exhibit what he believed to be the first and only sound recording of a species. He played a recording that he had made in Ecuador, in 1991, and asked whether anyone in the audience could recognize it. To everyone's amazement, especially to the speaker, Bill Porteous immediately identified it correctly, as a Brown Wood-Rail *Aramides wolfi*. It transpired that Bill is one of the very few people who have seen this species in the wild, in recent years, and has published a note on his findings in *Cotinga*. David's recording is to appear on a tape of New World rails currently being compiled by Bill Hardy and Bob Ridgely.

Pat Sellar played recordings to illustrate the difference in song between Chiffchaff *Phylloscopus collybita* in England and *P. canariensis* in the Canary Islands. He used these examples to highlight the forthcoming BOU meeting on 3 December, when Dr J. Martens would explore the bioacoustic evidence supporting genetic differentiation in the Palaearctic Chiffchaff complex.

Dr David Snow spoke about the winter song of Song Thrushes *Turdus philomelos* in his Buckinghamshire village, and the censusing of their breeding population over six years. In late October or early November a variable proportion of the males begin to sing. There is then a break in December, which in some years has coincided with the onset of a cold spell, but in other years has continued in spite of continuing mild weather. Song is resumed in early January by the same birds that sang in autumn, with additional birds beginning at any time from January to April. The final breeding population has been high (52–60 pairs in a village of a little over 100 acres), and suggests that the undoubted decline of Song Thrushes in farmland does not justify the alarm and concern for the survival of the species, that has been expressed in recent articles in the conservation literature and the national press.

Ron Kettle played some tapes, and showed several slides of Hyacinthine Macaws *Anodorhynchus hyacinthinus*, taken on a visit to the Pantanal, Brazil, in August 1992. Groups of birds were photographed feeding together on their staple diet of palm nuts, and at nest sites often in association with nesting Jabiru Storks *Jabiru mycteria*. Sound recordings included their aggressive display calls, and from a group of 30–40 birds coming to roost in trees at dusk.

David Griffin showed a series of slides of Firecrests *Regulus ignicapillus* caught and ringed in west London, and in particular a female with unusual plumage at Bedfont, near Heathrow, on 13 May 1995. A head-on view of this bird showed a well-defined, square-shaped black rib, bordered with white. No species of *Regulus* shows this feature, and the bird is therefore something of a mystery. Some have dismissed the bib as a patch of missing feathers, although the bib is very regular in shape. Others have suggested that this bird could be a hybrid—perhaps with one of the tit family? David Griffin invited comments.

(Post-meeting note: John Marchant has examined these photographs and, in conjunction with the recorded wing and weight measurements, has concluded that it is a normal Firecrest, with a patch of feathers missing from its chin.)

British Ornithologists' Club
Financial statements for the year ended 31 December 1996

Statement of Committee Members' Responsibilities

The Committee is required to prepare financial statements for each financial year which give a true and fair view of the state of affairs of the Charity at the end of the financial year and of the surplus or deficit for that period.

In preparing the financial statements, suitable accounting policies have been adopted and consistently applied to the best of the Committee's knowledge and belief, by reference to reasonable and prudent judgements and estimates. Applicable accountancy standards have been followed.

The Committee members are responsible for maintaining adequate accounting records for safeguarding the assets of the Charity and for preventing and detecting fraud and other irregularities. The Committee members are also required to indicate where the financial statements are prepared other than on the basis that the Charity is a going concern.

Balance Sheet as at 31 December 1996

	1996		1995	
	£	£	£	£
UNRESTRICTED FUNDS				
General Fund				
Balance at 1 January 1996	39,903		34,354	
Surplus of Income over Expenditure	5,959		5,549	
Balance at 31 December 1996		45,862		39,903
Herbert Stevens Trust Fund				
Balance at 1 January 1996	162,791		143,841	
Net Loss (1995: Profit) on sales of investments during the Year	(1,102)		8,629	
Increase in revaluation of investments at 31 December 1996	10,886		10,321	
Balance at 31 December 1996		172,575		162,791
Barrington Trust Fund				
Balance at 1 January and 31 December 1996		577		577
RESTRICTED FUNDS				
Publications Fund (see note 2)		3,867		3,330
Bird Atlas of Uganda Fund (see note 2)		2,597		—
		£225,478		£206,601
	£	£	£	£
Represented by:				
Fixed Assets				
Projection equipment		50		60
Current Assets				
Stock of Publications	100		100	
Cash in Hand	30		38	
Cash at Bank:				
—Barclays Prime Account	4,630		2,642	
—COIF Charities Deposit Account No. 1	50,324		45,576	
Sundry Debtors	141		782	
	55,225		49,138	

Current Liabilities				
Subscriptions received in advance	(4,740)		(4,184)	
Sundry Creditors	(4,673)		(5,111)	
		45,812		39,843
Herbert Stevens Trust Fund				
Investments at Market Value		172,575		162,791
Barrington Trust Fund				
111.57 COIF Charities Investment Fund Income Shares—at cost (Market value £871: 1995 £810)		577		577
Publications Fund				
COIF Charities Deposit Account No 2		3,867		3,330
Bird Atlas of Uganda Fund				
COIF Charities Deposit Account No 3		2,597		—
		£225,478		£206,601

Income and Expenditure Account for the year ended 31 December 1996

	1996		1995	
	£	£	£	£
INCOME				
Subscriptions				
Members	4,961		4,893	
Non-member subscribers	3,313		2,762	
Income Tax recovered under Deeds of Covenant	308		311	
		8,582		7,966
Donations		48		20
Investment income				
Herbert Stevens Trust Fund	9,912		7,090	
Barrington Trust Fund (COIF income Shares)	38		36	
Interest Received:				
Barclays Prime Account	139		125	
COIF Deposit Account No.1	2,698		2,561	
		12,787		9,812
Sales of Publications				
BOC Bulletin:				
Back Numbers	1,858		469	
Offprints	96		226	
Contributions to Colour Plates	—		584	
Inserts	160		55	
"Avian Systematics and Taxonomy"	849		1,155	
"Birds, Discovery and Conservation"	236		134	
"Extinct and Endangered Birds"	373		1,458	
		3,572		4,081
Cost of sales				
Opening Stock	(100)		(100)	
Closing Stock	100		100	
		—		—
Meetings				
Ordinary Meetings	3,131		3,470	
Centenary Dinner	—		8	
		3,131		3,478

Miscellaneous income				
Club ties	21		67	
Club brooches	56		167	
Miscellaneous	13		40	
		90		274
TOTAL INCOME		28,210		£25,631

	1996		1995	
	£	£	£	£
EXPENDITURE				
Subscription recruitment		—		245
Meetings				
Restaurant/room hire	2,997		3,296	
Bar facility charges	254		254	
Speakers/Notices etc	203		372	
		3,454		3,922
BOC Bulletin				
Publication and printing	9,968		8,140	
Additional offprints and back numbers	150		386	
	10,118		8,526	
Editor's honorarium	900		850	
Editorial and secretarial expenses	146		111	
Address labels	630		498	
Postage/packing	1,384		1,648	
		13,178		11,633
Other publications				
"Birds, Discovery and Conservation" purchased	897		—	
"Extinct and Endangered Birds"				
Reimbursable BEF Loan	—		1,000	
Postage	—		109	
		897		1,109
Future Publications	75		36	
Committee Administration				
Postage	418		492	
Stationery and printing	501		614	
Secretarial	292		157	
Telephone	128		212	
Travel	216		146	
		1,555		1,621
Publications Sub-Committee expenses		277		—
DEPRECIATION (Projection Equipment)		10		10
Miscellaneous				
Public liability insurance		133		133
Accountancy fees: ordinary funds	670		646	
Prior year under-provision	248		—	
Herbert Stephens Trust Fund	141		141	
Legal advice: Herbert Stevens Trust Fund	470		317	
Bank charges	18		14	
Credit card charges	182		116	
Binding Club copy of Bulletin back numbers	840		—	
Miscellaneous	103		139	
		2,805		1,506
Total expenditure		£22,251		£20,082

Excess of Income over Expenditure	£5,959	£5,549

NOTES TO THE ACCOUNTS

1. ACCOUNTING POLICIES

(1) Basis of Accounts
The financial statements are prepared under the historical cost convention.

(2) Depreciation
Depreciation is calculated to write off fixed assets over their expected useful lives, by reference to original cost or subsequent valuation at the following annual rate: Projection Equipment, 10% on cost.

(3) Stock
Stock is valued at the lower of cost and estimated net realisable value.

2. RESTRICTED FUNDS	Publications Fund		Bird Atlas of Uganda Fund
	1996	1995	1996
Balance at 1 January 1996	3,330	—	—
Sponsorship received	—	—	2,488
Donations	337	2,400	—
Income Tax Recovered	—	800	—
Interest—Gross	200	130	109
Balance at 31 December 1996	£3,867	£3,330	£2,597

HERBERT STEVENS TRUST FUND
Balance Sheet as at 31 December 1996

	1996 £	1995 £
General Fund		
Balance at 1 January 1996	162,791	143,841
Loss (1995: Profit) on sale of investments during the year	(1,102)	8,629
Increase on Revaluation of Investments at 31 December 1996	10,886	10,321
Balance at 31 December 1996	£172,575	£162,791
Represented by:		
Investments at market value	172,575	131,855
Current Assets: Midland Bank SARA	—	30,936
	£172,575	162,791

INDEPENDENT EXAMINER'S REPORT TO THE COMMITTEE MEMBERS OF THE BRITISH ORNITHOLOGISTS' CLUB

We report on the accounts of the Charity for the year ended 31 December 1996.

RESPECTIVE RESPONSIBILITIES OF TRUSTEES AND EXAMINER

As the charity's trustees you are responsible for the preparation of the accounts; you consider that the audit requirement of section 43(2) of the Charities Act 1993 (the Act) does not apply. It is our responsibility to state, on the basis of procedures specified in the General Directions given by the Charity Commissioners under section 43(7)(b) of the Act, whether particular matters have come to our attention.

BASIS OF INDEPENDENT EXAMINER'S REPORT

Our examination was carried out in accordance with the General Directions given by the Charity Commissioners. An examination includes a review of the accounting records kept by the charity and a comparison of the accounts presented with those records. It also includes consideration of any unusual items or disclosures in the accounts and seeking explanations from you as trustees concerning any such matters. The procedures undertaken do not provide all the evidence that would be required in an audit, and consequently we do not express an audit opinion on the view given by the accounts.

INDEPENDENT EXAMINER'S STATEMENT

In connection with our examination, no matter has come to our attention:

(1) which gives us reasonable cause to believe that in any material respect the requirements
—to keep accounting records in accordance with section 41 of the Act; and
—to prepare accounts which accord with the accounting records and to comply with the accounting requirements of the Act
have not been met; or

(2) to which, in our opinion, attention should be drawn in order to enable a proper understanding of the accounts to be reached.

Prince Albert House
20 King Street
Maidenhead, Berks
30 April 1997

DONALD REID & CO.,
Chartered Accountants

Approved by the Committee on 20 May 1997
D. GRIFFIN, Chairman

Noteworthy records and range extensions of some birds from the Reserva Natural del Bosque Mbaracayú (Mbaracayú Forest Nature Reserve), Departamento de Canindeyú, Paraguay

by Alberto Madroño N. & Estela Z. Esquivel

Received 12 October 1995

Introduction

The Reserva Natural del Bosque Mbaracayú (RNBM or Mbaracayú Forest Nature Reserve) is one of the few remaining areas of humid subtropical Atlantic Forest in Paraguay. This "Atlantic-type" forest is a westward extension of the true Atlantic forest of southeastern coastal Brazil and is sometimes referred to as "Bosque Paranaense" (Cabrera & Willink 1973, Laclau 1994), "Bosque Atlántico del Interior" (FMB 1994) or "Brazilian Interior Atlantic forests" (Dinerstein *et al.* 1995). We refer to it as the Paraguayan Atlantic forest for being part of the Endemic Bird Area of the same name (EBA B-52: see Wege & Long 1995, also ICBP 1992). The remaining Paraguayan Atlantic forest has a tremendous conservation value as it still holds populations of several threatened and near-threatened birds, including some endemic to the Atlantic forest (Brooks *et al.* 1993, Madroño N. & Esquivel 1995, Lowen *et al.* 1995, 1996a,b).

The RNBM is centred on 24°08′S, 55°25′W in the Departamento de Canindeyú, northeastern Paraguay, *c.* 10 km east of the town Villa Ygatimi. It has an almost rectangular shape of 57,715 ha with the northeastern corner contiguous to the border of Mato Grosso do Sul, Brazil. On the eastern side, another adjoining fraction of 5487 ha of mainly *campos cerrados* brings the total protected surface to 63,202 ha. The greater part of the reserve (*c.* 85%) is forested (tall, medium, low, flooded and gallery forests), although there are other natural communities as well, including grasslands, marshy areas, lagoons etc. To date, no detailed botanical inventory work in the reserve has been compiled other than CDC's (1991) general description of its different natural communities and Keel *et al.* (1993) who studied tree and shrub composition of several sample plots at one locality within the RNBM, concluding that the area studied was a top conservation priority in eastern Paraguay.

Typical trees of the higher canopy include: *Astronium fraxinifolium, Aspidosperma polyneuron, Tabebuia heptaphylla, Albizia hassleri, Peltophorum dubium, Anadenanthera colubrina* and *Balfourodendron riedelianum*. Some of these trees can reach heights of up to 30–35 m. In a medium stratum the tall forest has trees up to 20–25 m such as *Chrysophyllum gonocarpum, Diatenopteryx sorbifolia, Helietta apiculata, Myrciaria* sp., *Holocalyx balansae*, several species of Lauraceae, *Cabralea canjerana* and introduced *Citrus aurantium*. The low strata are mainly composed of shrubs that normally reach 4–8 m. Common species at this level are *Sorocea bonplandii*, *Inga marginata*, *Pilocarpus pennatifolius*, *Trichilia* spp. and *Piper* spp. The ground cover varies considerably from one place to another, but ferns of many types, Rubiaceae, Bromeliaceae and grasses are very common (more details on different habitat types in the reserve will be published in Lowen *et al.* in prep.). In the main text, we also often refer to *cerrado* of Aguara Ñu, this being characterised by a mosaic of savanna (with varying concentrations of *Butia* palm), pure grasslands, and to a lesser extent xerophytic woodlands that generally surround the more open areas.

The RNBM is drained to the west by the upper Jejui'mi river, a tributary of the Paraguay river. It is an area characterised by gently rolling hills mainly composed of soft sedimentary rock weathered into sandy soils of low fertility. There are also (in less extent) patches of red clayish soils which are generally more fertile and more commonly found to the east in the Parana river basin. The entire area is generally between 150–300 m above sea level. The annual rainfall is 1600–1800 mm (1800 mm in 1995 at Jejui'mi), with a dry cold season (between July and September) and a wet hot season (between October and February). Temperatures are highest during the summer months (December–February), with an average daily temperature of 27°C in January and maximum temperatures unlikely to surpass 38°C. During typical winter months (July and August) daily temperatures average 17°C, but temperatures can drop considerably (even below 0°C, with an average of 4–5 frosts each year; Acevedo *et al.* 1990).

Most of the information provided in this article is the result of 162 days of fieldwork completed between July 1994 and June 1995, which in most cases was conducted by both authors together (*c.* 300 man-days of field work and *c.* 1800 man-hours in the field). Fieldwork was distributed evenly over the year in order better to understand year-round changes in the bird community composition and activity patterns (to be published). Most bird species breed mainly in spring (September–November), but our knowledge of breeding seasons of many species in the reserve is still very limited. Records provided by other ornithologists are fully credited in the text. For a few species we cite records obtained after June 1995. For those species on which we give our opinion regarding their status in the RNBM (e.g. uncommon, rare, etc.), this is based upon our experience in the field up to February 1996 (which in total includes some 200 days in the field for each of the authors.

This paper summarises some of the most interesting records during this period. They have been chosen for their importance in contributing to current knowledge of the species' distribution or status, or because there are few records either in the entire country, or in Oriental Paraguay ("Orient" in Hayes 1995), "Central Paraguay" geographical region (as defined by Hayes 1995: 19) or the Dpto. Canindeyú. Some of the species are threatened or near-threatened (following Collar *et al.* 1994), in which case T (threatened) or NT (near-threatened) has been added in brackets after the scientific name.

Although not necessarily mentioned under each species account, our knowledge of previous records is mostly derived from the exhaustive monograph on the birds of Paraguay by Hayes (1995), whose taxonomic order is followed. Readers are also referred to Madroño N. & Esquivel (1995) who provide additional noteworthy records for the RNBM that complement the information presented here.

Coordinates (latitude and longitude) are given for each record, and have been obtained either using a Geographic Position System (*Pathfinder Basic Plus*, Trimble Navigation) or from a 1:50,000 scale map (Mapa Geográfico Militar) in combination with black and white 1:50,000 aerial photographs (see below). Coordinates without seconds (″) have been obtained from the map and we are certain that the error should not exceed ± 500 m. For visual records, we used Zeiss 10 × 40 and Vision 10 × 50 binoculars. Unless otherwise stated, records below were made by both authors. Place names are followed by coordinates the first time they appear, but not when mentioned later.

Species accounts

HOOK-BILLED KITE *Chondrohierax uncinatus*

There are few records from Oriental Paraguay; the records below are the first for Dpto. Canindeyú. One bird seen by AMN in flight on 16 September 1994 (24°07′54″S, 55°31′36″W), and another (possibly the same) on 29 Sept 1994 (24°08′03″S, 55°31′44″W). Further observations in August and September 1995 suggest that breeding may occur in RNBM.

RUFOUS-THIGHED HAWK *Accipiter erythronemius*

Neither Hayes *et al.* (1994) nor Chesser (1994) include this species as an "austral migrant" (either "northern austral migrants", i.e. birds that breed in Paraguay and migrate north in winter, or "southern austral migrants", i.e. birds that nest farther south and winter in Paraguay). On 10 March 1995, no less than 15 birds were observed flying north (*c.* 24°07′S, 55°31′W), with an obvious migratory behaviour (AMN and P. Donahue). Cold light winds from the south seemed to facilitate migration as other raptors, such as 12 Swallow-tailed Kites *Elanoides forficatus*, were also part of the same loose mixed group.

BLACK-AND-WHITE HAWK-EAGLE *Spizastur melanoleucus* (NT)

Hayes (1995) lists up to four records for Oriental Paraguay. The unspecified observations of the species in RNBM (Madroño N. & Esquivel 1995) are as follows: one bird soaring close above the forest canopy on 3 September 1994 at 24°07′29″S, 55°26′43″W (AMN) and a perching bird on 26 May 1995 at 24°07′52″S, 55°31′26″W (EZE). Another perching bird was observed at Jejui'mi (24°08′03″S, 55°31′44″W) on 6 April 1995 (P. Donahue). The species seems to be rare in the reserve, where the authors have only recorded it twice.

ORNATE HAWK-EAGLE *Spizaetus ornatus*

There are many records for the country, but none made with certainty since 1939 (an undated record from Parque Nacional Cerro

Corá is the only possibility; see Hayes & Scharf 1995), and none has ever been recorded in Dpto. Canindeyú (see Hayes 1995). The species has now been recorded at RNBM, where a bird was observed flying high, calling, on 14 and 15 February 1995 at Horqueta'mi (24°08'10"S, 55°19'21"W) by both authors and forest ranger S. Ramírez, and on 11 April 1995 at 24°07'37"S, 55°31'01"W by AMN. Indigenous Aché hunters know the species from the area, reporting previously finding at least one nest. The scant number of records suggests that the species is rare in the reserve.

BLACK HAWK-EAGLE *Spizaetus tyrannus*

Hayes (1995) regards the species as "hypothetical" for the country, adding that "further documentation is needed before this species can be accepted for Paraguay". Our records at RNBM confirm its occurrence in Paraguay (unless otherwise stated, observations took place at Jejui'mi in 1995 and refer to a single bird calling in high flight): one silent bird carefully observed over five minutes on 25 October 1994 at 24°08'40"S, 55°31'34"W (AMN, D. Pullan and R. Denny); two birds seen soaring high together in November 1994 (R. Clay); briefly observed on 17 March; 20 May (AMN), 21 May, 3 June (AMN), 13 June (forest ranger N. López) and 20 June (low flight, AMN) 1995. An additional record of the species occurred at Lagunita (24°08'04"S, 55°25'42"W) on 13 September 1995, where a bird was observed and its call tape-recorded (AMN, EZE and many other ornithologists of the joint Anglo-Paraguayan "Project Yacutinga '95").

A local resident, E. Caballero (now working at RNBM for the Fundación Moisés Bertoni), informed us that a few years ago, while sitting in a *mangrullo* (a hunting platform) south of Lagunita (*c.* 24°09'S, 55°25'W), he observed a large black eagle (presumably a Black Hawk-Eagle) that took a Brown Capuchin monkey *Cebus apella* from the upper canopy.

Birds have been heard giving a single long whistle lasting about 1.5–2 seconds, rising slightly and then falling quickly at the end. Another variation incorporated three fast short whistles preceding the longer call described above or interspaced between two long calls, this resembling the description given in Sick (1993) and also birds heard in Brazil, Ecuador and Panama (R. Clay verbally). Additionally, full descriptions were taken and the birds conformed to the literature, notably fitting Canevari *et al.*'s (1991) colour illustration of the species.

SUNGREBE *Heliornis fulica*

There are only two confirmed records and five undated, unconfirmed reports in Paraguay, all from Oriental Paraguay. Acevedo *et al.* (1990) list the species as if it was present in RNBM, but this was probably a guess, the species not being listed for the reserve in any of the unpublished lists (e.g. CDC 1991, FMB 1992). We have, however, observed/heard the species on several occasions at the Jejui'mi river between 24°08'S, 55°31'W and 24°10'S, 55°30'W. On 23 November 1994 an adult bird was persistently calling, and also observed, at 24°09'33"S, 55°30'24"W. The species seems to be uncommon, although probably has a healthy population along the Jejui'mi river within the reserve.

RED-LEGGED SERIEMA *Cariama cristata*

Hayes (1995) does not include the species for Central Paraguay. It is present, however, in the Aguara Ñu *cerrado* in the easternmost part of the reserve (mainly 24°08–17′S, 55°15–17′W). Recently, after a large fire took place in the above-mentioned area, a single bird was observed on 12 and 14 October 1994 (S. Ramírez and J. Padwe verbally) on the main unpaved road that crosses the RNBM west to east, in an area surrounded by tall forest (at 24°07′S, 55°28′W), *c.* 20 km away from the species' habitual grounds. The presence of the bird in such habitat (although admittedly on the road) is exceptional (the indigenous Aché had never seen this species in the forest) and presumably was due to the fire.

SCALED PIGEON *Columba speciosa*

Hayes (1995) lists only three records for Paraguay (all from Oriental Paraguay). Although the species was already recorded at RNBM (Brooks *et al.* 1993), we have now observed it year-round on many different occasions throughout the reserve, in forests and also islets of forest in the flooded grasslands of the Jejui'mi river. We judge the species to be uncommon but with a healthy population within the reserve.

HYACINTH MACAW *Anodorhynchus hyacinthinus* (T)

All *bona fide* records of this species in Oriental Paraguay are from Dpto. Concepción (see Hayes 1995). A record of "some birds" south of Parque Nacional Cerro Corá (questioned by López 1992 and hence by Hayes 1995) refers to captive birds of uncertain origin (F. Colmán verbally 1995). The three records reported in Madroño N. & Esquivel (1995) extend the species' known range about 200 km to the southeast into Dpto. Canindeyú. The most recent record at RNBM occurred in Aguara Ñu, in an area of *cerrado* vegetation at 24°10′49″S, 55°15′34″W on 18 October 1994, where a single bird was observed by the forest ranger J. C. Almada. These records in Canindeyú suggest that the species perhaps undertakes occasional movements (away from the extensive *cerrado* of Concepción) to other scattered and smaller *cerrado* existing further south (Dptos. of Amambay and Canindeyú) that provide seasonal fruiting of the jataí palm *Butia* sp. (although this fruit has never been reported as part of its diet: Collar *et al.* 1992, N. E. López verbally 1995). That the species undertakes seasonal long-distance movements has already been mentioned (Collar *et al.* 1992), although little information is available.

PHEASANT CUCKOO *Dromococcyx phasianellus*

The following records at the RNBM add Dpto. Canindeyú to the scant number of known localities for this species in Paraguay. A bird was heard (and tape-recorded) on 27 October 1994 at 24°07′20″S, 55°31′41″W (AMN, D. Pullan and R. Denny); one was observed on

16 March 1995 at 24°08′S, 55°31′W; one was heard on 29 August 1995, 1 and 11 September 1995 at 24°07′37″S, 55°31′01″W (AMN). The records above suggest that the species is a rare year-round resident in the area.

MOTTLED OWL *Ciccaba virgata*

There are only two recent records of this owl in Paraguay; Brooks *et al.* (1993) recorded it once at the RNBM (sight record). Since then, we have heard its call many times in high and medium forests in different parts of the reserve throughout the year.

OCELLATED POORWILL *Nyctiphrynus ocellatus*

Hayes (1995) only lists four records for Paraguay (one in 1978 from Dpto. Canindeyú; Storer 1989). We have now recorded the species many times throughout the year (1994–1996) in different areas of the RNBM (most are aural records). Breeding was also confirmed on 27 October 1994 at 24°07′35″S, 55°31′45″W, when an incubating adult (with a single egg) was found on a path in low forest close to low flooded forest (R. Denny, D. Pullan and AMN). The species seems to be uncommon in the reserve (although we believe a healthy population exists), most of the encounters being in tall forest away from the path.

SILKY-TAILED NIGHTJAR *Caprimulgus sericocaudatus*

There seem to be only three published records for the country (see Storer 1989). We have heard the species on several occasions at the RNBM: 14 July 1994 (24°08′33″S, 55°20′26″W); 17 and 18 August 1994, 19 November 1994 and 14 February 1995, all at Jejui'mi; and 16 March 1995 at 24°08′S, 55°31′W. The above records, plus another bird heard at Lagunita on 13 September 1995 by AMN, show that the species is an uncommon year-round resident in the RNBM.

LONG-TAILED POTOO *Nyctibius aethereus*

Although twice recorded at the RNBM (see Hayes 1995, Lowen *et al.* in prep.), there are still relatively few records for the country of this secretive species. On 11 February 1995 we had very close views of a silent bird perching and flying (the observation lasted more than 15 minutes) in the *cerrado* area of Aguara Ñu at 24°10′31″S, 55°15′32″W. Between late August and November 1995, a pair was breeding at 24°07′38″S, 55°31′08″W (incubating adults, a nestling and fledged juvenile were observed).

GREY-RUMPED SWIFT *Chaetura cinereiventris*

Hayes (1995) indicates that the species is "apparently present during winter'. We have observed Grey-rumped Swifts all year round at the RNBM.

GREEN-AND-RUFOUS KINGFISHER *Chloroceryle inda*

Hayes (1995) lists four records for Paraguay, the only recent records being from the RNBM in 1992 (Brooks *et al.* 1993). We have found the species regularly throughout the reserve year-round. Our records also include one active nest (with a minimum of two chicks) found on 29 November 1994 at 24°12′23″S, 55°29′53″W.

PYGMY KINGFISHER *Chloroceryle aenea*

There are only two previous records for the country (Hayes 1995). The finding of the species at the RNBM is the first record in Oriental Paraguay: one bird was briefly observed on 5 November 1994 (EZE), a pair on 11 November 1994 (R. Clay), and one bird on 7 April 1995 (AMN, EZE, P. Donahue and T. Wood). All records were at *c.* 24°08′S, 55°32′W.

COLLARED CRESCENTCHEST *Melanopareia torquata*

There is just one record for the country, from 1938 in Amambay Department (Ridgely & Tudor 1994). We observed one bird in short grassland in the *cerrado* of Aguara Ñu on 9 February 1995 at 24°10′S, 55°15′W. Breeding in the area seems likely as further observations between 14 and 20 September 1995 by the authors and several other ornithologists of "Project Yacutinga '95" showed that several pairs were present (Lowen *et al.* in prep.).

SHARP-TAILED TYRANT *Culicivora caudacuta* (NT)

The species has not been recorded in Oriental Paraguay since 1932 (Hayes 1995). We observed two birds (adult and immature) in grassland at the *cerrado* of Aguara Ñu on 13 February 1995 at 24°09′29″S, 55°17′21″W. Breeding in the area would seem likely, with further observations of the species by the authors and several ornithologists of "Project Yacutinga '95" (one bird mist-netted and photographed) between 14 and 20 September 1995 (Lowen *et al.* in prep.).

BAY-RINGED TYRANNULET *Phylloscartes sylviolus* (NT)

Madroño N. & Esquivel (1995) reported not having found this species after 162 days of fieldwork. It has been previously recorded in the reserve (see FMB 1992, Brooks *et al.* 1993). AMN observed the species on 29 August 1995 at 24°07′37″S, 55°31′01″W, a site where a pair and single birds have subsequently been observed regularly. Earlier in August 1995, D. Finch (verbally 1995) discovered a pair building a nest somewhere to the east (not further than 1 km from the above coordinates). The species is uncommon in the reserve, but probably has a healthy population. It is certainly difficult to detect, due to its habits of moving about high in the canopy and its low-pitched call. It is noteworthy that many of AMN's observations occurred in exactly the same place in a *Copaifera langsdorfii* tree between August 1995 and January 1996, suggesting some degree of seasonal territoriality.

LARGE-HEADED FLATBILL *Ramphotrigon megacephala*

There are just two recent records for the country, one of which was at the RNBM (Hayes 1995). We found the species twice in mixed giant bamboo *Guadua* sp. growth on 15 June 1995: one bird heard at 24°15′S, 55°21′W and one seen and heard at 24°15′49″S, 55°22′04″W. The species was again present at the first locality on 22 and 23 September 1995 (Lowen *et al.* in prep.).

CURL-CRESTED JAY *Cyanocorax cristatellus*

In Paraguay, the species has only been reported in Dpto. Concepción (Ridgely & Tudor 1989). It has now been recorded at the RNBM, with the first record in winter, probably August 1993 (forest rangers J. C. Almada, N. López, T. Osuna, S. Ramírez and R. Villalba). After this sighting, the species has been observed repeatedly in the same area, with our first observation between 9 and 12 February 1995, all in the *cerrado* area of Aguara Ñu at different localities (same general area mentioned above under the Red-legged Seriema). Most of the records refer to small groups of up to ten birds. One exceptional record of two birds occurred probably in December 1994 at Jejui'mi, in a small clearing surrounded by tall forest *c.* 22 km west of the species' habitual site at Aguara Ñu (S. Ramírez). Two Guaraní indians inhabiting part of the Aguara Ñu area independently informed us that the species has recently colonised this area from Brazil. It was previously only known to them from over the border in Brazil and thus they named it "Aka'ê Brasil" ("Aka'ê" is the generic Guaraní name for the two other species of *Cyanocorax* present in the area).

BANANAQUIT *Coereba flaveola*

The species was not previously recorded from Dpto. Canindeyú. Records at the RNBM are as follows: one bird on 8 March 1995 (P. Donahue), 13 and 14 March 1995 (AMN and EZE), all at río Jejui'mi (24°08′32″S, 55°31′34″W).

SILVER-BEAKED TANAGER *Ramphocelus carbo*

The species has only been reported twice in Oriental Paraguay (Hayes 1995). A bird was recorded on 10 March 1995 for the first time at the RNBM, at the río Jejui'mi (P. Donahue, AMN and EZE).

TEMMINCK'S SEEDEATER *Sporophila falcirostris* (T)

This rare Atlantic Forest endemic bamboo specialist has only previously been recorded in Paraguay in July 1977, west of Saltos del Guairá, Dpto. Canindeyú (Ridgely & Tudor 1989). It has now been found in the southernmost area of the RNBM, where giant bamboo growth is the most extensive. On 15 and 16 June 1995 (note winter date), a singing male was observed at 24°15′52″S, 55°22′02″W, and a second singing bird was heard nearby at 24°15′50″S, 55°22′23″W. A third singing bird was heard more than 1 km away (to the west). All birds exclusively used giant bamboo (*Guadua* sp. not "*Bambusa* sp." as erroneously stated in Madroño N. & Esquivel 1995), and a male was observed eating what were presumably bases of bamboo leaf petioles. Bamboo was certainly neither flowering nor seeding. Only these three birds were detected despite our walking a minimum of 5 km through habitat apparently suitable for the species. Further searches at the above-mentioned localities on 22–23 September 1995 during "Project Yacutinga '95" and in October 1996 did not locate the species.

The survival of the species in the area is in doubt, considering its strong association with giant bamboo forests. Suitable habitat for Temminck's Seedeater in the reserve is relatively restricted (perhaps no more than 5000 ha). The protection of an adjoining fraction of this type of mixed-bamboo forest south of the reserve is judged crucial to the species' long-term survival. This land is certainly the last tract of undisturbed forest around the reserve, with perhaps some 10,000 ha (privately owned). Other threatened bamboo specialists such as the critically threatened Purple-winged Dove *Claravis godefrida* could well be present in the area (recently reported not far away from the reserve in the Dpto. Canindeyú: Lowen *et al.* 1995), and would thus also benefit from any conservation initiatives that seek to expand the reserve's protected area to the south.

MARSH SEEDEATER *Sporophila palustris* (T)

The species has been erroneously reported at the RNBM (Collar *et al.* 1992, Hayes 1995), the bird in question actually being observed at Estancia La Fortuna, Dpto. Canindeyú (P. Scharf *in litt.* 1994, *per* R. Clay). First records for the RNBM occurred on several dates between 22 October and 2 November 1994 at Lagunita (24°08′S, 55°25′W), where up to three males (part of a mixed *Sporophila* flock) were observed (D. Pullan and R. Denny; also AMN, EZE and R. Clay). These dates suggest that this and the following *Sporophila* seedeaters are spring transients (see also Hayes *et al.* 1994). The first week of November also coincides with the arrival on the breeding grounds in Corrientes province, Argentina, of this species together with the sympatric *S. ruficollis*, *S. hypochroma* and *S. cinnamomea* (Pearman & Abadie in press).

DARK-THROATED SEEDEATER *Sporophila ruficollis* (NT)

The species was not previously recorded from Dpto. Canindeyú. Records at the RNBM are as follows: two males in *cerrado* vegetation in Aguara Ñu at 24°15′S, 55°15′W on 20 October 1994, and one male (part of a mixed *Sporophila* flock; see above) at Lagunita on 29 October 1994 (AMN).

RUFOUS-RUMPED SEEDEATER *Sporophila hypochroma* (NT)

The species has not been previously reported for Dpto. Canindeyú. Records at the RNBM include at least one male (part of a mixed *Sporophila* flock, see comments under Marsh Seedeater) between 29 October and 2 November 1994 at Lagunita (AMN, D. Pullan, R. Denny, EZE and R. Clay).

CHESTNUT SEEDEATER *Sporophila cinnamomea* (NT)

Records below constitute the first sightings in the RNBM, and the second record for the Dpto. Canindeyú: up to three males in a mixed *Sporophila* flock (see comments under Marsh Seedeater) at Lagunita between 22 October and 2 November 1994 (D. Pullan, R. Denny, AMN and EZE).

SOOTY GRASSQUIT *Tiaris fuliginosa*

The species was first recorded for Paraguay at the RNBM on 12 September 1992 (Brooks *et al.* 1993). Since then, a male was observed calling at the same place (24°08′58″S, 55°25′22″W) on 26 September 1994 (AMN), and another male was seen in November 1994 at 24°08′03″S, 55°31′44″W (R. Clay).

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Re-evaluation of the taxonomic status of *Phylloscopus proregulus kansuensis* Meise

by Per Alström, Urban Olsson & Peter R. Colston

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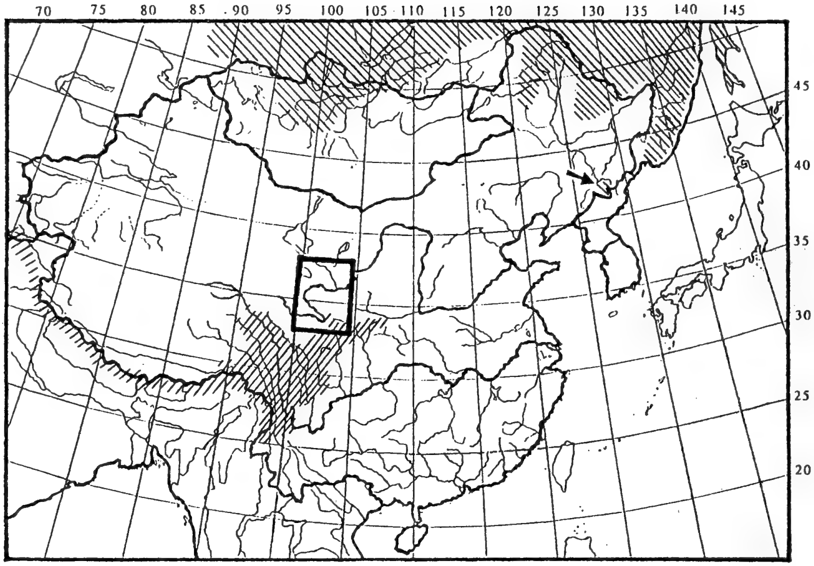
Phylloscopus proregulus is generally divided into 3 subspecies: *proregulus* (Pallas) breeding in Siberia, northern Mongolia and northeastern China; *chloronotus* (Gray) in central China and in the Himalayas west to central Nepal; and *simlaensis* Ticehurst in the westernmost Himalayas (e.g. Mayr & Cottrell 1986). Alström & Olsson (1990) argued that *chloronotus* and *simlaensis* should be treated as specifically different from *proregulus* under the name *P. chloronotus*, and this has since been followed by e.g. Sibley & Monroe (1993) and Beaman (1994). The taxon *kansuensis* Meise, described from Lauhukou, northern Gansu Province, China (Meise 1933, Stresemann *et al.* 1937), is either treated as a valid subspecies (Ticehurst 1938), a synonym of *proregulus* (Hartert & Steinbacher 1934, Vaurie 1954, Étchécopar & Hüe 1983, Meyer de Schauensee 1984, Mayr & Cottrell 1986, Williamson 1967) or a synonym of *chloronotus* (Cheng 1987, Alström & Olsson 1990). Based on recent field studies of *kansuensis*, we propose that it be elevated to the rank of species. Throughout this paper, *chloronotus* refers to the subspecies, while *P. chloronotus* refers to the species (*sensu* Alström & Olsson 1990).

Materials and methods

On 5 June 1992 Paul Lehman, François Vuilleumier and others (Paul Lehman *in litt.*) observed an unidentified *Phylloscopus* warbler on Laoye Shan in the Daban Shan range, Qinghai Province, China (36°56′N, 101°40′E; Fig. 1). Tape recordings of the song of this bird were sent to P.A. On 31 May–1 June 1993 P.A., Paul Holt and others visited Laoye Shan, where at least 10 singing males of the warbler with the unknown song were observed. It was concluded that morphologically it appeared to be indistinguishable from *P. chloronotus*, but both song and call were strikingly different from those of *chloronotus*. Two of these birds were tape recorded (song and calls), and another one was caught, measured and photographed, and a blood sample was collected. One male was exposed to playback of the songs of *proregulus*, *chloronotus* and *P. sichuanensis* (latter described by Alström *et al.* 1992) (see Appendix). On 21 June and 4 July U.O. and others found the warbler with the unknown song to be common on Huzu Bei Shan in the Daban Shan range (*c.* 37°N, 102°E; Fig. 1). One male was exposed to playback of the song of *chloronotus* (see Appendix). They also observed 5 males on Laoye Shan on 22 June. One of these was caught, measured and photographed, and a blood sample was collected. After consulting the literature and specimens (see below), it was concluded that this warbler was synonymous with *P. proregulus kansuensis* Meise, which was collected from much the same area.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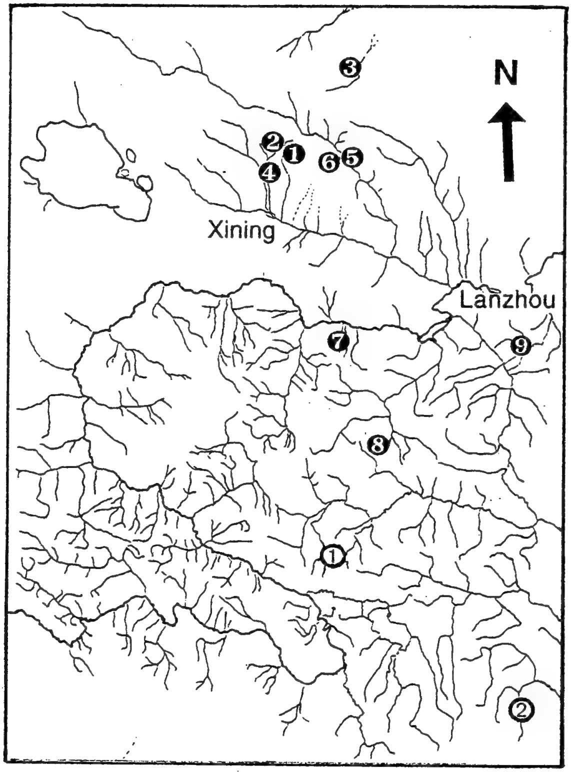
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On 2–3 June 1994 on Emei Shan, Sichuan Province (29°35′N, 103°11′E), P.A. exposed 4 territorial, singing males of *chloronotus* to playback of song of *kansuensis* (see Appendix). On 7–8 June 1994 P.A. found *kansuensis* to be common (*c.* 45 individuals) in Xinglong Shan, Gansu Province (*c.* 35°40′N, 103°55′E; Fig. 1). Five of these were exposed to playback of the song of *proregulus* and *chloronotus* and one to *P. sichuanensis* (see Appendix). On 11–22 June 1994 P.A. surveyed the area between Xining, Qinghai Province (36°35′N, 101°55′E; Fig. 1) and Jiuzhaigou, Sichuan Province (*c.* 33°25′N, 104°05′E; Fig. 1), and from Jiuzhaigou north to Longxi, Gansu Province (34°59′N, 104°46′E; Fig. 1) in order to try to find out whether or not *kansuensis* and *chloronotus* were sympatric. There is very little forest in this area (except in Jiuzhaigou), and most adequate patches of forest along the main road were checked. On 11–14 June 1994 Mengda, Qinghai Province (*c.* 35°45′N, 102°40′E; Fig. 1) was visited (together with Jesper Hornskov), and *kansuensis* was found to be common (*c.* 60 individuals; the commonest bird species). Eight of these were exposed to playback of the songs of *proregulus* and *chloronotus* (see Appendix), and 3 males and 1 female were caught and measured. On 15 June 1994 4 *kansuensis* (3 singing males and 1 calling bird, presumably a female) were observed in a small patch of forest at Hezuozhen, Gansu Province (35°00′, 102°58′E; Fig. 1), and two of the males were exposed to playback of *proregulus* and *chloronotus* (see Appendix). On 16 June 1994 *chloronotus* was found to be fairly common (≥13 singing males and 3 calling birds) in a small forest at Chakou, Gansu Province (*c.* 34°12′N, 102°25′E; Fig. 1). Three of these were exposed to playback of *kansuensis*. No *kansuensis* were observed at this site. On 17–19 June 1994 Jiuzhaigou was visited, where several *chloronotus* but no *kansuensis* were noted. Between Jiuzhaigou and Longxi no suitable forest was found. On 22 June 1995 P.A. and P.R.C. visited Laoye Shan, where *c.* 10 *kansuensis* were observed. On 23–25 June 1995 P.A. and P.R.C. surveyed Huzu Bei Shan, where *kansuensis* was common. On one of these a playback test was carried out (see Appendix).

During the playback experiments a speaker with a 20 m long cable was placed in the territory of a singing male. Songs of different taxa were played when the bird was considered to be close enough to the speaker to hear the song clearly. The term "1st approach" is the time when the bird exposed to the playback was first seen to move towards the speaker. "Full response" means that the bird responded by vigorously searching for the source of the sound, while adopting an aggressive posture with slightly raised tail and slightly drooped, quickly flicking wings; usually silent, but sometimes calling, only rarely singing

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Figure 1. Distribution of *chloronotus* //// and *proregulus* (only part of range in Siberia shown) \\\\. Detail shows all localities (white figures in black circles) where *kansuensis* has been found: 1, Lauhukou (type locality); 2, Komandse; 3, Hu-dja-dschuang; 4, Laoye Shan; 5, Tschau-tou; 6, Huzu Bei Shan; 7, Mengda, 8, Hezuozhen; 9, Xinglong Shan. Detail also shows localities (figures in open circles) where *chloronotus* has been found in close proximity to *kansuensis*: 1, Chakou; 2, Jiuzhaigou. Based on Stresemann *et al.* (1937) and personal observations.

one or two strophes. The song of *P. proregulus* was tape recorded by P.A. at Changbai Shan, Jilin Province (*c* 41°30'N, 128°11'E) in June 1987; the two song types of *P. chloronotus* were tape recorded by P.A. on Emei Shan, Sichuan Province (*c.* 29°35'N, 103°10'E) in May 1987; the song of *P. sichuanensis* was tape recorded by P.A. in Jiuzhaigou, Sichuan Province in June 1989; and the song of *kansuensis* was tape recorded on Laoye Shan, Qinghai Province in May 1993.

In the Natural History Museum, Tring, U.K., P.A. and P.R.C. examined 1 specimen of *kansuensis* (collected at the type locality; BMNH 1938.5.16.21) and a further 6 on loan from the Zoologischen Museum, Berlin, Germany (collected at or near the type locality; including the holotype), as well as long series of *chloronotus* and *proregulus*. All of the specimens of *kansuensis* and a series of *proregulus* and *chloronotus* were measured by P.A. Wing length was measured with the wing flattened and stretched (maximum chord), and bill length was taken to the skull.

Results

Vocal differences between kansuensis *and* proregulus/chloronotus

The song of *kansuensis* begins with a series of faltering, thin, high-pitched, slightly harsh *tsrip*, followed by a row of slightly accelerating clear *tsip* notes (often on two different pitches), and ends in a clear *c.* 1.1–2.2 s long trill (which often changes from high to slightly lower pitch) (Fig. 2A). The trill recalls the song of Wood Warbler *P. sibilatrix* and Emei Leaf Warbler *P. emeiensis* (Alström & Olsson 1995). Sometimes the initial *tsrip* notes are omitted, and sometimes the trill is not given in every strophe (the song then alternates between *tsrip* and *tsip*, the latter often on two pitches, for some time). The song of *kansuensis* is profoundly different from the varied, somewhat Canary *Serinus canaria*-like song of *proregulus* (Fig. 3), although the *tsrip* notes given by *kansuensis* are somewhat similar to those of *proregulus* (one note marked by an arrow in Fig. 2A and 3, respectively).

The song of *kansuensis* is also strikingly different from the two different song types of *chloronotus* (referred to as type A and type B, respectively, by Alström & Olsson 1990; Fig. 2B, 2C and 2D). However, two of the elements in the repertoire of *kansuensis* resemble individual elements in *chloronotus* song. The *tsrip* notes given by *kansuensis* are rather close to *tsrip* notes in *chloronotus* type B song (one marked by an arrow in Fig. 2A, 2B and 2C, respectively), and the *tsip* notes of *kansuensis* are rather similar to individual elements in especially type B song of *chloronotus* (one element marked by an * in Fig.2A, 2B and 2C, respectively). Accordingly, *chloronotus* type B song is

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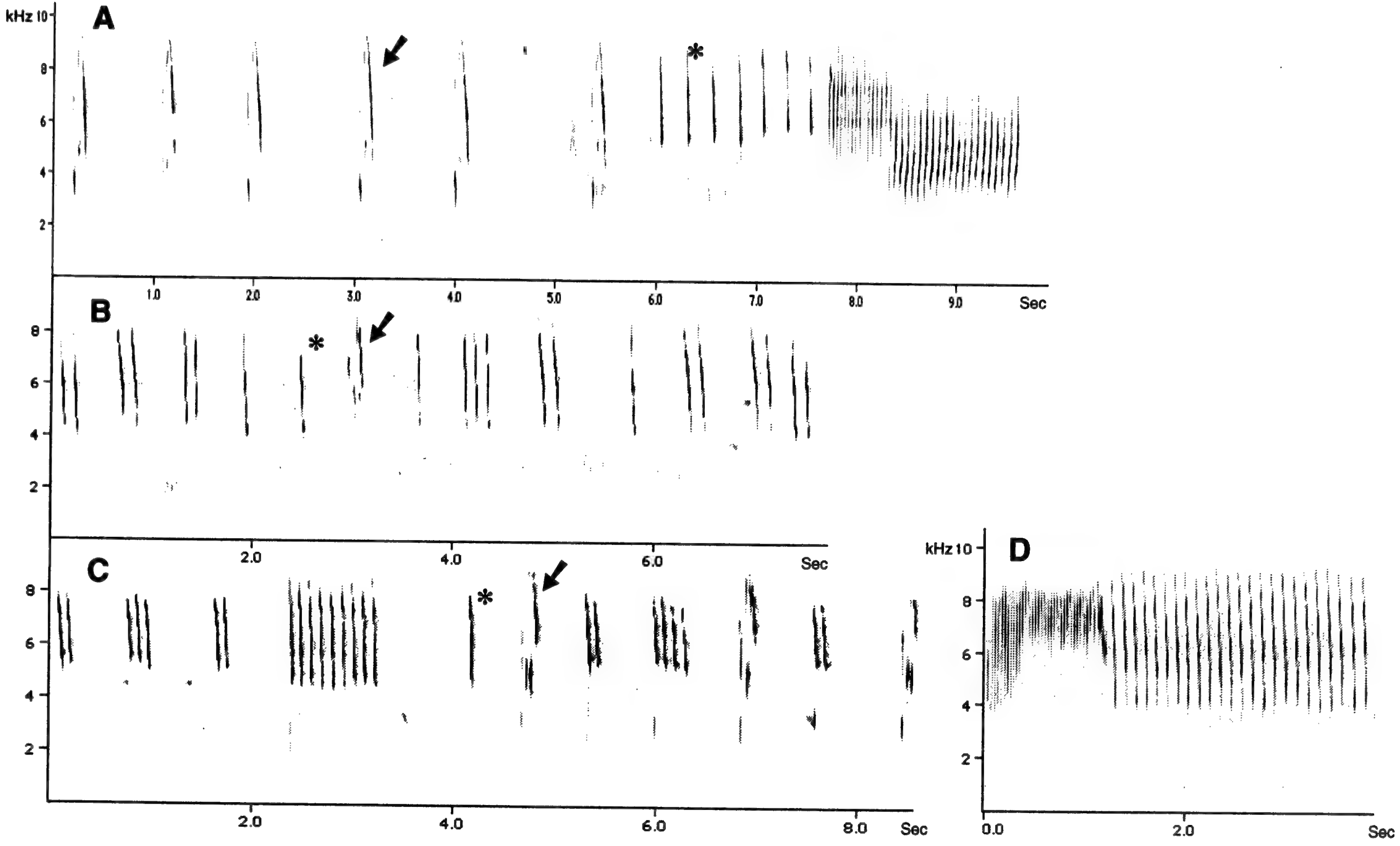
Figure 2. Songs of *kansuensis* and *chloronotus*. Arrows indicate *tsrip* notes and asterisks *tsip* notes (only one marked in each song). A. Complete song of *kansuensis*, Laoye Shan, Qinghai, China, June 1993. B. Part of song of *chloronotus* type B, Emei Shan, Sichuan, China, May 1987. C. Part of song of *chloronotus*, type B (variation), Emei Shan, Sichuan, China, June 1994. D. Complete song of *chloronotus*, type A, Emei Shan, Sichuan, China, June 1994. All tape recordings by Per Alström.


A
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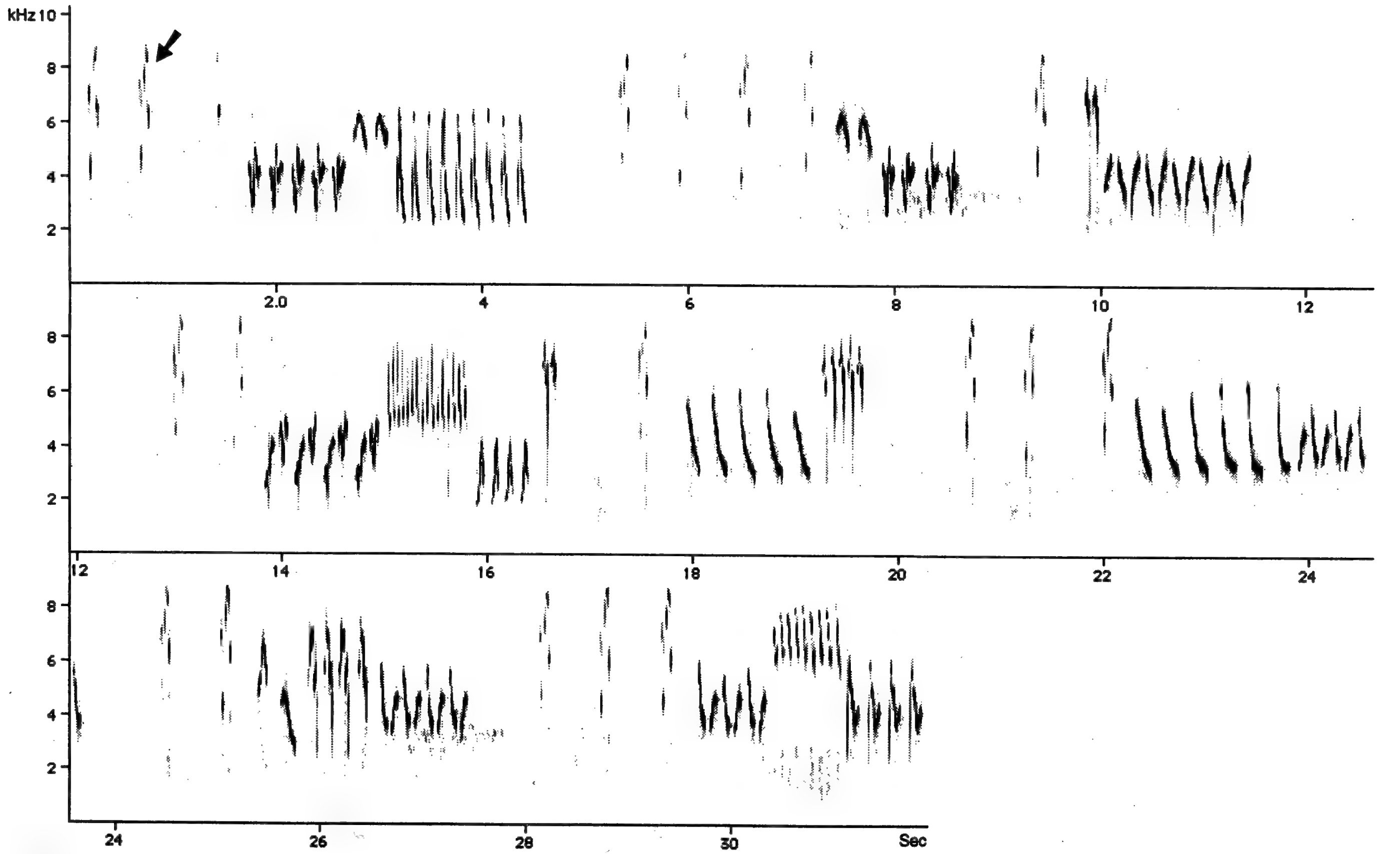

Figure 3. Complete song of *proregulus*, Changbai Shan, Jilin, China, June 1987. One *tsrip* note indicated by an arrow. Tape recorded by Per Alström.

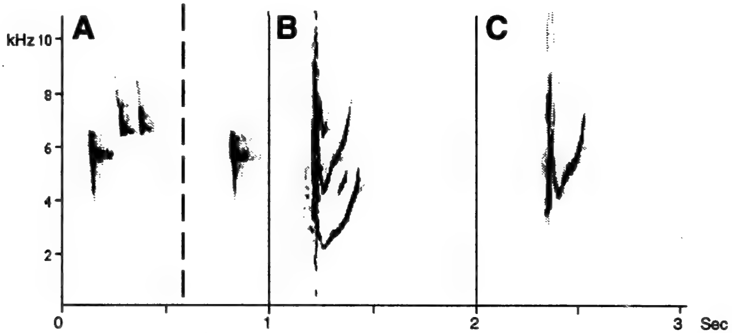

Figure 4. Calls of *kansuensis*, Huzu Bei Shan, June 1995 (A; variation shown); *proregulus*, Huzong, Heilongjiang, China, June 1988 (B); and *chloronotus*, Emei Shan, Sichuan, China, May 1989 (C). Note similarity between calls of *proregulus* and *chloronotus*. All tape recordings by Per Alström.

somewhat reminiscent of the song of *kansuensis* when the trills are excluded (as is sometimes the case for short periods of time); the most striking difference is that the individual *tsip* elements are double (infrequently single, triple or multiple) in *chloronotus*, while they are single in *kansuensis*.

The call of *kansuensis* is a thin *tsí-di or tsí-di-di* (Fig. 4A); sometimes it consists of four or five syllables, *tsí-di-di-di* or *tsí-di-di-di-di*, and rarely it is a monosyllabic *tsit* or, differently transcribed, *tsüt* (Fig. 4A). It is significantly different from the soft, subdued *dju-ee* or *duee* of *proregulus* (Fig. 4B) and the monosyllabic *tsuist* or, differently transcribed, *uist* of *chloronotus* (Fig. 4C).

Playback tests

Eleven of the 17 (65%) *kansuensis* exposed to playback of *proregulus* showed no interest whatsoever in the song of *proregulus*, while 6 individuals (No.5, 7, 8, 11, 12 and 13 in Appendix) reacted to the song of *proregulus*. However, in three of the individuals which did react to the song of *proregulus* (No. 7, 12 and 13) there was no aggression at all, the birds only showed a very temporary interest, which was interpreted as merely curiosity (see Appendix). In two others (No. 8 and 11) the aggression towards the song of *proregulus* was not nearly so strong as to the song of *kansuensis*, and it ceased after a while (see Appendix). Only one *kansuensis* (No. 5) responded with strong aggression towards the song of *proregulus*, though it did diminish after some time (see Appendix). It should be noted that four (No. 5, 7, 8 and 11) of the *kansuensis* which reacted towards the song of *proregulus* also reacted towards the song of *chloronotus* (see below).

Thirteen out of the 18 (72%) *kansuensis* exposed to playback of the song (both types) of *chloronotus* did not respond at all to *chloronotus* song. Five (No. 5, 7, 8, 11 and 12) individuals responded to *chloronotus* type B song. However, in two of these (No. 5 and 12) there was no

TABLE 1

Measurements of *chloronotus* (from China and NE India), *kansuensis* and *proregulus* (from Siberia and S China) based on personal measurements of specimens in The Natural History Museum, Tring, U.K., specimens on loan from the Zoologischen Museum, Berlin, Germany, and live birds. Numbers in brackets refer to means and standard deviations. All measurements in mm

		male	female
chloronotus	wing	50.5–57.0 (54.1; 1.85)	48.0–51.5 (49.7; 1.06)
(*n*=14 males, 10 females)	tail	36.0–44.5 (39.9; 2.13)	33.5–38.5 (36.5; 1.73)
	bill	9.8–11.4 (10.6; 0.48)	10.1–10.9 (10.4; 0.27)
kansuensis	wing	54.0–57.5 (55.6; 1.11)	51.0–52.0 (51.5; 0.35)
(*n*=9 males, 5 females)	tail	40.0–44.0 (42.4; 1.45)	37.0–40.0 (38.4; 1.29)
	bill	10.5–11.3 (10.8; 0.24)	10.0–11.1 (10.5; 0.41)
proregulus	wing	49.0–54.5 (51.3; 1.91)	48.0–52.0 (49.8; 1.37)
(*n*=12 males, 14 females)	tail	34.5–39.5 (36.7; 1.70)	33.0–40.0 (36.2; 1.95)
	bill	9.7–10.7 (10.3; 0.34)	9.7–10.8 (10.3; 0.33)

aggression at all involved, and the reaction was interpreted as merely curiosity. In none of the others was the reaction to the song of *chloronotus* nearly so strong as to the song of *kansuensis*, and the interest in the song of *chloronotus* invariably ceased after some time (see Appendix). Only one *kansuensis* (No. 7) reacted to *chloronotus* type A song, though there was no apparent aggression involved.

None of the 7 *chloronotus* tested with the song of *kansuensis* showed any aggression towards this song, though individual number 3 showed temporary interest the third time it was exposed to *kansuensis* song (see Appendix).

Morphological differences between kansuensis *and* proregulus/chloronotus

Kansuensis differs from *proregulus* mainly in being clearly paler yellow on the supercilium (unless very worn, *proregulus* is bright yellow on especially the anterior part of the supercilium, while *kansuensis* shows only a very faint yellowish tinge to the supercilium in front of/above the eye). At least in spring and summer the lower mandible is generally paler in *kansuensis* than in *proregulus*: it is either entirely pale orange or pale orange with a very small dark tip in *kansuensis*, while it has a much more extensive dark tip in *proregulus* (lower mandible frequently appears nearly all dark, although it is sometimes extensively pale orange or even practically all pale orange). Also the legs generally appear paler in *kansuensis* than in *proregulus*, although there is overlap. Furthermore, *kansuensis* has significantly longer wings (Table 1; Mann-Whitney U test, $P_{\text{males}}=0.0002$, $P_{\text{females}}=0.01$) and tail (Table 1; Mann-Whitney U test, $P_{\text{males}}=0.0001$, $P_{\text{females}}=0.04$) and a different wing formula (Table 2).

Compared to *chloronotus*, there appears to be a tendency for the supercilium to be marginally more yellowish-tinged, the lateral

TABLE 2

Wing formulae of *chloronotus*, *kansuensis* and *proregulus*. Based on same specimens as in Table 1 (both sexes combined). Wp means wing-point and P means primary. P10 is compared to tips of primary coverts, other primaries to wing-point. Figures given are mean, range and standard deviation

	chloronotus	*kansuensis*	*proregulus*
wp: P7	13.3%	15.4%	87.5%
wp: P6	6.7%	46.1%	0%
wp: P7=6	80.0%	38.5%	12.5%
P10	+ 8.0 (5.5–9.5; 1.19)	+ 7.6 (5.5–9.0; 0.97)	+ 6.9 (4.5–9.0; 1.39)
P9	− 8.6 (6.5–11.0; 1.53)	− 8.1 (6.5–10.0; 1.10)	− 6.7 (5.0–8.0; 0.83)
P8	− 1.4 (0.5–2.0; 0.48)	− 1.4 (1.0–2.0; 0.34)	− 0.7 (0.5–1.5; 0.32)
P5	− 1.3 (0.5–3.0; 0.72)	− 1.3 (0.5–2.0; 0.48)	− 1.9 (1.0–3.5; 0.64)

crown-stripes marginally paler and greener, and the underside whiter in *kansuensis*, but these differences are so subtle that *kansuensis* and *chloronotus* are essentially identical on plumage. However, the lower mandible is generally clearly paler in *kansuensis* than in *chloronotus* (in the latter it frequently appears nearly all dark, although sometimes pale orange with a very small dark tip). Also the legs generally appear paler in *kansuensis* than in *chloronotus*, although there is overlap. Although *kansuensis* and *chloronotus* are basically very similar on measurements and wing formulae, *kansuensis* has marginally longer wings (Table 1; Mann–Whitney U test, $P_{\text{males}}=0.045$, $P_{\text{females}}=0.006$) and a greater tendency for the 6th primary to be equal to the 7th (Table 2).

Breeding habitat of kansuensis, proregulus *and* chloronotus

At Laoye Shan (altitude *c.* 2500–2900 m) and Mengda (*c.* 2200–2500 m) *kansuensis* occurs in predominantly deciduous forest (including e.g. birch *Betula* and aspen *Populus*) with some spruce *Picea* mixed in (overall ⩽10–*c.* 20%). On Huzu Bei Shan (*c.* 2700–2900 m) it occurs mainly in deciduous forest (predominantly birch) with some spruce and tall junipers *Juniperus* mixed in, much less commonly in predominantly coniferous forest. At Xinglong Shan *kansuensis* occurs mainly in mixed deciduous and spruce forest (the predominant forest type), but also in mainly deciduous as well as mainly spruce forest, at an altitude of *c.* 1700–1800 m. At Hezuozhen *kansuensis* was found in "semi-old" secondary spruce forest with much undergrowth of deciduous bushes at an altitude of *c.* 3200 m (altitude according to locals).

The breeding habitats of *proregulus* and *chloronotus* differ significantly from that favoured by *kansuensis*. *Proregulus* breeds in the taiga, in coniferous forest or mixed forest with a high percentage of conifers (Dement'ev & Gladkov 1954, Flint *et al.* 1984, Rogacheva 1992, pers. obs.). *Chloronotus* breeds chiefly in spruce/fir *Abies* forest or predominantly spruce/fir forest, and only very sparsely in mainly deciduous forest (on mountains, just below the spruce forest belt). In

China *chloronotus* breeds between *c.* 2000 and *c.* 4000 m, usually at *c.* 2600–*c.* 3100 m (Étchécopar & Hüe 1983, Meyer de Schauensee 1984, Alström *et al.* 1992, pers. obs.).

Breeding ranges of kansuensis, proregulus *and* chloronotus

Kansuensis has been observed in the breeding season at 9 localities, from the eastern Lenglong Ling, north Gansu Province (*c.* 37°30′N, 102°30′E) in the north to Hezuozhen, south Gansu in the south (Fig. 1). It seems likely that its range extends at least slightly further northwest, as the mountain range continues in that direction. It is not known where *kansuensis* winters, but due to the severe winter climate in its breeding range, it ought to be considerably further south. In 1993 *kansuensis* apparently left Laoye Shan in mid to late October (Jesper Hornskov *in litt.*).

The breeding range of *proregulus* appears to be disjunct from that of *kansuensis* by at least 1000 km (Fig. 1). Mayr & Cottrell (1986) and Cheng (1987) state that *proregulus* and *chloronotus* intergrade in eastern Qinghai. This surely refers to *kansuensis*. We have found no evidence of *proregulus* breeding in Qinghai.

Chloronotus (including *simlaensis*) breeds from the western Himalayas through central China north to at least Chakou (Fig. 1), at the most 100 km south of Hezuozhen, where *kansuensis* was found. It seems likely that the breeding ranges of *kansuensis* and *chloronotus* actually overlap marginally, although this has not yet been proven.

Discussion

Since *kansuensis* is morphologically more similar to *chloronotus* than to *proregulus*, it may seem surprising that most previous authors (Hartert & Steinbacher 1934, Vaurie 1954, Étchécopar & Hüe 1983, Meyer de Schauensee 1984, Mayr & Cottrell 1986, Williamson 1967) have lumped *kansuensis* with *proregulus* rather than with *chloronotus*. However, Hartert & Steinbacher (*op. cit.*) do not state how many individuals they studied, Vaurie (*op. cit.*) only examined one, and we doubt that any of the others actually examined specimens of *kansuensis*.

The morphological differences between *kansuensis* and *chloronotus* are so slight that, based on these alone, *kansuensis* would be best synonymized with *chloronotus* or considered a very poorly differentiated subspecies of *P. chloronotus*. In contrast, the vocalizations of *kansuensis* are very different from those of *chloronotus*. In fact, the differences in song between *kansuensis* and *chloronotus* are much more pronounced than between different species in some other presumably monophyletic groups of *Phylloscopus* warblers, e.g. *P. occipitalis-P. reguloides-P. davisoni* (Martens 1980, Alström & Olsson 1993), *P. schwarzi-P. armandii* (Martens 1980, Alström & Olsson 1994), and *P. griseolus-P. affinis-P. subaffinis* (Martens 1980, Alström & Olsson 1992, 1994), and at least as pronounced as between other species of *Phylloscopus*. This alone suggests that the rank of species would be appropriate for *kansuensis*. However, since *chloronotus* has two song types which are nearly as different from each other as from the song of *kansuensis*, the distinctive song of *kansuensis* might be considered to be just a third, geographically localized, variant of *P. chloronotus* song. This is contradicted by the playback tests which have been carried out, which instead indicate that the songs of *kansuensis* and *chloronotus* would act as prezygotic reproductive isolating mechanisms if there were any sympatry. Especially the playback tests on those *kansuensis* (No. 16 and 17) and *chloronotus* (No. 5, 6 and 7) which were found in close proximity to each other (separated by at the most 100 km), combined with the apparent lack of intergradation between these two taxa (as indicated by the lack of individuals with intermediate vocalizations[1]), strongly suggest that *kansuensis* and *chloronotus* should be considered separate species. It is curious that 5 of the *kansuensis* tested showed some interest (though there was no or relatively little aggression involved) in the type B song of *chloronotus*, while only one individual reacted with curiosity to *chloronotus* type A song. Since *chloronotus* reacts equally strongly to both of its two song types (Alström & Olsson 1990 and Appendix), the reason why *kansuensis* showed more interest in the type B song than in the type A song does not seem to be a case of the former song type being more important in territory defence than the latter. It seems possible that *kansuensis* considers the type B song to be more reminiscent of its own song than the type A song. In general, *response* from one taxon to playback of song of another taxon is of little taxonomic relevance. Response to playback of heterospecific closely related sympatric taxa has been noted in several cases, presumably because of interspecific territorialism (e.g. Emlen *et al*. 1975, Catchpole 1978, Catchpole & Leisler 1986, Prescott 1987, Elfström 1990, Baker 1991). Response to playback of allopatric taxa is equally uninformative in this context, and may simply be a result of similarities between the songs of the taxa involved (cf. Ratcliffe & Grant 1985); the song's function as a reproductive isolating barrier is unlikely to be fully developed if the taxa are geographically separated. The fact that *kansuensis* and *chloronotus* exist so close to each other without any signs of intergradation indicates that they have evolved independently of each other for a substantial period of time. Significant interbreeding would presumably have merged the two forms. The differences in breeding habitat are further evidence of speciation (Richman & Price 1992).

The overall similarity between *kansuensis*, *P. chloronotus* and *P. proregulus* suggests that they share a common ancestor and thus form a monophyletic group. On plumage, wing-formula, size and song *kansuensis* shows a greater similarity to *chloronotus* than to *proregulus*.

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[1] We assume that the offspring from any mixed pairs of *kansuensis* and *chloronotus* would have aberrant songs compared to their parent taxa. This assumption is supported by reports of aberrant songs in suspected hybrids between *Phylloscopus bonelli* × *P. sibilatrix* (Bremond 1972, Fouarge 1972) and *P. trochilus* × *P. collybita* (Da Prato & Da Prato 1986). However, since song appears to be to a great extent learned in "song-birds" in general (see review in Catchpole & Slater 1995), it is possible that the song of hybrids would be very similar to or indistinguishable from the species which is more numerous in the area where it was born.

This, together with the distributional pattern, suggests that *kansuensis* and *chloronotus* diverged more recently, and thus are more closely related to each other than to *proregulus*. In analogy with the proposed treatment of *kansuensis* and *chloronotus* as separate species, *kansuensis* and *proregulus* must also be treated as specifically different. The playback tests support this treatment. However, three *kansuensis* (No. 5, 8 and 11) reacted with some aggression toward the song of *proregulus*, and in one of these (No. 5) the response was almost as strong as to the song of *kansuensis*. It should be noted that these three birds also responded to *chloronotus* type B song. As discussed above, it is important to keep in mind that only absence of response to playback may have some taxonomic relevance. The differences in breeding habitat between *kansuensis* and *proregulus* further support the view that they are better treated as separate species.

It is clear that *kansuensis* is not conspecific with *P. sichuanensis*. These two were found in sympatry at Laoye Shan, Xinglong Shan, Mengda, Hezuozhen and Chakou, and morphologically and vocally they are significantly different (Alström *et al.* 1992). Also, the two *kansuensis* (No. 1 and 3) which were exposed to playback of the song of *P. sichuanensis* did not respond at all to it. Moreover, where both taxa occurred together, there was a difference in average habitat preference, *sichuanensis* favouring less-tall secondary growth at lower altitude than *kansuensis*.

P. proregulus (*sensu lato*) has been variously named Pallas's Warbler, Pallas's Leaf Warbler, Pallas's Willow Warbler, Lemon-rumped Warbler and Pale-rumped Warbler. We support Beaman (1994) in using the name Pallas's Leaf Warbler for *P. proregulus (sensu stricto)*, Lemon-rumped Warbler for *P. chloronotus (sensu* Alström & Olsson 1990), and suggest the name Gansu Leaf Warbler for *P. kansuensis*. There are two reasons why we prefer the name Gansu Leaf Warbler rather than "Qinghai Leaf Warbler" (which might be thought a more suitable name, since nearly all of the records of *kansuensis* are from Qinghai Province and only a few from Gansu Province): firstly, the name Gansu Leaf Warbler is a translation of the scientific name (Gansu is the modern spelling of Kansu), and, secondly, the name Qinghai would surely be mis-pronounced by most people (correct pronunciation "Chinghigh").

Summary

Phylloscopus proregulus kansuensis Meise has variously been treated as a distinct subspecies, a synonym of *P. chloronotus (proregulus) chloronotus* or a synonym of *P. (p.) proregulus* (most authors). It is morphologically only very slightly different from *chloronotus*, though more clearly separable from *proregulus* (especially by its much paler yellow supercilium). Both song and calls are strikingly different from those of both *chloronotus* and *proregulus* (most different from latter). Unlike *chloronotus* and *proregulus* it breeds mainly in deciduous or mixed forest. In the breeding season it is parapatric with *chloronotus* (without any known geographical overlap), while it appears to be widely allopatric with *proregulus*. Playback tests indicate that the songs would act as prezygotic reproductive isolation mechanisms if there were any sympatry. We suggest that *kansuensis* be treated as a distinct species and that the English name be Gansu Leaf Warbler.

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Appendix

Playback experiment data

kansuensis

Individual No. 1, Laoye Shan 31 May 1993
● *proregulus* (2 min). No response. ● *sichuanensis* (2 min). No response. ● *chloronotus* type A (2 min). No response. ● *chloronotus* type B (2 min). No response. ● *kansuensis* (2 min). Full response. ● *proregulus* (2 min). No response. ● *sichuanensis* (2 min). No response. ● *chloronotus* type A (2 min). No response. ● *chloronotus* type B (2 min). No response. ● *kansuensis* (2 min). Full response.

Individual No. 2, Huzu Bei Shan 21 June 1993
● *chloronotus* type A (2 min). No response. ● *kansuensis* (2 min). Full response.

Individual No. 3, Xinglong Shan 8 June 1994
● *proregulus* (2 min). No response. ● *sichuanensis* (2 min). No response. ● *chloronotus* type A (2 min). No response. ● *chloronotus* type B (2 min). No response. ● *kansuensis* (2 min). 1st approach at 5 s followed by full response rest of time. ● *chloronotus* type B (4 min). No response. ● *chloronotus* type A (4 min). No response. ● *proregulus* (4 min). No response. ● *kansuensis* (2 min). 1st approach at 8 s followed by full response rest of time. ● *sichuanensis* (2 min). No response. ● *chloronotus* type B (2 min). No response. ● *chloronotus* type A (2 min). No response. ● *kansuensis* (2 min). 1st approach at 9 s followed by full response rest of time. ● *proregulus* (2 min). No response. ● *kansuensis* (2 min). 1st approach at 4 s followed by full response rest of time.

Individual No. 4, Xinglong Shan 8 June 1994
● *proregulus* (2 min). No response. ● *kansuensis* (2 min). 1st approach at 8 s followed by full response rest of time. ● *chloronotus* type A (2 min). No response. ● *chloronotus* type B (2 min). No response. ● *kansuensis* (2 min). 1st approach at 5 s followed by full response rest of time. ● *chloronotus* type B (2 min). No response. ● *kansuensis* (2 min). 1st approach 18 s followed by full response rest of time. ● *chloronotus* type A (2 min). No response. ● *kansuensis* (2 min). 1st approach at 110 s followed by full response rest of time.

Individual No. 5, Xinglong Shan 8 June 1994
• *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 7 s followed by full response rest of time. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 3 s followed by full response rest of time. • *chloronotus* type A (2 min). Came close to speaker twice (at 18 s and 42 s), but showed no aggression. • *kansuensis* (2 min). 1st approach at 4 s followed by full response rest of time. • *proregulus* (2 min). 1st approach at 4 s followed by full response rest of time. • *proregulus* (after the speaker had been moved *c.* 20 m; 4 min). 1st approach 3 s. Less strong response than before, on and off during rest of time. • *chloronotus* type A (2 min). No response.

Individual No. 6, Xinglong Shan 8 June 1994
• *chloronotus* type B (2 min). No response. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *kansuensis* (2 min). 1st approach at 6 s followed by full response rest of time. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *kansuensis* (2 min). 1st approach at 5 s followed by full response rest of time. • *chloronotus* type B (2 min). No response.

Individual No. 7, Xinglong Shan 8 June 1995
• *proregulus* (4 min). Came to *c.* 3 m from speaker at 25 s, but moved away at *c.* 35 s. Showed no aggression. No further response. • *chloronotus* type A (4 min). 1st approach at 6 s. Appeared curious, not aggressive. At 36 s *c.* 3 m from speaker. Moved away after that. • *chloronotus* type B (4 min). 1st approach at 18 s. At 50 s *c.* 3 m from speaker. Remained close to speaker rest of time; appeared slightly annoyed. • *kansuensis* (2 min). 1st approach at 8 s followed by full response rest of time. Much more agitated than when *proregulus* and the two types of *chloronotus* were played. • *proregulus* (2 min). No response. • *chloronotus* type B (2 min). 1st approach at 9 s, but no further response. • *kansuensis* (2 min). 1st approach at 7 s followed by full response rest of time.

Individual No. 8, Mengda 12 June 1994
• *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *kansuensis* (2 min). 1st approach at 10 s followed by full response rest of time. • *chloronotus* type B (4 min). 1st approach at 5 s followed by full response until *c.* 25 s, thereafter gradually turning uninterested, and after *c.* 1 min no response at all. • *proregulus* (4 min). 1st approach at 28 s followed by full response for *c.* 1 min, then gradually less interested. • *chloronotus* type A (4 min). No response. • *chloronotus* type B (4 min). No response. • *kansuensis* (2 min). 1st approach at 7 s followed by full response rest of time.

Individual No. 9, Mengda 12 June 1994
• *kansuensis* (a few s). Immediately full response. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 18 s followed by full response rest of time. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *kansuensis* (2 min). 1st approach at 4 s followed by full response rest of time. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 27 s followed by relatively weak response rest of time.

Individual No. 10, Mengda 12 June 1994
• *kansuensis* (a few s). Immediately full response. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 14 s followed by full response rest of time. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). Relatively weak response.

Individual No. 11, Mengda 12 June 1994
• *kansuensis* (*c.* 30 s). Immediately full response. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (4 min). 1st approach at 24 s. Some response; approached speaker, flicked wings now and then. At *c.* 2 min 10 s it moved away. Response interpreted as mainly curiosity. • *kansuensis* (2 min). 1st approach at 6 s followed by full response rest of time. Much stronger response than to *chloronotus*. • *proregulus* (4 min). 1st approach at *c.* 20 s. Some response; approached speaker, flicked wings now and then until *c.* 2 min, when it moved away. Response interpreted as mainly curiosity. • *chloronotus* type A (4 min). No response. • *chloronotus* type B (4 min). 1st

approach at 18 s. Obviously interested in the song; searched for the source of the sound and flicked its wings now and then. At *c.* 1 min 50 s it moved away from speaker. • *kansuensis* (2 min). 1st approach at 3 s followed by full response rest of time. Much stronger response than to *proregulus* and *chloronotus*.

Individual No. 12, Mengda 12 June 1994
• *kansuensis* (a few s). Immediately full response. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (4 min). 1st approach at *c.* 15 s, but no further response. • *kansuensis* (2 min). 1st approach at 45 s (bird was not seen when playback started, so perhaps had moved out of hearing range) followed by full response rest of time. • *proregulus* (4 min). Moved somewhat closer to speaker, but was at the most curious, definitely not aggressive. • *chloronotus* type A (4 min). No response. • *chloronotus* type B (4 min). No response. • *kansuensis* (2 min). 1st approach at 4 s followed by full response rest of time.

Individual No. 13, Mengda 12 June 1994
• *kansuensis* (a few s). Immediately full response. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 3 s followed by full response rest of time. • *proregulus* (2 min). 1st approach at 6 s, but no further response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 3 s followed by full response rest of time.

Individual No. 14, Mengda 13 June 1994
• *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 12 s followed by full response rest of time. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 8 s followed by full response rest of time.

Individual No. 15, Mengda 14 June 1994
• *kansuensis* (a few s). Immediately full response. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *kansuensis* (*c.* 30 s). Immediately full response. • *chloronotus* type B (2 min). No response. • *kansuensis* (1 min). 1st approach at 8 s followed by full response rest of time. • *proregulus* (2 min). No response. • *kansuensis* (*c.* 30 s). Immediately full response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 4 s followed by full response rest of time. • *chloronotus* type B (2 min). No response.

Individual No. 16, Hezuozhen 15 June 1994
• *kansuensis* (a few s). Immediately full response. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 18 s followed by full response rest of time, but not quite so aggressive as usual. • *proregulus* (2 min). No response. • *chloronotus* type A (2 min). No response. • *chloronotus* type B (2 min). No response. • *kansuensis* (2 min). 1st approach at 14 s followed by full response rest of time, but not quite so aggressive as usual.

Individual No. 17, Hezuozhen 15 June 1994
• *kansuensis* (a few s). Immediately full response. • *chloronotus* type B (2 min). No response. • *kansuensis* (a few s). Immediately full response. • *chloronotus* type A (2 min). No response. • *kansuensis* (a few s). Immediately full response. • *proregulus* (2 min). No response. • *kansuensis* (a few s). Immediately full response. • *chloronotus* type B (2 min). No response. • *chloronotus* type A (2 min). No response. • *kansuensis* (2 min). 1st approach at 8 s followed by full response rest of time. • *proregulus* (2 min). No response. • *kansuensis* (a few s). Immediately full response. • *chloronotus* type A (2 min). No response. • *kansuensis* (a few s). Immediately full response. • *chloronotus* type B (2 min). No response. • *kansuensis* (1 min). 1st approach at 6 s followed by full response rest of time. • *chloronotus* type B (2 min). No response.

Individual No. 18, Huzu Bei Shan 24 June 1995
• *chloronotus* type A (4 min). No response. • *kansuensis* (1 min). 1st approach at 35 s followed by full response rest of time. • *chloronotus* type A (4 min). No response. • *kansuensis* (1 min). 1st approach at 12 s followed by full response rest of time.

• *chloronotus* type B (2 min). No response. • *kansuensis* (1 min). 1st approach at 6 s followed by full response rest of time. • *chloronotus* type B (2 min). No response.

chloronotus

Individual No. 1, Emei Shan 2 June 1994
• *kansuensis* (2 min). No response. • *chloronotus* (2 min). 1st approach at 16 s followed by full response rest of time. • *kansuensis* (2 min). No response. • *chloronotus* (2 min). 1st approach at 6 s followed by full response rest of time. • *kansuensis* (2 min). No response.

Individual No. 2, Emei Shan 3 June 1994
• *kansuensis* (2 min). No response. • *chloronotus* type A (2 min). 1st approach at 4 s followed by full response rest of time. • *kansuensis* (2 min). No response. • *chloronotus* type A (2 min). 1st approach at 5 s followed by full response rest of time. • *kansuensis* (2 min). No response. • *chloronotus* type B (2 min). 1st approach at 6 s followed by full response rest of time.

Individual No. 3, Emei Shan 3 June 1994
• *proregulus* (2 min). No response. • *sichuanensis* (2 min). No response. • *kansuensis* (4 min). No response. • *chloronotus* type B (2 min). 1st approach at 7 s followed by full response rest of time. • *proregulus* (2 min). No response. • *sichuanensis* (2 min). No response. • *kansuensis* (4 min). No response. • *chloronotus* type B (2 min). 1st approach at 4 s followed by full response rest of time. • *kansuensis* (4 min). No response, though at 35 s and 3 min 40 s came close to speaker, but showed no aggression, and moved off almost immediately. • *chloronotus* type B (2 min). 1st approach at 7 s followed by full response rest of time.

Individual No. 4, Emei Shan 3 June 1994
• *kansuensis* (2 min). No response. • *chloronotus* (2 min). 1st approach at 8 s followed by full response rest of time. • *kansuensis* (2 min). No response. • *chloronotus* type A (2 min). 1st approach at 4 s followed by full response rest of time.

Individual No. 5, Chakou 16 June 1994
• *chloronotus* (a few s). Immediately full response. • *kansuensis* (2 min). No response. • *chloronotus* type B (1 min). 1st approach at 12 s followed by full response rest of time. • *kansuensis* (2 min). No response. • *chloronotus* type A (2 min). 1st approach at 9 s followed by full response rest of time. • *kansuensis* (2 min). No response. • *chloronotus* type B (a few s). Immediately full response.

Individual No. 6, Chakou 16 June 1994
• *chloronotus* (a few s). Immediately full response. • *kansuensis* (2 min). No response. • *chloronotus* type B (2 min). 1st approach at 8 s followed by full response rest of time. • *kansuensis* (2 min). No response. • *chloronotus* type A (2 min). 1st approach at 4 s followed by full response rest of time.

Individual No. 7, Chakou 16 June 1994
• *chloronotus* (a few s). Immediately full response. • *kansuensis* (2 min). No response. • *chloronotus* type A (2 min). 1st approach at 14 s followed by full response rest of time. • *kansuensis* (2 min). No response. • *chloronotus* type A (2 min). 1st approach at 9 s followed by full response rest of time. • *kansuensis* (2 min). No response. • *chloronotus* type A (2 min). 1st approach at 4 s followed by full response rest of time. • *kansuensis* (2 min). No response. • *chloronotus* type B (2 min). 1st approach at 4 s followed by full response rest of time.

New records of birds from Auyán-tepui, Estado Bolívar, Venezuela

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Auyán-tepui, located in Estado Bolívar, southern Venezuela, is one of the largest of the isolated sandstone mesas or tepuis of the highland region of south Venezuela that has come to be known as the Pantepui (Mayr & Phelps 1967). Auyán-tepui was first explored ornithologically during the Phelps Venezuela expedition of 1937–1938 (Chapman 1939, Gilliard 1941). That expedition spent several months on the southern talus slopes of the mountain, but due to arduous conditions and logistic difficulties, was only able to explore a small area on the southern, drier end of the 700 square kilometre summit plateau. Despite this, 32 species were recorded on the plateau including several new subspecies. Mayr & Phelps (1967) considered this an adequate sample for comparative studies of the avifauna. Subsequent to the 1937 expedition, the Universidad Central de Venezuela organised a brief expedition in 1956 that spent approximately one month on the extreme south end of the plateau and obtained a few specimens of birds as part of a general collection that emphasised plants (Steyermark 1967); the ornithological results of the 1956 expedition have not been reported in the literature. The geology, geomorphology and botany of the tepui have been reviewed by Tate (1938) and Berry *et al.* (1995).

As part of the recent Robert G. Goelet American Museum–Terramar Expedition to Auyán-tepui, we collected birds on the summit from 1 February to 1 March 1994. Five helicopter-supported camps were established in widely dispersed areas of the tepui summit, enabling us to sample the avifauna from a variety of habitats and elevations. Based on our Global Positioning System estimates (Appendix 1) of latitude and longitude, modern side-scanning radar images of Auyán-tepui, and the published map from the 1937/38 expedition (Tate 1938), it appears that our camps I and V were very close to the Phelps Expedition's 1850 m and 2200 m camps. Our other three camps sampled areas not previously visited by ornithologists, including a very wet area just above Angel Falls. Specimens were obtained using mistnets and shotguns and are deposited in the collections of the American Museum of Natural History (AMNH), New York, the Estación Biológica de Rancho Grande (EBRG), Maracay, Venezuela, and the Colección Ornitológica Phelps (COP), Caracas.

In this paper, we report 21 new species records for the summit plateau of Auyán-tepui; this includes one first record collected by the 1956 expedition from the Universidad Central de Venezuela. Several of our new records can be attributed to our use of mistnets, a sampling technique not used on early expeditions to localities in the Pantepui. The use of mistnets explains our collection of the *Aegolius* owl, the oilbird, and several new hummingbirds. In one calendar month (four man months), we added 21 new species to a summit avifauna that had numbered 32. We continue to believe (e.g. Barrowclough *et al.* 1995) that the avifaunas of most elements of the Venezuelan Pantepui are inadequately known due to restricted sampling duration, seasons, and techniques. A complete list of birds known to date from the summit plateau of Auyán-tepui is included in Appendix 2.

New records for Auyán-tepui

TEPUI TINAMOU *Crypturellus ptaritepui*

This tinamou, described in 1945, was previously known from only six specimens collected on Ptari-tepui and adjacent Sororopán-tepui (Phelps & Phelps 1958); those tepuis are some 50 km distant from Auyán-tepui and separated from it by the elevated (500–1000 m) grassland known as La Gran Sabana. The tinamou had been recorded as occurring in cloud forest in the subtropical zone between 1350 and 1800 m (Meyer de Schauensee & Phelps 1978). On Auyán-tepui four specimens were taken at three localities, from approximately 1500 to 1700 m, in the more humid northern areas of the tepui. The species was encountered frequently both in forested and more open scrubby areas but was retiring in its habits and usually was seen running into cover. One of two males collected had moderately enlarged testes and one of two females had an enlarged ovary; none were in moult. Vocalisations of an unknown tinamou at high elevations on Chimantá-tepui (*c.* 50 km south of Auyán-tepui) were tentatively assigned to this species by Medina Cuervo (1992). The failure of the 1937/38 Phelps expedition to obtain this species on Auyán-tepui is perplexing. Nevertheless, our establishment of the presence of the Tepui Tinamou there and its presumptive presence on Chimantá suggest that this species has a much wider distribution in the eastern Pantepui than had been previously recognised.

TURKEY VULTURE *Cathartes aura*

Individuals frequently were seen soaring near the tepui rim.

BLACK VULTURE *Coragyps atratus*

One sight record at Angel Falls (Camp IV).

ROADSIDE HAWK *Buteo magnirostris*

This hawk was seen at several localities at elevations from 1700 to 2200 m.

GREAT BLACK HAWK *Buteogallus urubitinga*

One individual was seen soaring out of the tepui's central canyon and over a forested area of the tepui at 1700 m.

SWALLOW-TAILED KITE *Elanoides forficatus*

Up to three individuals were observed, both flying and perched, in the vicinity of Angel Falls.

LITTLE CHACHALACA *Ortalis motmot*

Several individuals were seen and heard calling at 1530 m.

SPOTTED SANDPIPER *Actitis macularia*

This North American migrant was observed foraging along a large river near the rim of the central canyon.

RED AND GREEN MACAW *Ara chloroptera*

Daily sight records of a pair at 1530 m (near Camp III).

BUFF-FRONTED OWL *Aegolius harrisii*

A male with small testes and light body moult was collected at night in a mistnet in an open rocky area at 1700 m. This little known owl had been recorded in Venezuela from a few widely scattered localities: Mérida in the Andes, El Junquito in the Distrito Federal (unpubl. record; specimen at AMNH), and in the Pantepui from Cerro de la Neblina (Willard *et al.* 1991). This is the easternmost record of the nominate northern race. This record and the recent one from Neblina indicate that intensive nocturnal use of mistnets may establish a general occurrence of this species on the larger, higher tepuis.

OILBIRD *Steatornis caripensis*

One specimen of this wide-ranging bird was taken by mistnet over a stream at 1750 m where 15 to 20 birds were attracted to a light used for collecting moths on a foggy night. The species is known from scattered localities throughout the Pantepui (Willard *et al.* 1991) as well as elsewhere in South America.

TEPUI SWIFT *Cypseloides phelpsi*

Although Auyán-tepui is the type locality for this species (Collins 1972), it had not been previously recorded on the summit plateau. Gilliard (1941) reported it to be very common on the slopes up to 1100 m with flocks of up to 5000. On the summit it commonly was seen foraging low over vegetation, streams, and open rock. Two females and three males were collected; all had moderately enlarged gonads and no moult.

WHITE-COLLARED SWIFT *Streptoprocne zonaris*

This widely distributed swift frequently was seen in large flocks of up to several hundred birds flying high over the tepui.

BROWN VIOLETEAR *Colibri delphinae*

This species has an altitudinal range from tropical to temperate zones and a wide distribution in northern South America; it is known from many tepuis (Willard *et al.* 1991). This hummingbird was uncommon, with only two specimens taken by mistnet. Neither specimen was in moult; gonads were small.

VELVET-BROWED BRILLIANT *Heliodoxa xanthogonys*

This widespread Pantepui endemic was uncommon; two specimens were taken by mistnet. A male had moderately enlarged testes; a female had minute ovaries; both were in body moult.

VERSICOLORED EMERALD *Amazilia versicolor*

Two specimens were collected by mistnet at 1700 m. Neither specimen had enlarged gonads; a male was moulting tail feathers and a female had no moult.

COPPER-RUMPED HUMMINGBIRD *Amazilia tobaci*

One specimen (♀) was collected on the summit at 1700 m. It was previously known from the southern slopes of this tepui up to 1500 m. The bird had small ovaries and was in body moult.

RUFOUS-TAILED TYRANT *Knipolegus poecilurus*

This flycatcher is widespread in the Pantepui. A specimen collected at *c.* 2400 m on the south rim by an expedition from the Universidad Central de Venezuela in 1956, deposited at EBRG, is the only record of this species from Auyán-tepui.

LESSER ELAENIA *Elaenia chiriquensis*

Two male specimens of this widespread species were collected at 1700 and 2200 m; neither had enlarged gonads or moult, but both were rather fat. It was previously known from the slopes up to 1100 m (Gilliard 1941).

BLACK-BILLED THRUSH *Turdus ignobilis*

This thrush was fairly common in wooded areas. Three of five males had enlarged testes and one of two females had a moderately enlarged ovary. None of the birds was in moult. The Phelps Venezuela Expedition collected this species on the south slopes up to 1500 m (Gilliard 1941), but did not find it on the summit.

RED-SHOULDERED TANAGER *Tachyphonus phoenicius*

Gilliard (1941) collected this species from 460 m on the savanna to 1800 m on the slopes. We took an adult male with moderately enlarged gonads at 1700 m on the plateau.

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Appendix 1

Coordinates and elevations of 1994 collecting localities.

Camp I.	5°51′N, 62°32′W, 1700 m.
Camp II.	5°54′N, 62°29′W, 1750 m.
Camp III.	5°53′N, 62°38′W, 1850 m.
Camp IV.	5°58′N, 62°33′W, 1700 m.
Camp V.	5°46′N, 62°32′W, 2200 m.

Appendix 2

Complete list of birds known from the summit plateau of Auyán-tepui, Estado Bolívar, Venezuela. *=sight record.

*Crypturellus ptaritepui, Podiceps dominicus, Cathartes aura**, Coragyps atratus*, Buteo magnirostris*, Buteogallus urubitinga*, Elanoides forficatus*, Ortalis motmot*, Actitis macularia*, Gallinago paraguaiae*, Columba fasciata, Ara chloroptera*, Nannopsittaca panychlora, Aegolius harrisii, Steatornis caripensis, Caprimulgus longirostris, Streptoprocne zonaris*, Cypseloides phelpsi, Aeronautes montivagus*, Campylopterus hyperythrus, Colibri delphinae, Colibri coruscans, Polytmus milleri, Amazilia versicolor, Amazilia tobaci, Heliodoxa xanthogonys, Piculus rubiginosus, Cranioleuca demissa, Premnoplex adusta, Automolus roraimae, Lochmias nematura, Thamnophilus insignis, Myrmothera simplex, Chloropipo uniformis, Knipolegus poecilurus, Hirundinea ferruginea*, Todirostrum russatum, Mecocerculus leucophrys, Elaenia chiriquensis, Elaenia dayi, Elaenia pallatangae, Troglodytes rufulus, Turdus olivater, Turdus ignobilis, Macroagelaius imthurni, Myioborus castaneocapillus, Coereba flaveola, Diglossa major, Tangara cyanoptera, Tachyphonus phoenicius, Catamenia homochroa, Atlapetes personatus, Zonotrichia capensis.*

A distinctive new subspecies of Macgregor's Bowerbird (Ptilonorhynchidae) of New Guinea

by Clifford B. Frith & Dawn W. Frith

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Macgregor's Bowerbird *Amblyornis macgregoriae* is the most widely distributed of the four *Amblyornis* species of 'maypole' bower-building 'gardener' bowerbirds, all confined to mainland New Guinea. Macgregor's Bowerbird is found throughout the main mountain ranges of New Guinea except those of the extreme west of Irian Jaya (Tamrau, Arfak and Wandammen Mts.) at altitudes of 1600–3300 (rarely 1200–3300) m (Gilliard 1969, Schodde & McKean 1973, Beehler *et al.* 1986). Adult males are adorned with an extensive bright orange crest which they display to females during courtship at bowers they construct of sticks placed about a central sapling and decorated with moss and various objects including fruits, flowers and leaves (Frith 1970, Cooper & Forshaw 1977, Borgia 1986).

In the course of a study of bowerbird specimens in several major museum collections about the world a series of eight skins of Macgregor's Bowerbird from Mt. Bosavi, Southern Highlands, Papua New Guinea, were examined at the Bernice Pauahi Bishop Museum (BPBM), Honolulu, Hawaii, in January 1995. These consisted of four adult (fully crested) males, three immature (uncrested) males and one adult female, and were all collected during 6–9 June 1973 at *c.* 1400 m on the NNW slopes of Mt. Bosavi in forest. Seven were recorded by the preparator as caught in "snap traps" set to catch live mammals and one was mist-netted by A. B. Mirza.

We again examined all eight BPBM specimens from Mt. Bosavi at the American Museum of Natural History (AMNH), New York, in February 1995 where direct comparisons could be made with specimens from the nearest collection locality for the species, the Mt. Hagen area, Eastern Highlands, Papua New Guinea. This AMNH material, of the subspecies *A. m. kombok* (Schodde & McKean 1973), was extensive enough (see below) to permit meaningful conclusions concerning any differences in morphology between the birds of the Mt. Bosavi and Mt. Hagen area samples. For comparative purposes the colours of Smithe (1975) are referred to by their capitalized names with the numbers allocated to them in parenthesis. Where we deem a colour name of Smithe (1975) inappropriate we do not capitalise the name we use.

All wing and tail measurements were made with the same rulers, all others with the same electrical digital calipers, and all by CBF. Wing length measured was the flattened and straightened, thus maximised, chord, using a stopped steel rule. Tail length was measured from the point of entry of the central pair into the bird's skin to the tip of the longest feather with a small steel rule. Bill length was measured from

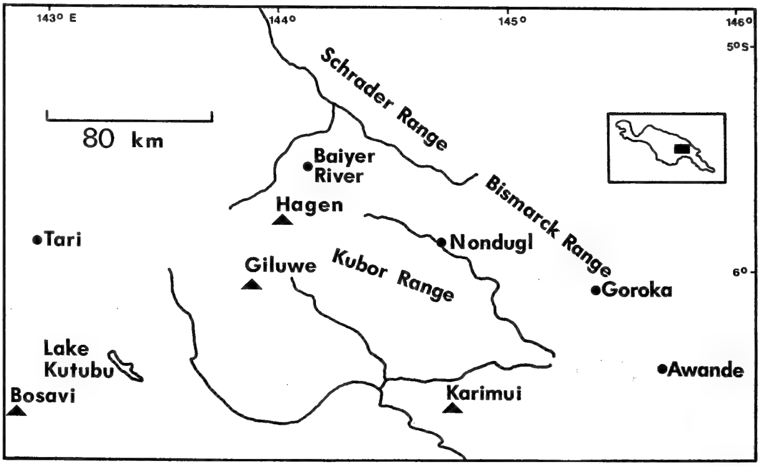

Figure 1. Map showing the location of Mt. Bosavi, type locality of *Amblyornis macgregoriae lecroyae*, and other locations in Papua New Guinea mentioned in the text. Solid triangles, mountains; solid dots, places. After Diamond (1972).

the bill tip to the cranio-facial hinge, and bill width was taken at the anterior edge of the nostril. Tarsus length was that of the tarsometatarsal bone.

Macgregor's Bowerbird was previously known to occur on Mt. Bosavi as Bell (1975) reported seeing it there in August 1970 and Thane Pratt (unpubl. data *in litt.*) also saw the species there in February 1975, but it appeared to have remained uncollected there until the BPBM specimens detailed here were taken. We were much surprised, therefore, to discover in June 1995 a single adult male specimen collected on 30 August 1970 at 1525 m a.s.l. on Mt. Bosavi by H. L. Bell within the collections of the Papua New Guinea National Museum and Art Gallery (PNGM), Port Moresby. Bell had prophetically written in pencil on his field specimen label "new subspecies?".

Mt. Bosavi is a 2600 m mountain located in the Western District of Papua New Guinea north of the Fly River delta of southern Papua New Guinea (Fig. 1), isolated from the central mountains of New Guinea as a vast discrete extinct volcanic cone in extensive lowlands. The nearest known population of Macgregor's Bowerbird to that on Mt. Bosavi is on the western side of the Tari Valley (Frith & Frith 1992) where a single specimen was collected for the BPBM and another for the Australian Museum (AM). Whilst we had previously examined and measured these two Tari Valley specimens they were not available for direct comparative study with the Bosavi series. In any event, little could be concluded from such limited material.

The generally brownish plumage of all eight BPBM birds from Mt. Bosavi is consistently and strikingly more saturated with reddish pigment (136) to give them an overall different appearance to a series of

A. m. kombok birds consisting of the following: 13 (8 adult ♂♂, 2 immature ♂♂, 2 ♀♀, 1 unsexed) from Mt. Hagen at *c.* 8500 feet, three (1 adult ♂, 1 immature ♂, 1 ♀) from Nondugl, two (1 adult ♂, 1 immature ♂) from Mt. Karimui, one adult ♂ from Awande and four (3 adult ♂♂, 1 immature ♂) from Kubor Mts. (see Fig. 1 for locations). The strikingly more reddish plumage of the Bosavi birds is clearly indicative of differentiation and is not a product of any kind of post-mortem colour changes described and discussed by Gilliard & LeCroy (1961). The Mt. Bosavi birds are, sex for sex and age group for age group, consistently a little smaller in both wing and tail length than *A. m. kombok* (Table 1). Gilliard & LeCroy (1961) stressed the use of tail (and crest) length to differentiate subspecies of *A. macgregoriae*. Adult male crest length measured from posterior base (Gilliard & LeCroy 1961) does not differ between Bosavi birds and *A. m. kombok*, but in exposed crest length the Bosavi birds may show a smaller area of colour. The latter measurement is less objective than the former, being a measure of the length of colourful crest viewed from above, but it is possible that Bosavi birds have more dark fore-crown feathering resulting in a shorter visible crest (Table 1).

As we agree with Gilliard (1969), Diamond (1972) and Schodde & McKean (1973) that the birds from the Kubor Mts., Mt. Karimui, Awande, Nondugl and Mt. Hagen are all clearly attributable to the subspecies *A. m. kombok*, we confine our comparisons of the plumage of the Mt. Bosavi birds to that of the 16 from Mt. Hagen and Nondugl. A general description of these 16 specimens follows:

> Underparts somewhat variable in degree of colour saturation (worn birds being slightly to considerably paler) but typically rich Buff (24) to Clay Color (26), and to Cinnamon (123A) in only two specimens. An indistinct broad area of the chest to the upper breast somewhat darker and browner, close to Raw Umber (23), but variable. Throat slightly paler than abdomen. Underwing coverts pure Clay Color (123B) and trailing edge of the primaries a more dilute tone of this colour. Forecrown, mantle and back of adult males Raw Umber (23) to Prout's Brown (121A) and crown of immature males and females redder, like Amber (36) but darker. Wings and upper tail less rich, more an Olive-Brown (28). Crest colour of the adult males variable, the richest being Spectrum Orange (17) in specimen 705724 and others paler, possibly to some degree due to fading.

Comparative photographs, taken under similar conditions by us, of the eight Mt. Bosavi specimens at the BPBM and of the single specimen at the PNGM enable us to determine that the latter is of similar appearance to the former. Notwithstanding the prior collection date of Bell's single specimen we designate it as a paratype because the BPBM series of eight clearly represents a far sounder basis for formal description of the holotype. A comparative description of the Mt. Bosavi population of *A. macgregoriae* follows:

Amblyornis macgregoriae lecroyae subsp. nov.

Holotype. Bernice Pauahi Bishop Museum, Honolulu, Hawaii, BBM-NG 103303, adult male, from NNW slopes of Mt. Bosavi, Southern Highlands Province, Papua New Guinea, 1400 ± m, collected

TABLE 1

Measurements of all known specimens of *Amblyornis macgregoriae lecroyae* and of sexed specimens of *A. m. kombok* in several museum collections

	Wing length	Tail length	Tarsus length	Bill length	Bill width	Crest length[3]	Exposed crest length[4]
A. m. lecroyae[1]							
Adult males							
BBM-NG 103303 Type	131	82	37.0	28.5	8.5	63	75
BBM-NG 103327	130	78	37.7	28.5	7.7	63	74
BBM-NG 103328	135	84	36.4	25.9	7.5	66	67
BBM-NG 103329	132	84	35.3	27.7	7.7	65	83
PNGM B937/25303	132	80	37.4	28.7	8.8	62	83
Mean, s.d.	132, 1.87	82, 2.58	36.8, 0.95	27.9, 1.16	8.0, 0.57	64, 1.64	76, 6.64
Immature males							
BBM-NG 103330	131	82	34.0	27.4	7.1		
BBM-NG 103331	133	83	—	28.3	7.9		
BBM-NG 103337	129	80	38.9	27.2	7.3		
Mean, s.d.	131, 2.00	82, 1.20	36.5, 3.46	27.6, 0.59	7.4, 0.42		
Adult female							
BBM-NG 103339	129	81	37.9	26.6	8.1		
A. m. kombok[2]							
Adult males							
Mean, s.d.	137, 3.92	87, 3.30	37.4, 2.03	28.1, 0.85	7.4, 0.55	63, 4.98	84, 5.59
n	32	29	32	32	31		32
Immature males							
Mean, s.d.	135, 3.66	85, 2.80	37.8, 0.97	27.8, 0.79	7.5, 0.60		
n	17	17	17	17	17		
Adult females							
Mean, s.d.	131, 3.03	84, 2.91	36.2, 1.45	28.7, 0.73	8.6, 0.62		
n	11	11	11	11	11		

[1] BBM-NG=Bishop Museum, Honolulu; PNGM=Papua New Guinea National Museum and Art Gallery, Port Moresby.

[2] The 60 specimens of *A. m. kombok* include: 25 from American Museum of Natural History, New York; 12 Natural History Museum, Tring; 10 Australian National Wildlife Collection, CSIRO, Canberra; 6 Australian Museum, Sydney; 5 PNGM; 1 BPBM; and 1 Field Museum of Natural History, Chicago.

[3] From posterior base (*cf.* Gilliard & LeCroy 1961, Schodde & McKean 1973).

[4] The length of visible crest colour viewed and measured from above.

by 'pan' trap by A. B. Mirza on 6 June 1973. See Table 1 for measurements.

Diagnosis. Upperparts: forecrown, side of face, malar, crown and mantle much richer and more strongly suffused with orange than in *A. m. kombok* (see above), being closest to Raw Umber (23) but slightly darker and suffused with rich brown-orange. Wings and tail less olive and more brown-orange than in *A. m. kombok*, the former being closer to but darker than Cinnamon-Brown (33) and the latter closer to Raw Umber (23). Crest colour as the most heavily saturated specimen of *A. m. kombok*, being Spectrum Orange (17). Underparts: conspicuously more orange-brown than all above specimens of *A. m. kombok*, and particularly so on the chin, throat and the darker area of the chest and upper breast. Throat closest to Raw Umber (123) and the darker chest/breast area, sides of abdomen and the flanks closest to Cinnamon Brown (33) but washed orange; these darker areas contrasting slightly with the paler Cinnamon (123A) remainder of the underparts. Underwing coverts pale rich ginger (as Clay Color 123B, but much more orange) and trailing edge of the primaries a more dilute tone of this colour.

Paratypes. Adult male specimens BBM-NG 103327, 103329 and PNGM B937/25303 are very similar to the holotype specimen but BBM-NG 103329 has a deeper orange crest. Specimen BBM-NG 103328 is even more orange, almost red-brown above, and its crest is as 103320. All three immature males and the female Mt. Bosavi birds (Table 1) are plumaged as the adult males but (lacking a crest) have the forecrown and crown slightly darker and more richly suffused orange than the rest of the upperparts and contrast with them slightly.

Distribution and habitat. Presently known only from the forest of the type locality and at altitudes of *c.* 1400 and 1525 m a.s.l. While this new subspecies is presently known only from Mt. Bosavi the use of this geographical feature as a trinomial is not desirable or appropriate as similar birds may prove to be found elsewhere. The southern end of the Muller Range is a possibility, though an unlikely one.

Comments. A. m. lecroyae is distinctly different in overall appearance to *A. m. kombok* in being darker and significantly more brown-orange. Of the above-described *A. m. kombok* series only female-plumaged (crestless) specimen AMNH 705730 from Mt. Hagen of uncertain sex approaches the coloration of the Mt. Bosavi *A. m. lecroyae* series, being similar in colour and tone above except for the upper tail which is not as dark or orange. Its crown is similar to but perhaps not quite as dark and orange as in female-plumaged *A. m. lecroyae.* Its underparts are generally similar to *A. m. lecroyae* but the throat is paler and the remainder, including the underwing, not as dark or as orange-suffused as the latter subspecies. Thus adult male, immature male and female *A. m. lecroyae* are conspicuously more orange-suffused and darker in their plumage than *A. m. kombok.* T. Pratt (*in litt.*) handled one mist-netted live adult male Macgregor's Bowerbird on Mt. Bosavi and wrote of it at the time "had a very short crest—molting?", which is noteworthy in view of his considerable experience with the species elsewhere.

We have found no description of the form of bower built by male Macgregor's Bowerbirds on Mt. Bosavi, but as Bell (1975) and T. Pratt (*in litt.*) made no remark in this regard and as bowers do not appear to differ in general appearance between the other populations of the species, we suspect Mt. Bosavi bowers are not significantly different in general appearance. We would not hesitate to elevate the Bosavi birds to full species status, however, should they prove to build a consistently different bower to those of other populations of the species, given the species-specific nature of bowerbirds' bowers (Diamond 1982, Borgia 1986).

Etymology. It is with great pleasure that we name this distinctive orange form of Macgregor's Bowerbird for our colleague and friend Mary LeCroy of the Department of Ornithology, American Museum of Natural History, New York. This is by way of small acknowledgement of her significant contributions to the ornithology of New Guinea and elsewhere, and much generous help long given to numerous ornithologists working on bowerbirds and other birds of New Guinea, and elsewhere.

In addition to raising the possibility that his single specimen of Macgregor's Bowerbird from Mt. Bosavi represented a new subspecies (see above), H. L. Bell (1975) noted that he took samples of three small passerine species from there large enough to indicate to him that, "if not distinct sub-species, they are definitely of different size to 'typical' birds on the main range". Moreover, Schodde & Weatherly (1983) described a new species of fairy-wren *Malurus campbelli*, subsequently considered a distinctive subspecies of *M. grayi* by LeCroy & Diamond (1995), discovered at *c*. 700–800 m a.s.l. on Mt. Bosavi. These observations, taken together with the distinctive morphology of *Amblyornis macgregoriae lecroyae* on Mt. Bosavi, suggest the possibility of other undescribed avian taxa awaiting discovery on that mountain.

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Amazona oratrix hondurensis: a new subspecies of parrot from the Sula Valley of northern Honduras

by Sebastian A. Lousada & Steve N. G. Howell

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Although Monroe & Howell (1966) suggested that there was a new subspecies of yellow-crowned parrot (i.e. a member of the *Amazona ochrocephala* complex; see *General remarks*) in the Sula Valley of Honduras, they had insufficient data to formally describe it at that time. Following our field and museum work, the complex situation in northern Honduras has been clarified. Most of the details of this were described by Lousada & Howell (1996) and, despite few museum specimens, we believe there is now ample evidence to describe the distinctive dimorphic Sula Valley birds as a new subspecies:

Amazona oratrix hondurensis, subsp. nov.

Holotype. Museum of Comparative Zoology, No. 136569; female. Honduras: Depto. Cortes; *c.* 12 miles NE of La Lima, along the Toloa canal at Urraco; 10 March 1928; collected by E. Bangs, original field number J. L. Peters 5505.

Diagnosis (adults). Although clearly a member of the *Amazona ochrocephala* complex, *hondurensis* differs from *belizensis* and *"guatemalensis"* (an undescribed dimorphic form of *belizensis*; Lousada & Howell 1996) in having yellow head coloration limited to the forehead and crown only, and in frequently having a yellow nape patch. Differs from *caribaea* in its overall paler bill and more extensive yellow on the forehead and crown. This latter is usually in a rounded or triangular shape versus a narrower band in *caribaea*. *Caribaea* has dark cere/bristle coloration, while *hondurensis* is often far paler due to the presence of at least some blond bristles and paler underlying skin. Differs from *parvipes* in its consistently pale bill and extensive yellow forehead and crown (see Figure 2c, page 47, Lousada & Howell 1996). The yellow-crowned morph of *hondurensis* is similar to *panamensis* from which it differs in its larger size and paler bill (*panamensis* usually has darker coloration on the bill).

Measurements (mm) of holotype. Wing (chord) 212, tail 100, culmen (from nostril) 30, length of middle toe (without nail) 30.

Distribution. Originally ranged throughout the Sula Valley of northern Honduras and west and east along the Caribbean coastal lowlands. It is now apparently restricted to a small area west of Tela and south of Punta Sal in the lower Sula Valley.

Etymology. We name this subspecies *hondurensis* recognising that it is the only member of the *A. ochrocephala* complex endemic to mainland Honduras.

Specimens examined. Honduras: Chasniguas (CMNH 1 male); Urraco (MCZ 1 female); Laguna Toloa (ANSP 1 male); 3 mi E La Lima (LSUMZ 1 female).

Captive specimens examined. Generally, captive birds are not included as specimens examined in a taxonomic description. In this case, however, we feel that they can add valuable data due to the limited series of museum skins, the undesirability of collecting more specimens from a very small remnant population, and the fact that some collection data are available for the birds noted below. The problem with captive birds is that in most cases the exact or even general location of collection from the wild is unknown, especially in the case of parrots in the international trade. Nevertheless, our experience in this region indicates that internal trade, while very common, generally reflects birds available locally from the wild. This is particularly true in the case of poorer *campesinos* (country people). Amongst these households it is very rare to find pet birds that are any significant distance away from their natural ranges.

In all, 17 wild-caught captive birds (4 males, 7 females, 6 unknown) have been studied. Six of these were seen in Honduras, within or bordering the present range of *hondurensis*. The remaining nine birds were seen in the United States. Fortunately, the importer is known for these birds and he reported collecting them from "the Puerto Cortes area around 1980" (J. McDonald pers. comm.), an area bordering the bird's present range but well within the range at that time.

Field observations. As published previously (Lousada & Howell 1996), Lousada and Morales located a flock of approximately 75 *hondurensis* in the wild. Although field observations are necessarily subjective, they took photographs which, while not of high quality, do show the key features of yellow crowns and pale bills.

Other specimens of the complex examined. Although many other specimens of this complex have been examined previously, the following specimens were all brought together to be examined side by side specifically for this paper.

oratrix. Mexico: Rio Cruz, Tampa (MCZ 1 female); Pasa Nueva, Veracruz (MCZ 1 male, 1 female); Petapa, Tehuantepec (MCZ 1 male).

belizensis. Belize: Gallon Jug, Orange Walk Dist. (LSUMZ 1 male); Hill Bank, Orange Walk Dist. (LSUMZ 1 female); near Ycacos Lagoon (MCZ 1 male); All Pines (CMNH 1 male).

caribaea. Honduras: Isla Barbareta (CMNH 2 males, 1 female); Isla Guanaja (CMNH 1 male).

parvipes. Nicaragua: 25 mi. SE Leicus Creek (UCLA 1 male); Leicus Creek (UCLA 3 females); 23 km SSW Waspam (UCLA 1 male, 1 female); 15 km SSW Waspam (UCLA 1 male, 1 female); 56 mi NW Puerto Cabeza (UCLA 1 female).

auropalliata. Mexico: 6 mi. NE Tonala, Chiapas (LSUMZ 1 female); Guatemala: 10 mi. SW Taxisco, Santa Rosa (LSUMZ 2 females); Finca el Cipres (MCZ 1 female); "Guatemala" (ANSP 2 unsexed); Honduras. San Lorenzo (MCZ 1 female); 7 mi. NE Choluteca (LSUMZ 1 male); Nicaragua: Coseguina (ANSP 1 female); "Nicaragua" (MCZ 1 male); Costa Rica: Lenorio (MCZ 1 male, 2 females); "Costa Rica" (MCZ 1 male, 1 female).

panamensis. Panama: Divala (MCZ 1 male); Parita (CMNH 1 male); unspecified location (MCZ 1 unsexed).

Individual variation

Individual variation is a marked feature of this population, as it is of some other *Amazona* taxa. In what follows, capitalized colour descriptions and numbers follow Smithe (1975, 1981), although almost none of them matches exactly. Apart from some key areas of colour on the head, overall colours are fairly typical for the complex. Individual variation of the subspecies as a whole has been published previously (Lousada & Howell 1996). The following are notes primarily on the museum specimens. The forehead and crown of the holotype have a pale yellow patch, nearest Sulfur Yellow (157), 40 mm in length from the cere and 20 mm wide at its broadest point with a total area of 492 mm^2. The crown coloration of the other three specimens is similar but is more extensive (532, 796 and 916 mm^2 in ANSP 90568, LSUMZ 29066 and CMNH 20448 respectively) and in a more rounded shape. (ANSP 90568 is missing many crown feathers and originally may well have had more yellow than measured). ANSP 90568 and LSUMZ 29066 lack yellow nape patches and may be immatures, or more mature individuals of the yellow-crowned morph. The holotype has a spotty yellow nape patch on the nape and hindneck which is darker yellow than the crown, closest to Spectrum Yellow (55). CMNH 20448 has a more sizeable yellow nape patch than the holotype; due to yellow flecks on the occiput this almost joins the crown patch. (One of the captive specimens shows this to an even more exaggerated extent.) Dusky margins on the feathers vary from bird to bird (as in other subspecies of the complex), being especially conspicuous in LSUMZ 29066. Immatures often have more dusky margins than older birds but this is not consistent enough to be a reliable age indicator. Although the thighs on all four specimens are green, there are some yellow flecks at the base of the thighs of CMNH 20448. The amount of red and yellow on the bend of the wing also varies among the specimens. There is none obvious on the bend of the wing of ANSP 90568 (another possible sign

TABLE 1
Area of yellow in crown (in mm^2) of adults of some subspecies of the *Amazona ochrocephala* complex

Subspecies	*n*	Range	Mean
belizensis	4	2264–2546	2460.5
hondurensis	4	492–916	684
caribaea	3	304–502	426
parvipes	8	0–514	160.25
auropalliata (all specimens examined)	14	0–398	128.36
auropalliata (Guatemala)	5	35–398	197.8
auropalliata (Costa Rica)	4	0–142	59
panamensis	2	684–748	716

Notes: Acetate sheets laid over crowns and traced onto. Tracings then laid over 2 mm graph paper and counted. *Belizensis* is the least accurate due to head curvature, and includes the eye region.

of being an immature) and there is only a small amount on the holotype: *c.* 20 mm^2 (2 feathers) closest to Geranium Pink (13) edged with yellow on the right wing and *c.* 39 mm^2 (4 red feathers and 1 yellow) on the left wing. There is more red along the marginal coverts that cannot be seen with the wing folded close to the body. The carpal edge is green, closest to Lime Green (59).

It is commonly known that soft-part colours change with death. The mandibles of the holotype are closest to Cinnamon (39) and darker at the edge and tip of the upper mandible, but were almost certainly far paler in life. The mandibles of LSUMZ 29066 are the duskiest, perhaps due to bleeding at death and/or the possibility that it may be an immature bird. All four specimens have mandibles that are somewhat darker than most *oratrix* museum specimens. Compared to *oratrix* there may perhaps be some subtle colour differences of one or more of the inner layers of the mandibles of *hondurensis* that are not necessarily apparent in life and at least partially account for this. Although the bills of the captive *hondurensis* specimens are all pale, some are a little greyer than others. The cere of the holotype has many blond bristles although the majority are dark. The ceres of the other specimens have blond bristles present in varying quantities. The underlying skin of the ceres is also likely to have darkened in death. The captive specimens show overall cere colour that ranges from extremely pale (like *oratrix*) to more dusky.

General remarks

As mentioned in Lousada & Howell (1996) there is a NW–SE cline evident in the amount of yellow in the different allopatric forms of the *Amazona ochrocephala* complex. By measuring crown patterns from museum skins, Lousada produced Table 1 which quantifies this. Interestingly and recognising the small sample, a similar trend appears to occur on the Pacific coast, with southern *auropalliata* having noticeably less yellow on the forehead than northern birds.

There is one other manifestation of the cline that was not mentioned in Lousada & Howell (1996). The carpal edge (below the bend of the wing) of most Mexican *oratrix* specimens is brilliant yellow, sometimes with a few red and green flecks. This yellow coloration is reduced or absent in *belizensis*.

Captive "*guatemalensis*" showed primarily green to yellowish green carpal edges with just occasional yellow or red flecks, as do the rest of the specimens of the complex.

Although AOU (1983) considered Sula Valley birds to be Yellow-crowned Parrots *A. ochrocephala*, we believe that, given a fuller understanding of the complex situation in northern Central America (Lousada & Howell 1996), *hondurensis* marks the southern end in a cline from Mexican *oratrix* through *belizensis* and "*guatemalensis*"; hence, we have placed it with Yellow-headed Parrot (*A. oratrix* of AOU 1983). It can even be argued, however, that *hondurensis* could be placed with Yellow-naped Parrot (*A. auropalliata* of AOU 1983), *caribaea* being intermediate between *hondurensis* and *parvipes* (Lousada & Howell 1996), or that all of these 'species' should be reunited as a single, polymorphic species, *A. ochrocephala*, as treated by Forshaw (1973).

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Observations on a population of Jerdon's Bushchat *Saxicola jerdoni* in the Mekong channel, Laos

by J. W. Duckworth

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Jerdon's Bushchat *Saxicola jerdoni* ranges west from Vietnam to eastern India (King *et al.* 1975), but there are few recent records and little has been written specifically about it. It is regarded as globally near-threatened (Collar *et al.* 1994). There are several historical records from Laos, all from north of Vientiane (Delacour & Jabouille 1927, Bangs & Van Tyne 1931, Bourret 1943, David-Beaulieu 1944). Between 1950 and 1990, no new bird observations were reported from Laos, and during intensive fieldwork from 1992 to 1995 the species was not found at any of the numerous sites surveyed (Thewlis *et al.* 1996, in prep.), which were, however, mostly to the south of the historical records. In March 1996 a dense population was discovered breeding at the inflow of the Nam Sang river to the Mekong only 60 km upstream of Vientiane. Subsequent observations were made in June and July 1996 at this site. The observations were made during an assessment of the conservation needs of the extensive area of cultivation and degraded forest to the north of Paksang (Duckworth 1996a, b) and relatively little time could be spent at the Mekong.

Study area and methods

The Nam Sang river enters the Mekong at Paksang (18°12′N, 102°09′E; 170 m a.s.l.), where there are a number of sedimentary islands and bars (mainly sands and silts) amid the many extensive rocky outcrops from the river bed. Much of the sedimentary plain, which is exposed in the channel by the lower water levels during the dry season, supports a dense bushland, composed of few woody species, growing to a height of 1–2 m. These bushes are submerged by turbulent water during the season of high flow, from mid-July to mid-October, after which water levels drop progressively; they are lowest during April. There are two main islands: Don Nou, at the mouth of the Nam Sang, and the much larger Don Sadok slightly downstream. Densely vegetated habitat extends 6 km along the river and in places exceeds 1 km in width; the total area estimated (from the Lao Service Geographique d'Etat 1:100,000 maps) is 3–4 sq. km. The habitat on the downstream half of Don Sadok differs from the bushland on Don Nou, being dominated by extensive areas of rank grass and, in places, stands of mature trees.

The area was visited in 1996 as follows: 14 February (12.00–14.00 h); 13 March (08.00–13.00 h); 22 June (06.30–19.00 h); and 15 July (06.30–18.30 h). Observations in February and March were limited to Don Nou. In June (when only half of the land exposed in March was still above water), work was concentrated on Don Nou but a brief boat trip was made around Don Sadok. In July the entire area of both islands remaining above water (about a tenth of that in March, and broken into many small islets) was surveyed. There was exceptionally little rain in early July 1996 and in many years there is probably negligible suitable habitat above water by mid-July. In both June and July, intensive observations were made on one morning on the dry land adjacent to the Mekong and for 1–2 km up the Nam Sang. This area is composed of rice paddies, dryland cultivation and regenerating scrub over abandoned cultivation amid fragmented and degraded *Lagerstroemia*-dominated mixed deciduous forest.

Estimates of Jerdon's Bushchat density were made in March by standing on four vantage points (all within 1 km of each other) and watching for 10–20 minutes to count the number of males in the viewable area, which itself was estimated as an arc of $x°$ (using a compass) with birds visible for y m (estimated visually; calibration elsewhere indicated that the observer could estimate distances across bushland of up to 500 feet [*c*. 150 m] within 20% accuracy). Visibility varied widely between vantage points and the method was crude because much of each area comprised bare rock, boulders or pools, none of which supported bushchats, and some birds were doubtless overlooked.

Observations

Counts of birds

Males were much more visible than females (in total 38 adult males were seen but only 3 females) and so only males were used for population estimation; this difference in visibility between the sexes was also noted by Stanford & Ticehurst (1938). On 13 March, combined density estimates in the four areas (of 2.5–15 ha) yielded 15 territories in 25 ha. Bushland probably covered a third of these 25 ha. While walking between the vantage points, six further singing males were located incidentally. On 22 June, 13 males were found, mostly on Don Nou, but most suitable habitat on both islands remained unsurveyed. On 15 July a thorough survey of all islands found only four males, which probably represented at least half the males in the area.

Most observations were made in the bushland, especially of Don Nou. There was not time to survey Don Sadok in March, but a male was seen from a boat in the extensive grass at the downstream end of this island in June, as well as several in the bushland of Don Sadok in June and July. No bushchats were seen in the extensive areas of trees, bare rock or sediment on the islands, up the Nam Sang river, or in the dryland habitats adjacent to the Mekong channel.

Breeding cycle

Most males observed in March were singing from sprays of vegetation projecting above the general level of the bushland, but they also perched for long periods in such positions without singing. They frequently dived to the base of an adjacent bush after a song bout. The morning of observations was largely cloudy and song continued intermittently at high levels throughout the visit. The closest separation observed between males in March was 30 m. In June and July, no singing was heard and, in June, two males were seen perched for many minutes only 6 m apart without showing aggression; territorial behaviour seemed negligible, but the males still spent long periods (many minutes) perched prominently atop projecting twigs and grasses. A juvenile male with a full-grown tail was seen with a female on 22 June.

Vocalisations

The song, which, with that of Yellow-bellied Prinia *Prinia flaviventris*, was the predominant bird sound coming from the bushland in March, was a thin warble such as might be produced by a *Sylvia* warbler, but lacking any harsh or churring notes. The most frequent call was a plaintive, loud, single-note *heeeeew*; a single-note swearing rasp was occasionally given.

Discussion

Population and status in the island complex

The territorial population on the islands in the Paksang area in 1996 probably exceeded 100 pairs. The bushland occupied by the birds occurs in a fine mosaic with open sediment, rocks and water; this figure is calculated on the basis of three pairs per 5 ha of mosaic habitat (as above) of which there is at least 200 ha. If grassy areas of Don Sadok were also occupied, the total population might have reached 200 pairs.

No bushchats were found in the special searches during June and July of the cultivation and scrub adjacent to the Mekong, nor were any seen in extensive surveys during February–March and June–July of such habitats over the area for 40 km to the north. The vegetation of some abandoned fields was of similar superficial physiognomy to the Mekong channel bushland, although the two habitats were composed of different plant species and the latter is a natural habitat while the former is a secondary regrowth in an area which was initially forested. A similar restriction, in that case of several species, to the vegetation of seasonally-inundated islands, with absence from adjacent dryland scrub, was also found in Amazonia by Rosenberg (1990) and Tye (1995). Both authors suggest that the distribution of the birds in question is restricted more by vegetation characteristics than by insularity *per se*; it is not possible to tell the relative importance of the two in determining Jerdon's Bushchat distribution at Paksang as no natural bushland was found away from islands.

During the months of highest flow, the Mekong inundates all habitat suitable for Jerdon's Bushchat. The bushes are completely underwater, but it is this annual submersion that retains the vegetation as bushland. Most bushchats had left the channel by July, some probably by late June. It is not yet possible to suggest where the birds go when the Mekong is high, but the absence of observations in dry land vegetation at Paksang means that it is unlikely that they simply move from the channel into the adjacent vegetation, unless they change completely in behaviour and become highly skulking. In the context of observations elsewhere, and the low sighting rate of females on the islands, this latter is more possible that it might seem. Before extensive human modification to the environment, the bushchats would have gone to some natural habitat when the Mekong was high, and it is perhaps most likely that they still go there. It may be another form of natural bushland, as the allied Whinchat *Saxicola rubetra*, when making short-term stops on migration over lowland England, selects from the available hedgerows and scrub those which are most similar to its breeding habitat (Duckworth 1994).

The lack of observations of the species on the February visit is of no significance as the two midday hours spent in the area were devoted to searching for waders and hirundines.

Bird community of the Mekong channel at Paksang

The distinct bird community in the Mekong channel at Paksang was typical of such a specialised island habitat with structurally simple vegetation: it had few species but a relatively high proportion were abundant, while some were rare or scarce elsewhere in the region. The bushland held high densities of Jerdon's Bushchat, Plaintive Cuckoo *Cacomantis merulinus*, Greater Coucal *Centropus sinensis*, Streak-eared Bulbul *Pycnonotus blanfordi*, Oriental Magpie Robin *Copsychus saularis*, Common Tailorbird *Orthotomus sutorius*, Plain Prinia *Prinia inornata* and Yellow-bellied Prinia, with lower numbers of Blue-tailed Bee-eater *Merops philippinus*, Pied Bushchat *Saxicola caprata*, Bright-capped Cisticola *Cisticola exilis* and a few others. Like Jerdon's Bushchat, the bulbul, bee-eater, Pied Bushchat, cisticola and both prinia species were extremely localised or unrecorded in the adjacent dry-land mosaic of cultivation, scrub and relict forest. Conversely, Grey-breasted Prinia *Prinia hodgsonii*, Stripe-throated Bulbul *Pycnonotus finlaysoni* (and various other species) abounded up to the riverbank but were rare and unrecorded, respectively, in the channel.

Some hillocks in the channel are always above water, except for flash floods, and their trees supported a depauperate derivative of the bird community of the adjacent land, including visits by Pompadour Green Pigeon *Treron pompadora* (at risk in Thailand and Laos; Treesucon & Round 1990, Thewlis *et al.* in prep.). Rocky outcrops within the channel hosted Wire-tailed Swallows *Hirundo smithii*, and the earth cliffs Plain Martins *Riparia paludicola*; both probably bred and in July over 300 of the former and over 100 of the latter were observed. These are the largest numbers seen in Laos in recent years of both species, which are at risk in Thailand and have declined in Laos (Treesucon & Round 1990, Thewlis *et al.* in prep.). Sandbanks, open mud and pools held ducks, wagtails, Paddyfield Pipit *Anthus rufulus* and waders (migrant and resident), and notably small numbers of River Lapwing *Vanellus duvaucelii* which has declined in Laos (Duckworth *et al.* in press) and Small Pratincole *Glareola lactea*, which is at risk in Thailand (Treesucon & Round 1990).

Comparison with other records of Jerdon's Bushchat

These are the first records from Laos of Jerdon's Bushchat for over 50 years. The species is poorly known and previous information, from throughout its range, concerning habitat use has been conflicting. This section aims to summarise all published information about the species relevant to its population, distribution and habitat use.

In Indochina, Jerdon's Bushchat was considered to be a rare and localised resident on several high plateaux (Delacour & Jabouille 1931). In Laos, it was a common resident above 1400 m in Tranninh, particularly at Ban Nonghet, a high valley (1500 m) dominated by rocks and tall herbs in place of the original forest and subject to frequent fires, frosts and fog (Delacour & Jabouille 1927, David-Beaulieu 1944). A specimen from Phou Khoum, a deforested mountain at 1600 m on the border of the provinces of Louangphabang and Tranninh, and lacking in ornithological interest (David-Beaulieu 1944), was received by Bourret (1943). A breeding female was taken on 12 May 1929 at Ban Muangyo in the far north of Laos at 2300 ft (750 m), an area of rice fields surrounded by good forest (Bangs & Van Tyne 1931).

The only other recent Lao record is of a male on 1 April 1996 in low bushes on a Mekong island 2 km downstream of the mouth of the Nam Ou (W. G. Robichaud verbally 1996). No Jerdon's Bushchats were found during frequent observation in 1992–1996 on Don Chuan, a large island in the Mekong in Vientiane (Thewlis *et al.* 1996, in prep.), which however lacks the bushland of the Paksang region, nor were any seen on a 2–3 hour search, specifically for the species, of an extensive area of sand with patches of bushland around Thadua (25 km downstream of Vientiane) on 10 April 1996 (R. J. Tizard & R. J. Timmins verbally 1996); the species is so conspicuous that, if it is present, one may be certain of locating males during breeding season observations of river channel bushland (Stanford & Ticehurst 1938 also felt a similar certainty about seeing birds in this habitat).

There are very few records from Vietnam: Kuroda (1917) and Delacour (1930) listed the species from Tonkin, at Lao Kay and Pakha respectively. Both are hilly areas, the latter being a quite deforested area at 4000 ft (1300 m).

In Thailand, the species occurs only in the north, is very scarce and inhabits the tall grass of riverine floodplains; populations have been reduced by drainage and clearance, especially the burning of reedbeds for agriculture (Round 1988); Round (1983) specifies three sites. J. N. Dymond (*in litt.* 1996) observed the species at Chiang Saen in northern Thailand where small numbers of birds (maximum 3) were found in a narrow belt of tall riverside grass containing a few thorny bushes which the chats used as perches. All his observations were in January–February and the species was very skulking; no calls or song were heard.

Only in Burma has occupation of river-island scrub been described previously: in the north bushchats were found with certainty where wild roses (called *Rosa bracteata* in Smythies 1986) grew on the sandy islands of the larger river valleys, including at Sinho (where it was probably breeding in May) and on the western edge of the Indawygi lake (Stanford & Ticehurst 1938). In Bhamo it bred in long grass and briars in the Irrawaddy valley in April–May (Harington 1905, 1909). Otherwise, its status in the country caused some controversy: Stanford & Ticehurst (1938) felt that the species occurred only in vast grass plains at low altitudes and disagreed with a former statement that it was a hill bird. Blanford (1870) found it in elephant-grass in the Irrawaddy valley, and Wickham (1929) found it only in this valley, in the northern part of the country. Oates (1883) considered that although probably resident, it was extremely rare in Burma, quoting only Blanford's (1870) record and some from Bhamo. Stanford & Ticehurst (1935) shot only one in lower Burma in over three years, in *kaing* grass in Leikchuang, and agreed with Oates's assessment of it as extremely rare in that part of Burma. Up to nine were recorded on three January–February visits in 1973–1982 to the reeds around Inle Lake (King 1983). Birds are still common (at least 10 males were seen in one day) at this lake, in 3–4 m high reeds at the lake's edge and in the huge floating mass of reeds on the lake itself; birds were observed feeding in areas of aquatic crops and floating vegetable gardens amid this mass (F. R. Lambert *in litt.* 1996).

In India it was: common all over the Brahmaputra basin in thick vegetation (particularly grass hedges) along streams or wet ditches, and one of the commonest birds in Manipur, including the suburbs of the capital Imphal, but it was never seen in the hills (Hume 1888); very common in North Cachar in cold weather, with a few remaining to breed on the higher hills (Baker 1894–1901); a common resident in the Khasia hills, and common on the adjacent plains in cold weather, but ascending above 3000 ft (900 m) in the breeding season (presumably about March) (Baker 1907); resident in parts of Upper Assam, occurring throughout the plains in the cold season (October to February) and confined to reed and grass adjacent to rivers (Stevens 1914–1915); an abundant breeder (laying eggs in April–May) in vast plains of sun grass on the north bank of the Brahmaputra in Lakhimpur district, and occurring at the base of the foothills in this district, in smaller numbers west to the grass plains of North Kamrup district, and also in the upland grass plains of the Chin hills (Baker 1924). Baker's (1933) summary of its status in India (which was not added to by Ali & Ripley 1973) recorded it from vast expanses of various tall grasses in the plains at the base of the Himalayas, extending into upland grass plains and foothills up to 2500 ft (700 m). It was particularly common in Assam in many places in Sibsagar and North Lakhimpur, where it bred in February–April in grasslands and grassy sandbanks in rivers that were flooded towards the end of that month by Himalayan meltwater.

There are very few recent records for the Indian subcontinent, where most areas of long grass in the wet lowlands, from which the majority of records listed above come, have been modified for cultivation (T. P. Inskipp verbally 1996). Choudhury (in press) recorded singles (over several years) each in November, March and May, in grass and reed along river or channel banks in the Dibru-Saikhawa Wildlife Sanctuary, Assam. This area is on the Brahmaputra plains just north-east of the area where Stevens (1914–1915) had previously recorded it regularly. There are only few records from Kaziranga National Park, Assam, an area of extensive grassland which seems, from previous descriptions of habitat occupied by the species in Assam and Burma, to be ideal for the species (T. P. Inskipp verbally 1996).

There are only three recent published records from Bangladesh, all from tea estates or grassland in the northeast in December–February (Thompson *et al.* 1993); the only previous records from the country cited in this source (from Godwin-Austen 1870) give no information on status or habitat use.

The only records from Nepal appear to be from the Kosi barrage in the east in May–June 1975–1976 (Inskipp & Inskipp 1991) and a few in the early 1990s from the west of the country (N. J. Collar verbally 1996); all were in extensive grassland.

There are few records from Yunnan: a male along the Namting river in February 1917 (Rothschild 1926), four specimens collected in Luxi and Gengma counties in the 1960s and a few sightings in Menglun, Xishuangbanna, in April 1994 during a two month survey (Han Lianxian *in litt.* 1996). The latter birds were all within 100 m of rivers.

In summary, although the records from the Mekong channel at Paksang are in a different habitat from the deforested hills in which it was previously recorded in Laos, records outside Indochina come mainly from lowland grass and scrub, usually close to water. The most frequently noted vegetation, extensive tall floodplain grassland, is rare or perhaps absent from the Mekong in north-central Laos. It might be that the bushchats at Paksang are inhabiting a sub-optimal area, following loss of a more favoured grassland (J. C. Eames *in litt.* 1996); however, if this were true it is unlikely that the density on the islands would be so high, or that the bird would be so localised to one habitat. Furthermore, occurrence in both lowland river valley scrub and higher-altitude hill scrub has previously been documented only in Burma. In some areas of India and Burma, the bird was found at low altitudes only in winter, with several authors noting a move to higher altitudes to breed, although the most comprehensive summary referred to breeding in seasonally flooded areas, as is Paksang. In general the bird's occurrence seemed to be patchy, with areas of local abundance amid extensive areas where the bird was scarce.

Threats to, and conservation needs of, the species in Laos

In contrast to forest, direct human exploitation of the island vegetation does not currently pose a threat to the habitat. It currently supports low levels of stock grazing and a major increase in this might affect the vegetation structure and in turn the bushchats. Salad and melons are grown during the dry season on the areas of extensive open sediment not used by the bushchats. Currently only a small proportion of the area suitable for gardens is used as such and no bushland is cleared for this purpose. The shrub *Mimosa pudica*, which thrives in disturbed areas, has taken over huge areas of lowland northern

Thailand (P. D. Round *in litt.* 1996). Although it has not colonised the Paksang islands, if their natural vegetation were to be cleared or overgrazed for any of the above reasons, regrowth might involve this invasive species, whose suitability for Jerdon's Bushchat is not known.

The heavy use of the area for fishing results in high levels of disturbance which are detrimental for River Lapwings (Duckworth *et al.* in press) but are unlikely to affect the bushchats, which seemed unconcerned by observers even within 10 m. Most small boys in Laos habitually kill birds with catapults and the habit of Jerdon's Bushchats of perching prominently on low vegetation makes them an easy potential target; but as the bushland can be reached only by boat, the threat from boys is negligible.

Potential threats which are more serious come from changes in the sediment flow dynamics of the Mekong as the bushland grows upon river-borne sediment. If substantial quantities of sediment are removed from the river, or trapped by barriers, water with an unnaturally low sediment load will wash away, without replenishment, downstream sand and silt deposits (Brooker 1981). If this were to happen upstream of Paksang, it would result in the reduction or even loss of vegetation. Intensive extraction of sediment during the dry season from the Mekong in Vientiane since 1994 has caused a major shrinkage of Don Chuan, a large island formerly supporting extensive vegetation. During 1996, similar heavy extraction was observed upstream of Vientiane halfway to Paksang. It is not clear if the sustainability of this practice, which was initiated only in the last few years, has been considered by those engaged in it, and it may be that as deposits close to Vientiane become depleted, extraction sites will move upstream. The suitability of the Paksang region for bushchats (the sediment of much of which, especially the areas supporting bushland, is too interspersed with rocky outcrops to make extraction financially viable from the site itself) would be reduced if substantial extraction were to occur upstream of it.

A further potential threat is the proposed chain of cross-Mekong hydropower dams which, if built, would disrupt seriously the ecology of the entire basin (Roberts 1995), probably including the sediment flow, as each dam traps sediment in its headpond.

The urgency for conservation action for this species is thus lower than for forest birds (see Thewlis *et al.* in prep.) and its precise level is difficult to assess because of the paucity of information on the bird in Laos, as elsewhere in its range. Further survey is thus the highest priority action. Visits to Paksang are needed to clarify the extent of occupied habitat, the population and the seasonal status of Jerdon's Bushchats there between August and February. The extent of occupied habitat along the rest of the Mekong and its major tributaries in Laos should be investigated. The areas and habitats used by the birds from Paksang during the peak of the wet season need to be established; they may have been modified or reduced by human activity. The montane areas of secondary grassland used by the birds in Tranninh (now Xieng Khouang province) need to be revisited and the bird's current status there assessed.

Summary

A dense population of the globally near-threatened and little-known Jerdon's Bushchat *Saxicola jerdoni* (totalling 100–200 pairs over 6 sq. km) was discovered in March 1996 breeding amongst a complex of scrub dominated islands in the Mekong channel at Paksang, 60 km upstream of Vientiane. Small numbers of birds were still present in mid July when most of the breeding area had been submerged by the seasonally rising river water. The remainder of the birds could not be located on the adjacent dry land and appear to disperse out of the area. This habitat differs greatly from that recorded in Laos during the only previous observations, made during 1925–1945, but such breeding habitat has been described previously in Burma. The species is probably under no imminent threat at the site unless the rapidly expanding practice of removing sediment from the channel during the dry season extends upstream of the site. Further surveys are urged, both in the Mekong and its major tributaries, and in the montane scrub in the north of Laos which was previously reported to hold the species. These are particularly important in view of the paucity of recent records from elsewhere in the species' range.

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Range extension of the Large-headed Flatbill *Ramphotrigon megacephala* with comments on its distribution

by Alexandre Aleixo

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The Large-headed Flatbill *Ramphotrigon megacephala* is patchily distributed in the forests of the Andes (western and central Venezuela, eastern and northern Colombia on east and west slopes, eastern Ecuador), western Amazonia (southeastern Peru, northern Bolivia, western Amazonian Brazil), humid montane Atlantic forest in southeastern Brazil (eastern Minas Gerais, Rio de Janeiro south to São Paulo), subtropical deciduous forests of eastern Paraguay (Alto Paraná, Canendiyu), and northeastern Argentina in Misiones (Ridgely & Tudor 1994, Hayes 1995, Pacheco 1995). This inconspicuous small flycatcher (13 cm; 13–17 g) seems to be largely linked to bamboo patches in all the regions where it occurs, perching low in the dense interior of the thickets, from which it sallies out for insects on bamboo foliage and stems (Parker 1982, 1984, pers. obs). Though difficult to observe (it remains motionless for long periods in the dense understory), it is readily detected when calling a ventriloquial disyllabic *whu-hoo*, mainly in early morning and late afternoon (Parker 1984, pers. obs).

On 22 October 1995, at 06.55 hrs, I tape-recorded an individual of *Ramphotrigon megacephala* (ALPA 21/10, deposited in the Library of Neotropical Sounds of the State University of Campinas—UNICAMP [ASN]) in a riparian forest with an understory of dense bamboo thickets, about 120 km northwest of the town of Barra do Garças (15°53′S, 52°15′W, on the western bank of the upper Araguaia river in southeastern Mato Grosso State, central Brazil). The riparian forest was on the margin of the Mortes river at an altitude of about 350 m in the Xavante Indian reserve of São Marcos. The dominant vegetation of the area is open *cerrado* (savanna-like vegetation), with riparian forests having a variable amount of understory bamboo cover.

The nearest known locality where *R. megacephala* has been reported is Alta Floresta in northern (Amazonian) Mato Grosso State (Ridgely & Tudor 1994), about 700 km northwest of the São Marcos Indian reserve. I compared the voice of the bird from São Marcos reserve with two other birds recorded in Ji-Paraná (Rondônia State, Amazonian

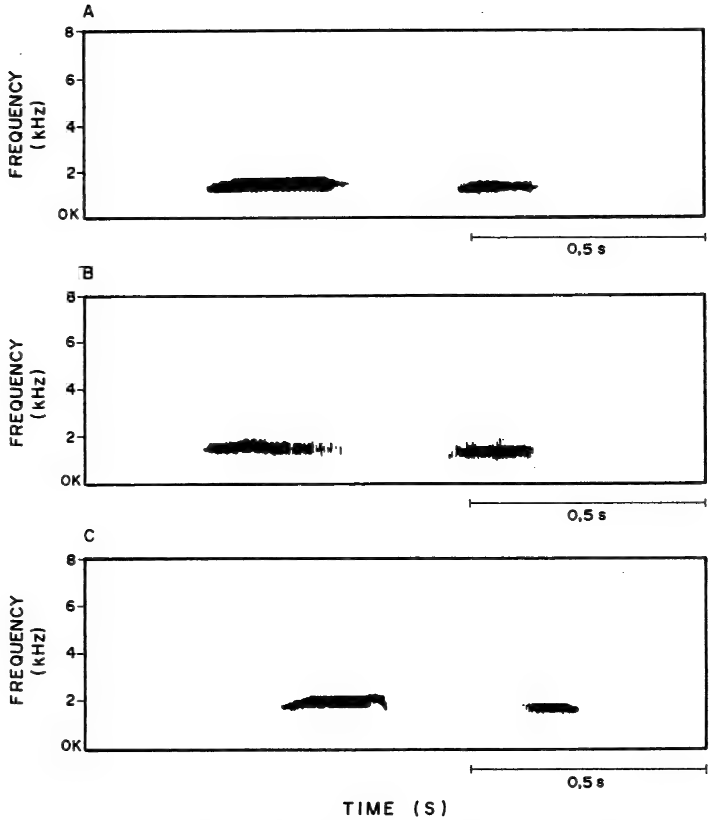

Figure 1. Sonagrams of the song of three populations of the Large-headed Flatbill *Ramphotrigon megacephala* in Brazil. A, Ji-Paraná, Rondônia State, Amazonia (JV 495/5b); B, Barra do Garças, Mato Grosso State, central Brazil (ALPA 21/10); C, Parque Estadual Intervales, São Paulo State, southeastern Brazil (ALPA 26/1+2). All recordings are deposited in the Libary of Neotropical Sounds (ASN) at the Bioacoustical Laboratory of the Universidade Estadual de Campinas-UNICAMP. Sonagrams were made on a MacIntosh Classic coupled to a MacRecorder Sound System 2.0.5.

Brazil; JV 495/5b-ASN) and Parque Estadual Intervales, Capão Bonito (southern São Paulo State, Brazil; ALPA 26/1+2-ASN). The song structure of the São Marcos bird (the disyllabic *whu-hoo*) is very similar to that of the birds from Amazonia (Rondônia) and southeastern Brazil (Fig. 1). Though a larger sample size is needed, preliminary measures of the duration of the notes of the song of the São Marcos bird indicate its closer relationship to Amazonian birds (Table 1).

The range extension here reported fills a gap in the spotty distribution pattern of *R. megacephala*, which until 1939 was known only from a few specimens from southeastern Brazil and adjacent

TABLE 1

Duration of the notes and interval between the two notes (in seconds) of the song of three populations of the Large-headed Flatbill *Ramphotrigon megacephala* in Brazil: Amazonia (JV 495/5b, Ji-Paraná, Rondônia State), Central Brazil (ALPA 21/10, Barra do Garças, Mato Grosso State) and Southeastern Brazil (ALPA 26/1+2, Capão Bonito, São Paulo State). Sounds were analysed on a MacIntosh Classic coupled to a MacRecorder Sound System 2.0.5.

	First note	Second note	Interval
Amazonia	0.309	0.166	0.23
Central Brazil	0.283	0.165	0.26
Southeastern Brazil	0.211	0.133	0.28

Argentina and Paraguay (Zimmer 1939). Further research has revealed a broader though very local distribution (Novaes 1960, Parker 1984, Ridgely & Tudor 1994, Pacheco 1995). The population here reported of *R. megacephala* in central Brazil, a region of dry open vegetation which separates two large humid forest tracts (Atlantic forests and Amazonia) and two distinct populations of the Large-headed Flatbill (*R. m. megacephala* and *R. m. boliviana*, respectively), may be interpreted as relictual. The new locality for *R. megacephala* lies approximately at equal distance between southwestern Amazonia and southeastern Brazil, two regions known to harbour a very distinct and specialist avifauna associated with bamboo thickets (Parker 1982, Pierpont & Fitzpatrick 1983, Rodrigues *et al.* 1994). This new record suggests that *R. megacephala* may have had a wider distribution in the past, being now confined to regions where its habitat still remains. Relictual bamboo understory forests in central Brazil have not previously been reported in the literature (Sick 1955, Goodland 1971), and may be very locally distributed. Prance & Brown (1987) hypothesized that during the Pleistocene the transitional forest (which includes the bamboo forest type) was more extensive but was replaced more recently by rain forest in Amazonian lowlands and by *cerrado* on the central Brazilian Plateau. After the reduction of the transitional forest due mainly to climatic changes, species peculiar to it would have a relatively restricted and fragmented distribution (Prance & Brown 1987), a hypothesis for which this record of the Large-headed Flatbill provides support. Further ornithological investigation in these relictual riparian forests with a dense understory of bamboo will probably lead to other range extensions of forest birds closely associated with bamboos and previously unknown on the central Brazilian shield.

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Distributional notes on birds of Andean dry forests in Bolivia

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From 20 May to 19 October 1995, an ornithological and botanical expedition conducted by the Foundation for Tropical Research and Exploration (TREX), in collaboration with the Herbario Nacional de Bolivia (HNB) and the Colección Boliviana de Fauna (CBF), visited 12 Andean dry forest localities (i.e. forest mainly composed of drought-deciduous trees) throughout Bolivia. The avifauna of one of these sites (Inquisivi, site 6) had previously been surveyed in 1993, 1994 and 1995 by SM, who did not participate in the TREX expedition, and his data are included in this paper. We present details on noteworthy ornithological results, including some notes on a species new to science (*Cranioleuca*, unnamed species), the first observations of Lemon-browed Flycatcher *Conopias cinchoneti* in Bolivia, 29 new departmental records, 12 new altitudinal records and notes on two threatened bird species. Remsen & Traylor (1989) and *A birdlist of Bolivia* (Armonía 1995) compiled and published by Asociación Armonía, the Bolivian representative of BirdLife International, were used as references for all new departmental records listed below. New altitudinal records are mainly based on Fjeldså & Krabbe (1990), Ridgely & Tudor (1989, 1994) and Armonía (1995). For all survey sites except Río Pilcomayo (site 12), which was visited for only 2 days, lists of all species observed are presented (see Appendix). Tape-recordings of individual birds and dawn choruses were made at sites 2–6, 8 and 11 and will be housed in the Library of Natural Sounds, Laboratory of Ornithology, Cornell University.

Throughout Bolivia, dry forests at medium to high altitude (1500–3500 m) have been severely degraded or locally completely destroyed, mainly due to overgrazing, the excessive use of fire and the extraction of timber (especially for the production of charcoal). Thus, in many areas (e.g. Torotoro, upper Consata Valley, upper tributaries of Río Grande and Río Pilcomayo) most dry forest is characterized by a low, open canopy and shows little to no tree regeneration. The final stages of degradation are *Dodonaea*-covered slopes or barren badlands. Consequently, conservation measures are urgently needed, especially since these forests hold a number of bird species that have small ranges (J. V. Remsen *in litt.*).

In contrast, foothill dry forest dominated by *Anadenanthera* is still widespread, and, while little of this habitat can be regarded as pristine (in fact, pre-Incan terraces are commonly found), the ecosystem as such seems to be comparatively healthy. Fortunately, the most important area of foothill dry forest was recently included in Parque Nacional Alto Madidi, but other significant areas currently lacking any protective status are found along the lower Río Grande in the Masicurí region and southward along the Cordillera de los Milagros, including our study area at Río Azero.

Survey sites:

(1) **Consata**, depto. La Paz, provs. Saavedra and Muñecas, from *c.* 3 km (15°24′S, 68°31′W) to 18 km (15°26′S, 68°34′W) SW Consata along the road to Sorata; 30 May–3 June; 6–15 m tall, 30–85% deciduous dry forest dominated by *Anadenanthera colubrina* (1000–1400 m); further downriver the forest graded into disturbed evergreen forest, further upriver into dry scrub.

(2) **Yolosillas**, depto. La Paz, prov. Nor Yungas, *c.* 4 km N Yolosa on the road to Caranavi (16°12′S, 67°45′W); 20–23 May, 8 Oct; small (1–5 ha), isolated patches of degraded (logging) dry forest (8–12 m tall, *c.* 50% deciduous, dominated by *Anadenanthera colubrina*) on steep slopes near the Río Coroico (1000 m) and on N-facing slopes (1100–1300 m); slopes facing W, E and S and most areas adjacent to the river supported degraded (logging, burning) evergreen forest.

(3) **Las Mercedes**, depto. La Paz, prov. Sud Yungas, from 6 km (16°17′S, 67°23′W, 1300 m) to 27 km (16°13′S, 67°13′W, 800 m) E Villa Barrientos along road to La Asunta; 2–7 Oct; slightly degraded forest (10–15 m tall, *c.* 80% deciduous, dominated by *Anadenanthera* sp., *Cereus* sp., several Leguminosae) from Río Boopi (800–850 m) and Río Tamampaya (850–1000 m) up to *c.* 1200 m, above which dry forest was originally replaced by more humid forest but now mostly cleared for agriculture; *c.* 32 km E Villa Barrientos dry forest started to grade into humid foothill forest.

(4) **Miguillas**, depto. La Paz, prov. Inquisivi, 4.5 km NNW Miguillas (16°33′S, 67°22′W); 21–25 Sept; moderately to, in part, severely degraded (logging, burning, grazing) dry forest (8–10 m tall, *c.* 70% deciduous, with *Anadenanthera* sp., *Acacia macracantha*, *Cereus* sp.) from Río La Paz (1100 m) up to 1600–1700 m, above which the forest was largely replaced by pastures; slightly more humid forest (10–12 m tall, *c.* 50% deciduous) in a shallow, *c.* 50 m wide, S-facing ravine.

(5) **Huara**, depto. La Paz, prov. Sud Yungas, from the confluence of Ríos La Paz and Jucumarini (16°37′S, 67°28′W, 1250 m) to *c.* 3 km ENE Rancho Cieneguillas (16°34′S, 67°25′W, 1500 m); 27 Sept–2 Oct; moderately degraded dry forest (6–12 m tall, on steep, eroded slopes replaced by open scrub, 80–90% deciduous, dominated by several Leguminosae, *Schinopsis* sp., with *Tillandsia duratii* abundant) from Río La Paz (1200–1250 m) up to 1800–1900 m, above which the forest had largely been cleared; evergreen forest along the Río Jucumarini (*c.* 12 m tall, 5–15 m on each side of the river, dominated by *Cecropia* sp., *Solanum* sp., *Anadenanthera* sp., *Inga* sp., *Tessaria integrifolia*, *Piper* sp.) interspersed with gravel bars and open scrub vegetation.

(6) **Inquisivi**, depto. La Paz, prov. Inquisivi, slope N Inquisivi (16°54′S, 67°09′W) from 2500 m down to Río Khatu at 2050 m (*c.* 2.5 km N Inquisivi); 14–21 Sept, 17–18 Oct (TREX expedition); 13–16 and 23–28 Dec 1993, 27 Jan–2 Feb 1994, 3–6 Jan 1995 (SM); moderately degraded (grazing, logging) dry forest (8–10 m tall, *c.* 95% deciduous, with *Schinus molle*, *Schinopsis haenkeana*, *Ceiba* sp.), largely replaced by agricultural fields and plantations of *Eucalyptus globulus* above 2500 m; a 50–80 m wide band of *c.* 20% deciduous forest along a ravine from *c.* 2500 m down to Río Khatu; a small, severely degraded (logging, grazing) patch of evergreen forest and scrub at Río Khatu (10 m wide stretch of *c.* 12 m tall forest along the river dominated by *Erythrina* sp., adjacent scrub up to 5 m tall and dominated by *Piper* sp., *Acacia macracantha* and several Compositae).

(7) **Río Caine**, depto. Potosí, prov. Charcas, and depto. Cochabamba, prov. Arce (18°06′S, 65°46′W to 17°53′S, 65°55′W); 11–14 June; extensive areas of severely degraded (logging, grazing, burning) dry forest (*c.* 10 m tall, 85% deciduous, originally dominated by *Schinopsis haenkeana* and *Aspidosperma quebracho-blanco*, now mostly by *Prosopis kuntzei* and *Acacia* spp.) on slopes at 2100–2400 m; extensive agricultural areas in the flat river valley (2050–2100 m) with very few trees (mostly *P. kuntzei*, *A. quebracho-blanco*,

Capparis sp.) as well as *Opuntia sulphurea* and *Puya* sp. in overgrazed areas.

(8) **San Juan del Potrero**, depto. Santa Cruz, prov. Florida, 5.5 km SE San Juan del Potrero (17°59′S, 64°15′W); 3–8 Sept; moderately degraded (grazing) dry forest (5–8 m tall, *c*. 80% deciduous, dominated by *Aspidosperma quebracho-blanco*, several Leguminosae and *Cereus* spp.) covering most of the area from seasonally dry creeks (where the forest was slightly taller and less deciduous) at 1500 m up to hill tops at 1950 m.

(9) **Novillero**, depto. Cochabamba, prov. Campero, from *c*. 3 km (18°18′S, 65°15′W, 2400 m) to 22 km (18°13′S, 65°18′W, 2800 m) NW Novillero along the road to Santiago; 16–20 June; degraded (logging, grazing) dry forest (*c*. 8 m tall, 80% deciduous, dominated by *Tipuana tipu*) grading into more humid forest (to 18 m tall, 25% deciduous, including many Myrtaceae) on S-facing slopes at higher elevations; large areas cleared and dominated by scrub of *Baccharis* spp., *Minthostachys* sp., *Tecoma* sp., etc.; valley bottoms mostly converted to agriculture, only scattered patches of degraded evergreen forest (10–15 m tall, *c*. 15% deciduous) in ravines.

(10) **Masicurí**, depto. Santa Cruz, prov. Vallegrande, from the confluence of Río Masicurí and Río Grande (19°04′S, 63°41′W, 500 m) to the vicinity of Masicurí (18°49′S, 63°48′W, 800 m); 9–14 July; slightly to severely degraded (logging, grazing) dry forest (8–15 m tall, 60–85% deciduous, dominated by several Leguminosae incl. *Anadenanthera colubrina*), gradually becoming more humid with increasing elevation until replaced by slightly to moderately degraded evergreen forest (*c*. 20 m tall, 10–20% deciduous) at about 800 m; most of the 0.5–1.5 km wide valley bottom converted to pastures and plantations with few remaining patches of degraded (logging, grazing) evergreen gallery forest (to 30 m tall, *c*. 30% deciduous, originally less deciduous).

(11) **Río Azero**, depto. Chuquisaca, prov. Siles, from *c*. 15 km NW Río Azero (19°32′S, 64°10′W, 1500 m) along the road to Padilla to 35 km SW Río Azero (19°47′S, 64°02′W, 1200 m) along the road to Monteagudo (altitude at Río Azero 1000 m); 27 June–4 July; large tracts of slightly disturbed (some grazing and logging) dry forest (15–20 m tall, 40–80% deciduous, diverse with numerous Leguminosae); slightly to severely degraded (logging) evergreen forest (to 25 m tall, *c*. 10% deciduous) along the Río Azero and in humid ravines.

(12) **Río Pilcomayo**, depto. Potosí, prov. Linares, and depto. Chuquisaca, prov. Yamparaez, from Oron Kkota (19°34′S, 64°51′W, 2050 m) to 5 km SW Icla (19°23′S, 64°48′W, 2450 m); 22–24 June; arid area with scattered patches of severely degraded dry forest (*c*. 7 m tall, 95% deciduous, dominated by *Schinopsis haenkeana*, *Tipuana tipu* and *Aspidosperma quebracho-blanco*) at higher elevations; desert scrub (with *Neoraimondia herzogiana*) and degraded riverine forest (5–12 m tall, *c*. 50% deciduous, dominated by *Aspidosperma quebracho-blanco*, *Jatropha hieronymi* and various columnar cacti) at lower elevations.

Species accounts

BAND-TAILED PIGEON *Columba fasciata*

This species was observed at 1500 m at Huara by SKH and MK, and at 800 m along the Río Boopi at Las Mercedes by SKH, well below its usual elevational range (Fjeldså & Krabbe 1990, Armonía 1995).

MAROON-CHESTED GROUND-DOVE *Claravis mondetoura*

Up to 5 individuals (3 males, 2 females) of this poorly known species were observed by SKH and SH on 3, 4 and 6 Oct within 2.5 km of road along the Río Boopi and Las Mercedes, 500 m below its known elevational range (Fjeldså & Krabbe 1990, Armonía 1995). Surprisingly, all birds were observed in dry forest. Any humid forest with bamboo thickets, the habitat the species usually is associated with (Hilty & Brown 1986), was located on the slopes at least 400 m above the dry forest.

RED-FRONTED MACAW *Ara rubrogenys*

To increase the knowledge about daily and seasonal movements and population trends of this threatened species (classified as "vulnerable" by Collar *et al.* 1992), we include our observations here. During five days spent along the Río Caine, only one individual was seen (on 11 June by SH), whereas *c.* 40 birds were found in the same area on 1 Aug 1989 (MK pers. obs.), about 60 were estimated to have been present in Oct/Nov 1990 (Boussekey *et al.* 1991) and *c.* 100 were estimated to have been present from Sept 1991 to March 1992 (Pitter & Christiansen 1995). This nearly complete lack of sightings of Red-fronted Macaws during our survey along the Río Caine is puzzling, especially since the species was not considered to be under any immediate threat in this area by Boussekey *et al.* (1991), and Pitter & Christiansen (1995) considered it to be resident.

At Novillero, MK and SH saw 4 individuals flying downriver at dawn on 20 June; none were recorded at this site from 30 April to 2 May 1995 by P. Nygaard-Andersen and N. Moray Williams (pers. comm.). In the Río Pilcomayo drainage, 22 individuals were seen flying to a roost by MK and SH on 22 June about 3 km S of Icla (19°22′S, 64°48′W). On the evening of the following day between 104 and 116 birds were observed flying upriver near Hacienda Uyuni (19°26′S, 64°50′W) by MK and SH, presumably to the same roost as the birds of the previous day, whereas only 45 birds flew downriver at the same site the next morning. During the day, groups of 3 to 6 birds were found in riverine forest along the Río Pilcomayo (19°27–35′S, 64°49–51′W), totalling *c.* 18 birds along a 20 km stretch of the river. On the morning of 7 July about 90 birds were seen flying upriver along Río La Haciendita (19°01′S, 64°12′W) at 1300 m, where none were seen the previous afternoon.

CANARY-WINGED PARAKEET *Brotogeris versicolurus*

Observations of a flock of 4–6 individuals by SM on 27 Dec 1993 and of several pairs by SKH on 16, 18 and 20 Sept 1995 at Inquisivi represent the first reports of this species for depto. La Paz (Remsen & Traylor 1989, Armonía 1995).

MONTANE FOREST SCREECH-OWL *Otus hoyi*

At Río Azero, this species was captured three times (involving at least 2 different individuals) in dry forest at 1100 m whilst mist-netting bats on the nights of 28 and 29 June. Additionally, MK heard and saw an individual at 1250 m at a site about 1.5 km away from the netting area on 27 June. These records fill an altitudinal and ecological gap between the humid montane forest site above 1300 m from which the species was originally described (König & Straneck 1989) and a recent record from the Bolivian chaco (Kratter *et al.* 1993). At Río Azero *O. hoyi* is sympatric with *O. choliba*.

BUFF-FRONTED OWL *Aegolius harrisii*

The characteristic, wailing trill of this secretive species, for which few records exist from Bolivia (J. V. Remsen *in litt.*), was heard by MK and SH from deciduous forest near our camp at Masicurí on the night of 16 July. To our ears the voice was identical to the recording on Hardy *et al.* (1990). The species was also found to be locally common in structurally similar, but not mountainous habitat between Pozo Colorado and Fn. V. Rivarola, Presidente Hayes, Paraguayan Chaco (*c.* 23°30′S, 60°20′W, 100 m) in Oct 1991 by MK and P. Driesch (cf. Paraguayan distribution of this species in Hayes 1995), suggesting that it may be more widespread in deciduous forests than previously thought, and that the Andean and SE Brazilian populations may be connected by a population in the chaco and adjacent dry forest habitats.

BAND-WINGED NIGHTJAR *Caprimulgus longirostris*

A pair seen by MK and SH at 800 m on a tributary of the Río Masicurí on the night of 9 July represents a considerable downward range extension on the eastern side of the Andes (from 2100 m; Fjeldså & Krabbe 1990, Armonía 1995).

AMETHYST WOODSTAR *Calliphlox amethystina*

Two males were observed by SKH on 7 Oct at 800 m along Río Boopi at Las Mercedes. This is, to our knowledge, the first report of this species in Andean valleys and represents an increase in altitudinal range by 100 m (Bond & Meyer de Schauensee 1943, Remsen & Traylor 1983).

STRIPED WOODPECKER *Picoides lignarius*

Observations of this species on 25 and 28 Dec 1993 by SM and on 16 Sept 1995 by SKH in dry forest below Inquisivi represent the first reports of this species for depto. La Paz (Remsen & Traylor 1989, Armonía 1995).

GREEN-BARRED FLICKER *Colaptes melanochloros*

Daily observations of a few individuals between 2200 and 3000 m at Inquisivi by SM in 1993 and 1994 and by SKH and SH in 1995 represent the first reports for depto. La Paz (Remsen & Traylor 1989, Armonía 1995). Interestingly, none of the birds seen in 1995, even when two individuals (presumed pairs) were observed together, showed the red malar stripe typical of the male.

BOLIVIAN EARTHCREEPER *Upucerthia harterti*

Observations of a pair and a single individual on 13 June by MK and SH on the SW side of the Río Caine represent the first reports for depto. Potosí (Remsen & Traylor 1989, Armonía 1995). These birds and another pair seen on 24 June at 2500 m in the Río Jaya Mayu valley (17°52′S, 65°56′W) were found in habitat much modified by timber extraction, agriculture and grazing. The pair seen along Río Caine spent several hours foraging and vocalizing in a hedge formed by dead *Acacia* branches and a barren cliff, where the birds investigated crevices in a manner reminiscent of Rock Wrens *Salpinctes obsoletus*. Remsen *et al.* (1988) found this species to be partial to dry scrub and forest with a dense undergrowth of terrestrial bromeliads, a typical feature of severely overgrazed habitats (MK unpubl. data). These observations suggest that *U. harterti* tolerates human degradation of its habitat quite well and may not be "near-threatened" (as considered by Collar *et al.* 1992).

An individual of this species was also seen in degraded dry forest (dominated by *Prosopis laevigata*, *Caesalpinia* spp. and *Dodonaea viscosa*) with abundant terrestrial bromeliads (*Puya meziana*) at Huachillas (16°39′S, 68°01′W, 3000 m) in the La Paz valley on 8 Sept 1991 by J. Fjeldså (pers. comm.) and on 9 Sept 1991 by MK. These are the first reports of this species for depto. La Paz (Remsen & Traylor 1989, Armonía 1995).

Cranioleuca, unnamed species

A distinctive, rufous-capped form of *Cranioleuca* spinetail, which will be described as a new species by SM and J. Fjeldså, was a common species in dry forest below Inquisivi. It was first discovered and tape-recorded by SM on 27 Dec 1993, and specimens were collected a few weeks later. The species was mostly seen in pairs in the lower canopy and upper understorey but occasionally also in mixed-species flocks. It was also frequently encountered by SKH, MK and SH in 1995.

BERLEPSCH'S CANASTERO *Asthenes berlepschi*

The sighting of a pair at 2300 m in the Consata Valley (15°30′S, 68°38′W) on 30 May by MK and SH represents a new altitudinal record for this threatened species (ranked as "insufficiently known" by Collar *et al.* 1992), previously known from 2600–3700 m (Fjeldså & Krabbe 1990), and only recently rediscovered (Mayer 1995). The birds were found in a low, open "hedge" formed by *Puya* bromeliads along a field edge in an area of intense agricultural activity. The Consata Valley has been densely inhabited at least since Incan times, and natural habitats have been almost completely converted into cultivated areas. Nevertheless, *A. berlepschi* seems to be common within its restricted range (the Consata Valley and its tributaries); three separate individuals were seen crossing the road on 3 June by MK while driving from Tacacoma to Quiabaya (15°38′S, 68°40′W) at 3200–3500 m in open, degraded *Polylepis* forest and in *Baccharis pentlandii* scrub, and the species was common around the town of Sorata (Mayer 1995). Apparently, *A. berlepschi* is as common and tolerant of habitat degradation within its restricted range as the closely related *A. dorbygni* (of which it may only be a race; Ridgely & Tudor 1994) in similar dry valleys further south in Bolivia.

Our observations increase the known range size of *A. berlepschi* to *c.* 200 km^2. We expect that the species will also be found in the not yet surveyed areas north of the Río Consata where the habitat is very similar, which would increase its range size to 450 km^2. Based on the combined information above, we do not consider *A. berlepschi* to be under any immediate threat and suggest it should be removed from the list of threatened species.

BUFF-BROWED FOLIAGE-GLEANER *Syndactyla rufosuperciliata*

Regularly seen by MK and SH in dry forest down to 1000 m in mixed-species flocks with *Poecilurus scutatus*, *Basileuterus bivittatus* and *Arremon flavirostris* at Río Azero. In the Andes, this species was previously known only from humid forest above 1300 m (Ridgely & Tudor 1994, Armonía 1995).

SPOT-BILLED GROUND-TYRANT *Muscisaxicola maculirostris*

Repeated observations by SKH and MK of an individual along the Río La Paz at 1300 m at Huara represent a downward range extension of 700 m for this species in Bolivia (Ridgely & Tudor 1994, Armonía 1995).

BROWN-CRESTED FLYCATCHER *Myiarchus tyrannulus*

An individual was seen and tape-recorded at 2300 m on 15 and 16 Sept by SKH at Inquisivi. This species was previously known only up to about 1700 m (Ridgely & Tudor 1994, Armonía 1995).

LEMON-BROWED FLYCATCHER *Conopias cinchoneti*

One individual of this distinctive flycatcher was observed foraging along Río Khatu below Inquisivi on 16 Sept by SKH. The bird was constantly on the move, perching only briefly in two small bushes about 1–1.5 m above ground on an open gravel bar. It frequently sallied out horizontally into the air about 15–25 m away from its perch. The bird did not call and disappeared into gallery forest after about 10 minutes. On 8 Oct, MK observed another individual along Río Coroico at Yolosillas for about 3 minutes in degraded riverine forest. Both individuals were identified by their two-toned colour pattern with olive backs and yellow underparts, a yellow superciliary extending far back onto the nape and the lack of wingbars and white edgings on the outer rectrices. The coloration of the bird at Yolosillas was rather dull, suggesting that it was a juvenile. These are the first reports of this species for Bolivia and would represent a huge southward range extension of 600 km from Cuzco, Peru (Ridgely & Tudor 1994). However, until "tangible evidence" for the occurrence of this species in Bolivia is obtained (preferably by specimen), its presence in Bolivia should be regarded as hypothetical.

WHITE-NAPED XENOPSARIS *Xenopsaris albinucha*

An individual of this species, known from only a handful of localities in Bolivia (J. V. Remsen *in litt.*), was observed on 16 July by MK in a mixed-species flock in tall, disturbed gallery forest along the Río Grande at 500 m in Masicurí. It perched briefly almost directly above the observer about 5 m above ground before flying into the viny tangles of a treefall gap, where it could not be relocated.

WHITE-LINED TANAGER *Tachyphonus rufus*

A pair seen in degraded riverine forest at 1300 m at Huara on 28 Sept by MK represents the first report for depto. La Paz (Remsen & Traylor 1989, Armonía 1995) and fills part of a large distributional gap for this rather local species (Ridgely & Tudor 1989), previously known from localities about 750 km further E in eastern Santa Cruz (Armonía 1995) and *c.* 650 km further NW in Cuzco, Peru (Isler & Isler 1987).

FAWN-BREASTED TANAGER *Pipraeidea melanonota*

A pair seen in a mixed-species flock near the confluence of the Río Masicurí and Río Grande at 500 m on 11 July by MK represents an unusually low record of this species on the eastern Andean slope (where usually recorded above 1500 m, Ridgely & Tudor 1989; above 1200 m according to Armonía 1995). Also regularly seen at 1100–1400 m at Río Azero.

CHESTNUT-VENTED CONEBILL *Conirostrum speciosum*

At Miguillas this species was found at elevations of up to 1500 m by SKH, about 500 m above the usual altitudinal range of the species (Ridgely & Tudor 1989).

CINEREOUS CONEBILL *Conirostrum cinereum*

An individual was observed preening for about 2 minutes in degraded riverine forest at 1300 m along the Río La Paz at Huara on 28 Sept by MK. This observation represents a considerable downward range extension for the eastern Andean slope (previously known only above 2500 m; Ridgely & Tudor 1989, Armonía 1995).

EPAULET ORIOLE *Icterus cayanensis*

A pair was seen at 1500 m at San Juan del Potrero on 5 Sept by SKH, 500 m above the usual range for this species (Ridgely & Tudor 1989, Armonía 1995).

The following 23 species were found at 2050–2400 m on the SW side of the Caine valley (site 7), an area of relatively low elevation, which political arbitrariness has placed in depto. Potosí (most of which is well above 3000 m), and while they are new to the department (Remsen &

Traylor 1989, Armonía 1995), these records were to be expected based on known ranges in adjacent departments and represent only minor range extensions: Buff-necked Ibis *Theristicus caudatus* (4 on 12 June by MK and SH), Black-chested Buzzard-eagle *Geranoaetus melanoleucus* (1 on 13 June by MK and SH), Roadside Hawk *Buteo magnirostris* (1 on 11 June by SH), Collared Plover *Charadrius collaris* (2 on 13 June by MK and SH), Large-tailed Dove *Leptotila megalura* (several on 11–13 June by MK and SH), Blue-crowned Parakeet *Aratinga acuticaudata* (common), Smooth-billed Ani *Crotophaga ani* (several on 12 June by MK and SH), Glittering-bellied Emerald *Chlorostilbon aureoventris* (1 male on 12 June by MK), White-bellied Hummingbird *Amazilia chionogaster* (several on 11–13 June by MK and SH), Narrow-billed Woodcreeper *Lepidocolaptes angustirostris* (2 on 11 June by MK and SH), Rufous Hornero *Furnarius rufus* (common), Olive-crowned Crescentchest *Melanopareia maximiliani* (1 on 12 June by MK), Suiriri Flycatcher *Suiriri suiriri* (2 on 13 June by MK and SH), Southern Scrub Flycatcher *Sublegatus modestus* (1 on 13 June by MK), Greater Wagtail-tyrant *Stigmatura budytoides* (common), Creamy-bellied Thrush *Turdus amaurochalinus* (several on 12 June by MK and SH), Grey-crested Finch *Lophospingus griseocristatus* (common), Ringed Warbling-finch *Poospiza torquata* (pair on 13 June by MK and SH), Great Pampa Finch *Embernagra platensis* (singing male by MK and SH on 11 June), Black-backed Grosbeak *Pheucticus aureoventris* (several on 11–13 June by MK and SH), Sayaca Tanager *Thraupis sayaca* (regularly seen by MK and SH), Brown-capped Redstart *Myioborus brunniceps* (2 on 12 June by MK), Masked Gnatcatcher *Polioptila dumicola* (pair on 13 June by MK and SH).

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Appendix

The following list includes all species observed at 11 of the 12 survey sites described in the text (site 12, Río Pilcomayo, is not included): **1** Consata, **2** Yolosillas, **3** Las Mercedes, **4** Miguillas, **5** Huara, **6** Inquisivi, **7** Río Caine, **8** San Juan del Potrero, **9** Novillero, **10** Masicurí and **11** Río Azero. The habitat(s) in which each species was observed are abbreviated as follows: **D**=dry forest; **E**=evergreen forest (including gallery forest); **A**=predominantly agricultural areas; **R**=directly at rivers; **O**=flying over the survey area. No specimens were collected. Relative abundances were not estimated due to the relatively short time spent at each site.

Tinamus major 10E. *Crypturellus obsoletus* 3D. *Crypturellus undulatus* 2DE, 8D. *Crypturellus atrocapillus* 3D, 4D. *Crypturellus tataupa* 2DE, 3D, 4D, 8D, 10DE. *Nothoprocta pentlandii* 6DA. *Phalacrocorax brasilianus* 2O. *Tigrisoma fasciatum* 2R. *Ardea cocoi* 10R. *Ardea alba* 10R. *Egretta thula* 7R, 10R. *Nycticorax nycticorax* 9O. *Theristicus caudatus* 7A. *Coragyps atratus* 3O, 8O, 10O, 11O. *Cathartes aura* 1O, 2O, 3O, 4O, 5O, 6O, 7O, 8O, 9O, 10O, 11O. *Vultur gryphus* 5O, 6O, 7O, 8O, 11O. *Sarcoramphus papa* 11O. *Merganetta armata* 2R, 6R. *Chondrohierax uncinatus* 2O, 3D, 4O, 5D. *Elanoides forficatus* 3O. *Ictinia plumbea* 3D, 4O. *Accipiter bicolor* 9O. *Geranoaetus melanoleucus* 1D, 3O, 5O, 6O, 7O, 8O, 9O, 11O. *Harpyhaliaetus solitarius* 10O, 11O. *Buteo magnirostris* 1DE, 2O, 3D, 4D, 5DE, 6A, 7D, 8D, 9D, 10DE, 11DE. *Buteo albigula* 6O. *Buteo brachyurus* 3O, 11O. *Buteo albicaudatus* 8O. *Buteo polyosoma* 9O. *Buteo albonotataus* 1O. *Phalcoboenus megalopterus* 6O. *Polyborus plancus* 8D, 11E. *Falco sparverius* 1D, 3D, 5DE, 6DE, 7D. *Falco femoralis* 11O. *Falco rufigularis* 2E, 5D, 10E. *Falco peregrinus* 5O, 7O. *Ortalis guttata* 1DE, 2E, 3D, 10D. *Penelope montagnii* 9D. *Penelope jacquacu* 3D. *Pipile pipile* 10D. *Aramides cajanea* 2E, 3E, 10E. *Charadrius collaris* 7R. *Actitis macularia* 3R, 6R. *Columba maculosa* 7O. *Columba fasciata* 3D, 5D, 6D. *Columba plumbea* 1D, 3D. *Zenaida auriculata* 1D, 7DA. *Columbina talpacoti* 10A, 11E. *Columbina picui* 1D, 3A, 5DE, 6DA, 7DA, 10DEA. *Claravis mondetoura* 3D. *Leptotila verreauxi* 1DE, 2DEA, 3D, 4D, 5DE, 6DE, 8D, 10DEA, 11DE. *Leptotila megalura* 3D, 4D, 5DE, 6DE, 7DA, 8D, 9DE, 11D. *Ara militaris* 10O. *Ara rubrogenys* 7O, 9O. *Ara auricollis* 10E, 11DE. *Ara severa* 10O. *Aratinga acuticaudata* 7DA, 8D. *Aratinga mitrata* 1D, 2O, 3D, 4D, 5DE, 6D, 7D, 9DE, 11DE. *Pyrrhura molinae* 2DE, 3D, 4D, 5DE, 6DE, 10DE, 11D. *Myiopsitta monachus* 7DA. *Bolborhynchus aymara* 6D, 7D. *Brotogeris versicolurus* 1D, 6DE, 7O, 9O, 10O, 11O. *Pionus menstruus* 1O, 2O, 3D. *Pionus maximiliani* 8D, 10O, 11O. *Pionus* sp. 4O. *Amazona aestiva* 7O, 8D, 10O, 11O. *Piaya cayana* 1D, 2DE, 3D, 4D, 5DE, 6D, 8D, 10E, 11DE. *Crotophaga ani* 7A, 10A. *Otus choliba* 4D, 6DA, 8D, 9D, 10E, 11D. *Otus hoyi* 11D. *Bubo virginianus* 6O. *Pulsatrix perspicillata* 3D, 10E. *Glaucidium brasilianum* 10D. *Glaucidium* sp. 2E. *Aegolius harrisii* 10D. *Nyctibius griseus* 4D. *Nyctidromus albicollis* 11D. *Caprimulgus rufus* 4D, 5D. *Caprimulgus longirostris* 9DE, 10ER. *Hydropsalis brasiliana* 8D. *Uropsalis lyra* 6O. *Cypseloides rutilus* 6O. *Streptoprocne zonaris* 6O, 8O. *Aeronautes montivagus* 5O. *Aeronautes andecolus* 6O, 7O, 9O. *Panyptila cayennensis* 10O. *Phaethornis superciliosus* 10E. *Phaethornis pretrei* 8D, 11D. *Campylopterus largipennis* 2E. *Colibri thalassinus* 2DE. *Colibri serrirostris* 6D. *Chlorostilbon mellisugus* 1DE, 3D, 4D, 5DE, 6DE. *Chlorostilbon aureoventris* 7DA, 8D, 9D, 11D. *Thalurania furcata* 10E. *Taphrospilus hypostictus* 10E. *Amazilia chionogaster* 1D, 2DE, 3D, 4D, 5DE, 6DEA, 7A, 8D, 9DE, 10DE, 11DE. *Oreotrochilus adela* 7D. *Patagona gigas* 7D. *Sappho sparganura* 5D, 7D, 9D, 11D. *Heliomaster longirostris* 2D. *Calliphlox amethystina* 3D. *Acestrura mulsant* 2D. *Trogon collaris* 10E. *Trogon curucui* 2E, 3D, 4D, 5E. *Electron platyrhynchum* 3D. *Momotus momota* 3D, 4D, 5DE, 8D, 10DE, 11DE. *Ceryle torquata* 2ER, 10ER. *Chloroceryle amazona* 2ER. *Chloroceryle americana* 10ER, 11ER. *Nystalus chacuru* 1D, 6A, 10D. *Nystalus maculatus* 8D. *Monasa nigrifrons* 10E. *Pteroglossus castanotis* 3D. *Ramphastos tucanus* 3D. *Ramphastos toco* 10E, 11E. *Picumnus cirratus* 3D, 5D, 8D, 10D, 11D. *Picoides lignarius* 6D, 7D, 9D. *Veniliornis fumigatus* 4D, 5E. *Veniliornis frontalis* 5D, 11D. *Veniliornis* sp. 10E. *Piculus chrysochloros* 10E. *Piculus rubiginosus* 2E, 8D, 11D. *Colaptes melanochloros* 6DA, 9D. *Dryocopus lineatus* 3D, 4D, 5D. *Campephilus melanoleucos* 10DE, 11D. *Campephilus rubricollis* 4D. *Campephilus leucopogon* 8D, 9D. *Sittasomus griseicapillus* 3D, 4D, 5D, 8D, 10DE, 11D. *Xiphocolaptes promeropirhynchus* 3D, 10E. *Xiphocolaptes major* 10D, 11D. *Dendrocolaptes picumnus* 4D, 8D. *Xiphorhynchus guttatus* 10E. *Lepidocolaptes angustirostris* 7D, 8D, 9D, 11D. *Lepidocolaptes albolineatus* 3D. *Campylorhamphus trochilirostris* 4D, 5D. *Upucerthia harterti* 7DA, 8D. *Cinclodes fuscus* 5R, 7R, 9R, 11R. *Furnarius rufus* 6A, 7A, 8D, 9A, 10A. *Synallaxis azarae* 1DE. *Synallaxis frontalis* 5E, 6DEA, 8D, 10DE. *Poecilurus scutatus* 3D, 10E, 11D. *Cranioleuca pyrrhophia* 8D, 9DE. *Cranioleuca*, unnamed species 6DEA. *Asthenes dorbignyi* 6DA. *Asthenes berlepschi* 1A. *Phacellodomus striaticeps* 6A, 8D. *Syndactyla rufosuperciliata* 11D. *Phylidor rufus* 10E. *Xenops rutilans* 10DE, 11D. *Batara cinerea* 11E. *Taraba major* 3D, 4D, 5DE, 10DE. *Thamnophilus doliatus* 2E, 3D, 4D, 5EA. *Thamnophilus aroyae* 2E. *Thamnophilus punctatus* 10DE. *Thamnophilus caerulescens* 1E, 5DE, 6DE, 8D, 9DE, 11D. *Thamnophilus ruficapillus* 11D. *Thamnophilus* sp. 4D. *Myrmotherula longicauda* 2E. *Herpsilochmus atricapillus* 10E. *Formicivora melanogaster* 10E. *Pyriglena leuconota* 3D, 4D, 6E. *Chamaeza campanisona* 11E. *Melanopareia maximiliani* 5D, 6A, 7D. *Phyllomyias burmeisteri* 5E. *Phyllomyias sclateri* 10E. *Zimmerius bolivianus* 4D. *Camptostoma obsoletum* 3D, 4D, 5D, 6DEA, 8D, 11D. *Phaeomyias murina* 6A, 8D. *Sublegatus modestus* 5D, 7D, 10D. *Suiriri suiriri* 7D, 9D, 10E. *Myiopagis gaimardii* 3D. *Myiopagis viridicata* 1E, 10E. *Elaenia obscura* 6EA. *Elaenia* sp. 3D, 8D. *Mecocerculus leucophrys* 9D. *Serpophaga cinerea* 2R, 3R. *Serpophaga munda* 5D, 6DE, 7D, 8D, 11D. *Stigmatura budytoides* 7DA, 8D, 9D. *Anairetes flavirostris* 6D, 7DA. *Leptopogon amaurocephalus* 2E, 3D, 10E. *Leptopogon superciliaris* 3D. *Phylloscartes ophthalmicus* 2E, 3D. *Phylloscartes ventralis* 11D. *Hemitriccus margaritaceiventer* 1D, 2D, 3D, 4D, 5D, 6D, 8D, 10DE, 11D. *Todirostrum cinereum* 10E. *Tolmomyias sulphurescens* 2E, 3D, 4D, 10E. *Myiophobus fasciatus* 2E, 5E, 6DEA. *Pyrrhomyias cinnamomea* 6E. *Contopus fumigatus* 5E, 6E. *Contopus cinereus* 10E. *Empidonax* sp. 3D. *Lathrotriccus euleri* 3D. *Cnemotriccus fuscatus* 5D. *Sayornis nigricans* 1R, 2R, 3R, 5R, 6ER, 10R, 11R. *Pyrocephalus rubinus* 3D. *Ochthoeca leucophrys* 9D. *Muscisaxicola maculirostris* 5R, 7R. *Knipolegus aterrimus* 3D, 4D, 5DE, 6A, 7DA, 8D, 9DE, 11DE. *Colonia colonus* 10E. *Satrapa icterophrys* 3D. *Hirundinea ferruginea* 3D, 5D, 6DE, 7DA, 8D, 9DE, 10D. *Machetornis rixosus* 10A. *Casiornis rufa* 2E, 3D, 4D, 5D, 10E. *Myiarchus swainsoni* 11D. *Myiarchus ferox* 3D. *Myiarchus cephalotes* 2DE. *Myiarchus tyrannulus* 3D, 4D, 5DE, 6D, 11D. *Myiarchus* sp. 8D, 10E. *Pitangus sulphuratus* 7A, 9DEA, 10EA, 11DE. *Myiozetetes similis* 2E. *Conopias cinchoneti* 2E, 6ER. *Myiodynastes chrysocephalus* 3D. *Myiodynastes maculatus* 2E, 3D, 4D, 5D. *Legatus leucophaius* 2E. *Tyrannus melancholicus* 1DE, 2E, 3D, 5DE, 6EA, 10EA, 11DE. *Xenopsaris albinucha* 10E. *Pachyramphus viridis* 10E. *Pachyramphus castaneus* 3D. *Pachyramphus polychopterus* 3D. *Phytotoma rutila* 7DA, 9A. *Notiochelidon cyanoleuca* 2E, 3D, 5E, 7A, 9AO, 10E. *Atticora fasciata* 3DR. *Thryothorus genibarbis* 1DE, 2DE, 10DE. *Troglodytes aedon* 2DEA, 3DA, 4D, 5DEA, 6DE, 7DA, 8D, 9DEA, 11DE. *Cinclus leucocephalus* 1R. *Polioptila dumicola* 7DA, 8D, 9D, 11D.

Myadestes ralloides 2E. *Entomodestes leucotis* 5E. *Turdus chiguanco* 6A, 7A, 9EA, 11D. *Turdus fuscater* 6A. *Turdus rufiventris* 8D, 10DE, 11DE. *Turdus amaurochalinus* 1D, 2D, 5DE, 6DE, 7DA, 10DE. *Mimus dorsalis* 7DA. *Cyanocorax cyanomelas* 2DE, 3D, 4D, 5DE, 8D, 10DE, 11DE. *Cyanocorax chrysops* 8D, 10DE, 11D. *Cyclarhis gujanensis* 4D, 5D, 6D, 8D, 10DE. *Vireo olivaceus* 1D, 2E, 3D, 5DE, 6DA, 10DE. *Hylophilus hypoxanthus* 10E. *Zonotrichia capensis* 4D, 7A, 8D, 9EA. *Ammodramus aurifrons* 3RA, 5R, 10A. *Lophospingus griseocristatus* 7DA, 8D, 9DA. *Poospiza boliviana* 9D. *Poospiza whitii* 6DE. *Poospiza torquata* 5DE, 6DE, 7D, 8D, 9D. *Poospiza melanoleuca* 8D, 11D. *Sicalis flaveola* 6A, 8D. *Embernagra platensis* 7A, 10DE. *Volatinia jacarina* 2A. *Sporophila caerulescens* 3D, 5DE, 6A. *Catamenia analis* 5E, 6DA. *Tiaris obscura* 3D, 5DE. *Arremon flavirostris* 4D, 5DE, 8D, 9D, 10D, 11D. *Atlapetes fulviceps* 9E. *Atlapetes torquatus* 9E. *Coryphospingus cucullatus* 1D, 2EA, 3DA, 4D, 5DE, 8D, 10D, 11D. *Pheucticus aureoventris* 4D, 5DE, 6DE, 7A, 8D, 9EA, 10E. *Saltator maximus* 1DE, 2DE. *Saltator aurantiirostris* 6DE, 7A, 8D, 9DEA. *Cyanocompsa brissonii* 2E, 4D, 5E, 8D. *Schistochlamys melanopis* 1E. *Cissopis leveriana* 10E. *Chlorospingus ophthalmicus* 6D. *Thlypopsis sordida* 10E. *Hemithraupis guira* 4D, 5D, 10E. *Tachyphonus rufus* 5E. *Piranga flava* 2E, 5D, 8D, 9DE, 10DE, 11D. *Ramphocelus carbo* 1DE, 2E, 3DA, 10E. *Thraupis sayaca* 1DE, 3DA, 4D, 5DE, 6DE, 7A, 8D, 9DE, 10DE, 11DE. *Thraupis palmarum* 1E, 3D. *Thraupis bonariensis* 5E, 6DE, 7A, 8D. *Pipraeidea melanonota* 10E, 11D. *Euphonia chlorotica* 8D. *Euphonia laniirostris* 2E, 3D. *Euphonia cyanocephala* 3D, 4D, 5D, 6DE. *Euphonia* sp. 2E. *Cyanerpes caeruleus* 1E. *Diglossa sittoides* 2E, 4D. *Tersina viridis* 2E. *Coereba flaveola* 2DE, 3D, 4D, 5DE, 8D. *Parula pitiayumi* 2DE, 4D, 5DE, 6DE, 8D, 10DE, 11DE. *Geothlypis aequinoctialis* 2E, 10E. *Myioborus brunniceps* 6DE, 7A, 8D, 9E, 11DE. *Basileuterus bivittatus* 1D, 2DE, 3D, 5D, 9DE, 10DE, 11D. *Basileuterus coronatus* 2E. *Conirostrum speciosum* 3D, 4D, 5D. *Conirostrum cinereum* 5E. *Psarocolius decumanus* 1DE, 2DE, 3D, 4D, 5DE, 10DE, 11DE. *Psarocolius atrovirens* 2E, 3D, 5DE, 6D. *Psarocolius angustifrons* 3D. *Cacicus chrysopterus* 11D. *Icterus cayanensis* 8D, 10E, 11D. *Oreopsar bolivianus* 7A. *Molothrus badius* 6A, 7A, 9A, 10A. *Scaphidura oryzivora* 3DA. *Carduelis magellanica* 7A, 9E. *Carduelis xanthogastra* 6A. *Carduelis* sp. 2E, 3D.

IN BRIEF

ON THE IDENTITY OF *LOPHORNIS MELANIAE* FLOERICKE (TROCHILIDAE)

In 1920, Curt Floericke described a new species of *Lophornis*, on the basis of two unlocalised males. He described his new species, *L. melaniae*, as intermediate between *L. stictolopha* and *L. delattrei*. According to Floericke, the crest feathers were narrow and pointed but not nearly so "radical or thread-like" as those of *delattrei*, and they all, or nearly all, had a black terminal spot but this was much smaller than in *stictolopha*. Floericke admitted that *melaniae* looked superficially like aberrant specimens or hybrids between the other species, but this he considered unlikely, as he recalled seeing other similar specimens before, and furthermore the crest was not intermediate in colour, but even paler than in *delattrei*, especially in the central part which pales to a pale isabelline yellow. The bill was stated to be longer than in either *stictolopha* or *delattrei*.

Lophornis delattrei occurs through tropical and subtropical zones in southwest Mexico and from the Pacific slopes of Costa Rica and Panama through the central and eastern Andes of Colombia to northern and eastern Peru and Bolivia. The male has a rather long chestnut-buff crest, each feather sharply pointed and tipped with a tiny green "spangle". The cheek feathers are only slightly lengthened, rufous with green tips. The monotypic species *Lophornis stictolopha* occurs through western Venezuela, eastern Colombia and eastern Ecuador. The male is very like that of *delattrei* but the crest feathers are not narrowed to a point, and are tipped with larger spots, black but shining faintly green from some angles and mauve from others.

There are three (or perhaps four) recognised races of *delattrei*, including *brachylopha* from Mexico, and *lessoni* from Costa Rica to Colombia, in which the male differs from the nominate in that the points of the crest feathers are sharper, and the spangles in some specimens are almost or quite absent. Nominate *delattrei* is from northeastern and central Peru. A fourth race, *regulus*, from Bolivia, is questionably distinct from *delattrei*; Zimmer (1950) could find no difference in adult males but some possible differences in females.

It has been suggested by Meyer de Schauensee (1966) that *melaniae* represented melanistic specimens of some other species of *Lophornis*, but he appears to have based this assumption on the name, since he did not see either the specimens or the original reference. Neither the name nor the description has anything to do with melanism: Floericke named the bird after his wife! (Meyer de Schauensee's English name "Dusky Coquette" is therefore also inappropriate.)

It is not possible to assess the types, for these almost certainly no longer exist. I am assured by Dr H-W. Mittmann (*in litt.*) that Floericke's collection was stored at the Naturalienkabinett Stuttgart, and was completely destroyed during World War Two. All discussion must therefore be somewhat subjective. However, while curating the Natural History Museum collection, I found a pale-crested skin with reduced spangling, which agreed quite closely with Floericke's description of *melaniae*. Males of *L. delattrei* exhibit variation in depth of colour of the crest, so Floericke may have had some abnormally pale (or perhaps faded) specimens. Thus, *Lophornis melaniae* has no taxonomic validity, and probably represents aberrant or faded specimens of *L. delattrei*.

I am grateful to Derek Goodwin for kindly translating Floericke's paper, and to Gary Graves for commenting on an early draft of this note.

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THE MALEO *MACROCEPHALON MALEO* ON BUTON

The Maleo *Macrocephalon maleo* is an endemic megapode of Sulawesi, Indonesia (White & Bruce 1986, Jones *et al.* 1995). Its distribution and the status of nesting grounds on the island have been studied in detail (Dekker 1990, Argeloo 1994). However, the occurrence of the species on Sulawesi's off-lying islands is obscure and requires confirmation (Argeloo 1994, Jones *et al.* 1995).

Buton, one of the islands where according to indirect evidence maleos could possibly occur (Dekker 1990, Argeloo 1994), is located to the south of Sulawesi Tenggara, the southeastern province. Until recently, there had been no confirmed information regarding the occurrence of Maleos on Buton other than eggs which were for sale at the market of Maligano and which were said to originate from a sandy area around the headwaters of the Lebo river (Pramono 1991). Early ornithological expeditions did not mention the species for the island (see van Bemmel & Voous 1951). Recently, Addin (1992) studied microhabitat characteristics of the Maleo nesting grounds and reported the presence of Maleos along the Lebo and Lagito rivers (North Buton Wildlife Reserve between 122°47′ and 123°13′ E). Sykes (1996) reported their presence on the Maligano coast (between 4°20′ and 5°38′ S). An average of 4.5 Maleo pairs visited the nesting ground at the Lebo river per day between July and September 1991, with a minimum of 3 pairs and a maximum of 6 pairs per day (Addin 1992). Approximately 10 birds were recorded on the Maligano coast during a three-month survey between August and November 1995 (Sykes 1996). These data confirm the occurrence of the species on Buton.

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FRINGILLA COELEBS GENGLERI—AUTHORSHIP AND DATE REVISITED

Some time ago, in a note in this journal, Clancey (1993) stated that the British race of the Chaffinch, known as *Fringilla coelebs gengleri* Kleinschmidt (1909), should instead be attributed to Hens & van Marle (1933). According to Clancey, Kleinschmidt's description of *gengleri* as "form. nov." introduced an unavailable infrasubspecific entity, and Hens & van Marle were the first to use the name for a subspecies, thus making it available under Art. 10 (c) of the Code (International Commission on Zoological Nomenclature 1985) and becoming its authors following Arts. 50 (c) (i) and 23 (j). This view is mistaken and obviously originated from certain misinterpretations of the rules and the original work. It seems worthwhile to use this case to illustrate the provisions of the Code regulating treatment of infraspecific names which are rather complicated and distributed among various articles.

First of all, if the interpretation were actually correct that Kleinschmidt (1909) had created with *F. c. gengleri* an infrasubspecific name in the sense of the Code, it would not have been Hens & van Marle (1933) who made it available, but most probably Gengler (1924). In this detailed study of Chaffinch races, *Fringilla coelebs gengleri* Kleinschmidt appears among others, thus Art. 10 (c) is satisfied. It cannot be excluded, however, that some other work between Kleinschmidt's and Gengler's publications already uses *gengleri* as a name for a subspecies. I only mention these details to highlight an awkward nomenclatorial problem when author and date of names first published as infrasubspecific have to be determined: complete knowledge of pertinent literature is necessary.

Fortunately, in the case discussed here, this problem is not relevant. Clancey's allegation that *F. c. gengleri* is not available from Kleinschmidt (1909) is obviously based on the belief that an intersexual variant was described as a "form. nov.", being expressly infrasubspecific under Art. 45 (f) (iv). A study of the original work reveals, however, that this is not the case. Kleinschmidt first describes an individual variant in Chaffinches, then states that ". . . I found among English Chaffinches such a surprisingly high percentage of . . . (this variant) . . . that I dare separate the English breeders because of the frequency of the new variant". It is thus clear that the name *gengleri* was erected not for the individual variant itself but for a geographic entity. Kleinschmidt himself, in the very same paper, says that ". . . it is debatable if such an individual variety should be named as an aberr. nov. as insect collectors do in similar cases". Throughout his scientific work, Kleinschmidt used "form" as a denomination for geographic subdivisions within his "Formenkreise", a kind of precursor of the superspecies concept (e.g. Kleinschmidt 1900, 1901). While the status of Kleinschmidt's "Formenkreis"-names is debatable because of his deliberate disregard of the rules of zoological nomenclature, all of his names erected for "forms" doubtlessly have to be treated as available names in the species-group following Arts. 45 (f) (ii) and (g) (ii) (for an overview of Kleinschmidt's nomenclature, see Haffer (1992) and references therein).

Finally, another tricky detail of the regulations of the ICZN can be illustrated here. For a name published expressly for a "form", Art. 45 (g) is to apply. Thus, even if *gengleri* had indeed been published explicitly for an individual variant, it would *not* be deemed infrasubspecific, because it was adopted for a subspecies prior to 1985 (namely by Gengler (1924) as stated above) and would thus retain its *original* author and date [Art. 45 (g) (ii) (1)]! This does not hold, though, for the fourth names in quadrinominal combinations which are always infrasubspecific under Art. 45 (f) (iii).

To summarize, no interpretation of the rules is possible that could justify Clancey's assumption that Kleinschmidt's name was infrasubspecific. Therefore, if one indeed wishes to separate the British Chaffinches at subspecies level, the name must clearly be *Fringilla coelebs gengleri* Kleinschmidt (1909).

I am indebted to Dr Ward Tomlinson for linguistical improvements to the manuscript.

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MELANISM IN THE GULLS (LARIDAE)

Melanism in gulls is an uncommon phenomenon. In my previous review (Sage 1963) I was aware of just eleven records involving three species—Black-headed Gull *Larus ridibundus*, Herring Gull *L. argentatus* and Lesser Black-backed Gull *L. fuscus*. There is always the possibility of some examples of melanism reported in gulls being due to oiling or some other form of soiling, rather than pigmentation. However, the melanism of a Herring Gull reported by Stokoe (1954) was almost certainly genetically based (see Sage 1963), and in the case of two melanistic Black-headed Gulls seen in Northumberland in the winter of 1961–62, it was established that in the case of at least one bird the condition was due to pigmentation and not soiling (Sage 1962). It is of interest that Frantzen (1963) described a melanistic Black-headed Gull seen in Germany two months before the Northumberland record. An individual of this species showing both albinism and melanism which appeared to be genetically based was described by Harrison & Harrison (1962).

Since my earlier paper, three further records of melanism in the Black-headed Gull have come to hand and it is important that they be published in order to complete the record. One with the head, back and wings black; tail and underparts grey; legs reddish; seen at Chew Valley Lake, Somerset, on 23 January 1966 (A. P. Radford *in litt.*). One a uniform sooty-brown all over, bill and leg colour not seen, was present at Bosterne, Hampshire, on 15 March 1967 (Dr J. S. Ash *in litt.*). One with the head and wings deep charcoal-grey, back and underparts black, seen at Lowestoft Ness, Suffolk, on 15 November 1970 (W. H. Jolly *in litt.*).

A photograph and description of a melanistic Black-headed Gull seen on Sanday, Orkney, in July 1996 has been published recently by Thorne (1996). Finally, I was previously unaware of the record of an almost completely melanistic Laughing Gull *L. atricilla* seen in Florida, U.S.A., in October 1932 (Westen 1934).

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BRYAN SAGE

7 December 1996

NOTICE TO CONTRIBUTORS

Papers, from Club Members or non-members, should be sent to the Editor, Dr C. J. Feare, 2 North View Cottages, Grayswood Common, Haslemere, Surrey GU27 2DN. They should be typed on one side of the paper, with treble-spacing and a wide margin, and submitted in duplicate. The style and lay-out should conform with usage in this or recent issues of the *Bulletin*.

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Correspondence on membership, changes of address and all other matters should be addressed to the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants GU31 5PA, U.K. For details of Club Meetings see inside front cover.

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British Ornithologists' Club

Edited by
Dr D. W. SNOW and Prof C. J. FEARE

Volume 117 No. 4 December 1997

FORTHCOMING MEETINGS

Advance notice of meeting dates for 1998. Nine meetings are being arranged for the following Tuesdays: **20 January** (Ian Burrows on *Birds of Papua New Guinea*—see below), **17 March** (Tony Prater on *Waders*), **21 April** (Dr W. R. P. (Bill) Bourne on *Birds and Islands*), **19 May** (AGM and social evening—with informal "mini-talks" as in 1997), **14 July**, **15 September**, **13 October** and **17 November**. Details of speakers on these dates will be published when finalised.

Tuesday 20 January 1998. Dr Ian Burrows *B.Sc., Ph.D.* will speak on **"The Birds of Papua New Guinea"**. Ian has been a keen birder for many years, with a passion for rare and elusive species. After spending a year as a Warden of Cape Clear Bird Observatory in 1975, he obtained a Ph.D. in Applied Microbiology from Aston University in 1980. He has spent ten years (1986–1995) in Papua New Guinea lecturing in Microbiology, Ecology and Biology at the University of Papua New Guinea, in Port Moresby. He has visited and watched birds in every province of PNG, apart from Bougainville, and has conducted extensive research and consultancy programmes on the Melanesian Scrubfowl, Macgregor's Bird of Paradise, and a wide range of rainforest birds. A fluent pidgin speaker, he has worked as an in-field consultant for the British and Australian Broadcasting Corporations and the World Wildlife Fund. In 1997, together with Phil Gregory, he has founded Sicklebill Safaris Ltd., specialising in tours to Melanesia and Australia in search of rare and little known species.

*Applications to the Hon. Secretary by **4 January**, please.*

Tuesday 17 March 1998. Dr A. J. (Tony) Prater, *Ph.D, B.Sc* will speak on **"Waders"**. Having obtained his BSc in zoology (Exeter, 1965), Tony has been actively involved with birds, travelling widely, especially to North and South America, Africa, Europe, Australia and the Antarctic. His first appointment was as Warden of Lundy Bird Observatory in 1965. Since then he has held many posts with the RSPB and BTO. His special interest in waders began whilst working for the RSPB, on wader feeding as part of the feasibility study for the Morecambe Bay Barrage (1968–70). He is the author of several books, including *Identification and ageing of Holarctic Waders* (1977), *Estuary Birds of Britain and Ireland* (1981), and *Shorebirds* (1986). Since 1994 he has been Deputy RSPB Officer for Wales.

*Applications to the Hon. Secretary by **3 March**, please.*

Tuesday 21 April 1998. Dr W. R. P. (Bill) Bourne will speak on **"Birds and Islands"**. At the age of ten, Bill was evacuated to Bermuda, in the central western North Atlantic, for three years during World War II, where he sailed and fished and chased the local birds. Since then, in the course of a complicated career ending with an Honorary Research Fellowship at Aberdeen University, he has periodically managed to spend shorter periods watching both the land and seabirds of a variety of other islands, ranging from Bear Island and Cyprus, via the Cape Verde Islands and Ascension, to South Georgia and Juan Fernández. He will summarise these experiences and draw some conclusions.

*Applications to the Hon. Secretary by **7 April**, please.*

Meetings are held in the Sherfield Building of Imperial College, South Kensington, London SW7, at 6.15 p.m. for 7 p.m. The nearest Tube station is at South Kensington, and car parking facilities are available; a map of the area will be sent to members, on request. The cash bar is open from 6.15, and a buffet supper, of two courses followed by coffee, is served from about 7.00. (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion.

Overseas Members visiting Britain are particularly welcome at meetings. For details in advance, please contact the Hon. Secretary, Cdr M. B. Casement, OBE, RN: Dene Cottage, West Harting, Petersfield, Hants GU31 5PA.

Tel/Fax: 01730-825280 for late bookings and cancellations.

Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

Vol. 117 No. 4 Published 12 December 1997

The eight hundred and sixty-ninth meeting of the Club was held on Tuesday 17 June 1997, at 6.30 p.m. 21 Members and 9 guests attended.

Members present were: The Rev. T. W. GLADWIN (*Chairman*), R. W. WOODS (*Speaker*), Miss H. BAKER, Captain Sir Thomas BARLOW Bt. RN, J. W. BARRINGTON, Captain M. K. BARRITT RN, P. J. BELMAN, D. R. CALDER, Cdr M. B. CASEMENT RN, R. B. CHILDRESS, S. J. FARNSWORTH, D. J. FISHER, D. GRIFFIN, J. A. JOBLING, Dr J. B. KERSLEY, D. J. MONTIER, Mrs A. M. MOORE, R. G. MORGAN, Dr W. G. PORTEOUS, N. H. F. STONE and Mrs F. E. WARR.

Guests attending were: Mr M. ADAMS, Mrs A. BROWN, Mrs C. R. CASEMENT, Mrs S. CHILDRESS, Mrs J. M. GLADWIN, Mrs S. GRIFFIN, Mrs S. KERSLEY, Mrs M. MONTIER and Mr J. WARR.

After dinner, Mr Robin Woods spoke on the *Atlas of Breeding Birds of the Falkland Islands*, illustrating his talk with slides of birds, habitats and data from the Atlas. Together with his wife Anne, who jointly edited the book, he lived in Stanley for six years to 1963, while he worked for the British Antarctic Meteorological Service. His first book on Falkland birds was published in 1975. The Falklands consist of two main islands, and about 780 smaller islands. They cover 4,700 sq. miles, extend 150 miles, east to west, but the population is only about 2,200 of whom two-thirds live in the only town of Stanley. A further 2,000 military personnel are based at Mount Pleasant Airport.

There are no native trees but *Cupressus macrocarpa* and shrubs have been planted in Stanley and at most of the 80 or more remote farm settlements, providing good shlter for gardens and birds. The native Tussac grass *Parodiochloa flabellata* formerly grew up to 3 m (10 feet) tall in dense coastal fringes and was mistaken for palm trees by early visitors. Uncontrolled grazing by cattle and sheep has destroyed over 80% in total, and almost all Tussac on East and West Falkland. It survives as a single plant community on ungrazed offshore islands where it supports about 30 bird species. A century ago, some farmers saw its value as fodder or shelter and replanted coastal paddocks. Bird density inland, away from ponds or streams, is very low. Most of the country is open moorland with rock outcrops. Roads of crushed stone have been constructed recently and the Government Air Service provides transport to about 30 inhabited settlements with airstrips, but travel to the outer islands is difficult. Kidney Island, which has thousands of colonial seabirds, and was declared as the first Falkland Island Government Nature Reserve in 1964, can only be reached by sea.

Returning in late 1983 to study passerines in Tussac grass, Robin collected records of breeding birds from residents. Ideas for an Atlas were discussed with members of the Falkland Islands Trust in Stanley, and the Falkland Islands Foundation in UK. Both organisations, which later merged to become Falklands Conservation, supported the project, and record forms reached the Falklands for the 1984/85 season. Robin described the development of the project over ten breeding seasons, with examples of local publicity, data collection and analysis. Records were received from residents, military personnel in the Islands, observers on Naval patrol ships, and tourists. One visiting scientist was funded to cover the more inaccessible parts of the main islands. Observations varied according to the detectability of species, observer skills and topography. Penguins were highly visible while elusive nocturnal petrels were all under-recorded. In the Atlas, survey results and notes on habitat and breeding are compared with historical data. The distribution of most species is related to the main topographical features such as the number of ponds, the amount of coast and the attitude of land within each 10 km grid square.

Some interesting species were discussed. These included the Upland Goose *Chloephaga picta* which occurs in more squares than any other species. The closely related Ruddy-headed Goose *Ch. rubidiceps* is also widespread, but has recently been classified as **Near-threatened** by BirdLife International because the continental population has declined drastically. The endemic Falkland Flightless Steamer Duck

Tachyeres brachydactyla and the Kelp Goose *Ch. hybrida* are both thriving in coastal squares. Three species of gulls show very different levels of abundance.

The Barn Owl *Tyto alba* was proved to breed for the first time during the survey. It nests in dense European Gorse *Ulex europeus* which was introduced about a century ago as cattle fencing. Pellet analysis shows that the introduced feral House Mouse *Mus domesticus* is the main prey animal. In contrast, a very tame endemic race of the Blackish Cinclodes *Cinclodes antarcticus* (the Tussacbird), cannot survive with rats, mice or cats but is numerous on coasts of outer islands. Similarly, the endemic Cobb's Wren *Troglodytes cobbi*, first described at a B.O.C. meeting in 1909, is found only on offshore Tussac islands without mammalian predators, and is now classed as **Vulnerable**. Its susceptibility is probably linked to its habit of feeding and nesting at or below ground level. Records of feral cats *Felis catus*, Common Rats *Rattus norvegicus* and House Mice show the wide distribution of these introduced predators.

The Falklands may hold the majority of the world population of the Black-throated Finch *Melanodera melanodera*. It is present in good numbers, though classed as **Near-threatened** because continental birds are declining, through destruction of habitat. A very unusual, tame and inquisitive bird of prey, the Striated Caracara *Phalcobaenus australis*, also **Near-threatened**, is recovering slightly after more than a century of persecution as a pest of sheep farming. It breeds on offshore islands with albatross and penguin colonies, and has a very restricted distribution in extreme southern South America. The Falklands, with about 600 pairs, hold the majority of its population.

The Atlas discusses the conservation implications of environmental factors, including offshore fishing, probable oil extraction developments and imminent revision of local wildlife protection legislation, for all breeding species. A recent collection of bird bones from peat deposits on West Point Island may give evidence of the occurrence of species now absent, and radiocarbon dating would make an impressive difference to knowledge of the history of Falkland Islands birds.

In thanking Robin for his talk, the Chairman introduced Mrs Anne Brown, Secretary of Falklands Conservation (Robin's guest), who joined in the subsequent lively question and discussion period.

The eight hundred and seventieth meeting of the Club was held on Tuesday 15 July 1997 at 6.15 p.m. 27 Members and 9 guests attended.

Members present were: The Rev. T. W. GLADWIN (*Chairman*), Miss H. BAKER, C. R. BARLOW, J. W. BARRINGTON, D. M. BRADLEY, P. J. BULL, Cdr M. B. CASEMENT RN, Dr R. A. CHEKE, Dr R. A. F. COX, R. B. CHILDRESS, D. J. FISHER, F. M. GAUNTLETT, A GIBBS, D. GRIFFIN, J. A. JOBLING, R. H. KETTLE, M. B. LANCASTER, D. J. MONTIER, Mrs A. M. MOORE, Mrs M. N. MULLER, Dr R. P. PRYS-JONES, N. J. REDMAN, R. E. SCOTT, N. H. F. STONE and C. W. R. STOREY.

Guests attending were: T. APPLETON (*Speaker*), M. BRADLEY, Mrs J. BULL, Mrs S. CHILDRESS, Mrs J. M. GLADWIN, Mrs M. H. GAUNTLETT, P. J. MOORE, C. A. MULLER and Mrs S. STONE.

On completion, Tim Appleton gave an illustrated talk entitled "From Greenfields to Ramsar" about the history and development of Rutland Water.

The eight hundred and seventy-first meeting of the Club was held on Tuesday 16 September 1997 at 6.15 p.m. 25 Members and 13 guests attended.

Members present were: Mrs A. M. MOORE (*Chairman*), G. E. GREEN (*Speaker*), Miss H. BAKER, J. W. BARRINGTON, P. J. BELMAN, I. R. BISHOP, D. R. CALDER, Cdr M. B. CASEMENT RN, F. M. GAUNTLETT, D. GRIFFIN, J. A. JOBLING, R. H. KETTLE, Dr C. F. MANN, D. J. MONTIER, Mrs M. N. MULLER, R. G. MORGAN, P. J. OLIVER, Dr W. G. PORTEOUS, Dr R. P. PRYS-JONES, N. J. REDMAN, P. G. W. SALAMAN, Dr D. W. SNOW, S. A. H. STATHAM, N. H. F. STONE and G. THOMAS.

Guests attending were: Ms G. BONHAM, Mrs J. B. CALDER, D. GANDY, T. EVANS, Mrs M. H. GAUNTLETT, Mr & Mrs D. B. ILES, Mrs M. MONTIER, P. J. MOORE, R. RANFT, Dr B. M. ROGERS, Mrs K. SALAMAN, and Mrs B. K. SNOW.

On completion, Graeme Green gave an illustrated talk entitled "Cotingas and their niche in the neotropical avifauna".

The cotingas as a group reflect the diversity which is typical of the Neotropical avifauna in general. The geological history of the Americas is such that there are many centres of avian endemism, both lowland and montane, and many cotingas are endemic to just one of these areas. This endemicity and resultant dependence on one discrete area makes these cotingas vulnerable to habitat modification. This factor has perhaps reached its nadir in the rampant destruction of the Atlantic forests of Brazil, Argentina and Paraguay, where perhaps only 4% of primary forests remain. Whether this is sufficient habitat for viable populations to survive may be answered sooner rather than later. Also, it is not just these discrete areas of endemism where habitat modification is such a problem; the whole of the eastern slope of the Andes is under threat of complete forest clearance outside protected areas, particularly within the elevational range suitable for agriculture based on cash crops such as sun coffee and marijuana.

Hindering our understanding of the possible consequences to the Neotropical avifauna in general, and cotingas in particular, of this habitat modification is the fundamental lack of baseline data for many Neotropical birds. The ground-breaking efforts of many ornithologists such as Frank Chapman, Alexander Skutch, and others, has developed into a modern field-orientated ornithological movement. This growing cadre of field ornithologists may become crucial in gathering sufficient information on the birds of the Neotropics to help decision-makers to avert further extinctions.

The increasing understanding of the crucial role that vocalisations play in the lives of Neotropical birds has led to vast collections of taped vocalisations being housed in various institutions, where they are accessible to researchers. There are also more commercial tapes appearing on the market, and these can also be extremely useful in increasing researchers' knowledge of the avifauna. Cotingas exhibit a wide repertoire of vocalisations, ranging from the woeful and near-mute to the spectacular. Knowledge of their vocalisations is a useful tool in mapping distributions of these birds, as many are attracted to tape playback, or whistled imitations, of their vocalisations. For example, the Elegant Mourner *Laniisoma elegans* (the erstwhile Shrike-like Cotinga), has a distribution centred on the Atlantic Forests of Brazil from where, it is speculated, it colonised the eastern slope of the Andes of Peru, Ecuador, Colombia and Venezuela (Snow 1982). The vocalisation of the Atlantic Forest taxon of this species, *L. e. elegans* is now widely known (indeed, it is now commercially available), and this has led to more data being gathered about the taxon, which can be extremely difficult to observe, during fieldwork in the region. Consequently, the belief among many ornithologists is that this taxon is both more widespread, and less rare, than formerly considered.

The Atlantic Forests of Brazil harbour several other cotingas with interesting vocalisations. Anyone who has heard the ululating, high-pitched and far-carrying whistle of the Black-and-Gold Cotinga *Tijuca atra* will not forget its ventriloquial quality. Another characteristic (and beautiful) cotinga of the region, the Hooded Berryeater *Carpornis cucullatus* has a vocalisation which has earned it the onomatopoeic name 'coracacho'; indeed it is perhaps the characteristic call of the wetter forests of the Serra do Mar. The rediscovery in the region in 1996 of the feared-extinct Kinglet Calyptura *Calyptura cristat* is a fitting reward for the efforts of the fieldworkers in the region, and epitomises the requirements for solid, and at times monotonous data-gathering in the cause of conservation of these wonderful and spectacular birds.

Erratum:

In the account by Prof. Richard Chandler *Bulletin* 117 (3), p. 158, a sentence was omitted. The following sentence should be inserted before the last sentence in paragraph 2: "The two forms also differ in both orbital ring (narrow and yellow-orange in *fuliginosus*, fleshy, broad and orange-yellow in *ophthalmicus*) and claw colour (orange in *fuliginosus* and black in *ophthalmicus*)."

Subspeciation in Layard's Tit-babbler of the southwestern Afrotropics

by P. A. Clancey

Received 18 May 1996

The tit-babblers *Parisoma subcaeruleum* and *P. layardi* form a small unit of sympatric species endemic to the South African Sub-Region, where they affect the *Acacia* savanna biome. They are thought to be closely related to the Old World warblers of the genus *Sylvia*. While both South African species are broadly sympatric, *P. layardi* is the less common of the pair and is confined to the extreme west and the south of their joint range, which extends from southwestern Angola, the mid-Zambezi drainage and the plateau of Zimbabwe, south to the Cape and western Natal in the Republic of South Africa. The other species currently treated as congeneric are *P. buryi* of southwestern Arabia, and *P. lugens* and *P. boehmi* of the northeast and eastern parts of Africa. *P. buryi* is monotypic, while *P. lugens* and *P. boehmi* are moderately polytypic, as are *subcaeruleum* and *layardi*. While the two southern African forms are sympatric and share the same *Acacia* biome, they are, nevertheless, moderately differentiated ecologically, with *layardi* found in broken, hill country with tracts of rocky terrain.

In the west of its range, *layardi* is present along the western seaboard at sea level, but in the extreme east, in the highlands of Lesotho, it affects high country, breeding to elevations in excess of 2500 m and reaching the alpine summit of the high Drakensberg. From the ecological point of view it is significant that in the west of the range precipitation levels are low, being *c.* 120 mm annually, whereas in the extreme east the birds espouse an environment which experiences a rainfall of *c.* 600–1500 m.

Traylor, in his 1986 appraisal of subspeciation in *P. subcaeruleum* and *P. layardi*, admitted four subspecies for both species. While I have no cause for cavil over the four subspecies admitted in *subcaeruleum*, the recognition of four in *P. layardi* calls for reconsideration, and is critically reassessed hereunder.

With its limited range, *P. layardi* has invited a limited measure of interest on the part of systematists. The first worker to describe a form in *P. layardi*, which was named initially from Clanwilliam in 1862 by Hartlaub, was Vincent (1948) who, on the basis of a limited material of eight specimens from the Lesotho highlands and the small Transvaal Museum series of ten then available, separated the Lesotho birds on the basis of colour and bill-length characters. Later, Winterbottom (1958) separated a race on a comparable range of colour variables, based on five specimens from the coastlands of the western Cape and nineteen from a range of localities to the northeast in the lower Orange R. basin of the Richtersveld. Both descriptions compared a dark blue-grey-backed form with a lighter, more olivaceous-backed form (the nominate), no attempt being apparently made to bring the two dark grey variants together in the comparisons. The geographical variation in the present *Parisoma* is relatively simple, grouping readily into two classes, one dark bluish-grey with white in the wings and over the lores, and the other olivaceous grey, without white in the wings and over the face. Birds in the former group also frequently exhibit a prominent white supra-loral spot. Strangely, neither Vincent nor Winterbottom alluded to the strong development of white over the wings and the face. This was particularly strange in the case of Vincent's highland material from Lesotho which he described as *P. l. barnesi*, these all strongly marked with white in the wings, but in the western Cape where comparable birds are seemingly confined to the dune country, of which Winterbottom had but five specimens, birds of both forms come into very close proximity to one another.

The finding of two widely sundered populations showing closely comparable suites of characters in *P. layardi* follows a comparable trend in a number of Cape endemics, notably *Promerops cafer/ P. gurneyi*, *Chaetops frenatus/Ch. aurantius* and *Pseudochloroptila pseudochloroptila/P. symonsi*. However, unlike the listed endemics, the forms here discussed are not even subspecifically differentiated. In the present case there is no ready ecological interpretation, as western birds occupy scrub along the southwestern Cape coast and eastern birds are typical for the species.

The second variant population, differentiated from the dark bluish birds already dealt with, is more olive-tinged over the dorsal surface and wings, and moreover lacks white over the remiges and usually the face, which surfaces are olive-grey. On the underside they differ little from the blue-grey birds though tending to show more white medio-ventrally. To such elements Winterbottom applied the name *P. l. aridicola*, the type a bird taken at Noisabis in the Richtersveld. A critical examination reveals that birds agreeing taxonomically with *aridicola* extend far to the south of the Richtersveld and the basin of the lower Orange R., where they lie in juxtaposition with dark birds confined to the dunes along the coast to the west. Birds agreeing in such characters were collected at a range of localities extending from Kamiesberg to Calvinia and Citrusdal. Some were identified by Winterbottom in 1958 as *aridicola*, which raises the question of the status of *aridicola* as being other than a junior synonym of *layardi*, proposed on a Clanwilliam specimen. In essence, this would deprive the present *layardi* of a name, which can however be met by seeing the latter as congruent with the eastern highland taxon as part of *P. l. barnesi*.

A further name requires to be considered, *P. l. subsolanum* Clancey, 1963: Aprilskraal siding, near Molteno, northeastern Cape. This is not a particularly sharply defined subspecies, but is seen as a connecting link between the two dark well-characterised southern populations of *P. l. barnesi* in having the breast and sides darker, yet lacking any marked white in the wings and face, and can be gainfully employed for the population of "nominate *layardi*-type" birds present throughout the southern mountains and Karoo of the Cape.

Nominate *P. l. layardi* extends from the central and southern parts of Namibia south to the northwest of the Cape in the basin of the lower

Orange R., south to about Port Nolloth on the coast and in the south in the interior of Little Namaqualand to Clanwilliam, Calvinia and Citrusdal, thence northeast to the middle Orange R. Both nominate *layardi* and *subsolanum* are separable in the entire lack of white in the wings and face, such parts being olivaceous grey (about the Deep Mouse Gray of Ridgway).

Three subspecies can be admitted in the present species: *P. l. barnesi*, *P. l. layardi* and *P. l. subsolanum*, the first-named in two widely sundered populations. They are based entirely on plumage characters, no significant differences having been detected in their linear measurements.

Parisoma layardi barnesi Vincent 1948, *Bull. Brit. Orn. Cl.* 68, p. 145: Lekhalabaletsi R. valley above confluence of the Jareteng and Lekhalabaletsi Rivers, Lesotho at 29°17′S, 29°24′E, 8900 ft.

Upper-parts and wings dark bluish leaden grey (about Dark Neutral Gray of Ridgway), and occasionally with a well-defined narrow white superciliary stripe over the lore. Below, white with narrow blackish streaking over the fore-throat and with the breast and sides moderately washed with light neutral grey. The wings with the outer vanes of the remiges broadly edged with white, this carried to the tertials, forming a well-defined white wing-stripe.

Range. Occurs in two widely sundered populations, the eastern one confined to the highlands of Lesotho and adjacent northeastern parts of Cape Province (Drakensberg Range and the interior ranges of the Maluti Mts). A second undifferentiated population is present along the western Cape where it occurs in maritime vegetation from the Port Nolloth district in the north, south narrowly to the southwestern Cape. Localities:- *W. Cape*: Port Nolloth, Wallekraal, Twee Dam (Springbok), Karoopoort (Koue Bokkeveld), Kliprand 27 m N. of Garies, Bitterfontein, Lootsberg Pass, Ysterfontein, Melkbos, Muizenberg. *E. Cape*: Naude's Nek Pass, Strandfontein. *Lesotho*: Marakabeis, mountains E. of Maseru.

Remarks. The type-specimens of *P. layardi* (Clanwilliam) and *P. l. aridicola* were made available for comparison by the South African Museum, Cape Town. The *layardi* type had been mounted and its coloration is now wholly unreliable.

Parisoma layardi layardi Hartlaub 1862, *Ibis* (1)4, p. 147: Zwartland, Malmesbury district; corrected to Clanwilliam, western Cape, by Winterbottom 1957, *Ostrich* 28, p. 235.

Parisoma layardi aridicola Winterbottom 1958, *Bull. Brit. Orn. Cl.* 78, p. 148: Noisabis, Richtersveld, northwestern Cape.

Upper-parts and wings distinctly lighter, less dark bluish-grey, than in *P. l. barnesi*, being about Deep Mouse Gray of Ridgway, and without white over the wings and face, the outer vanes of the flight-feathers greyish olive-buff.

Compared to *subsolanum* differs in the starkly whiter ground to the fore-throat, and the greater extent of the mid-ventral white. Upper-parts lighter olivaceous-grey.

Range. The highlands of Damaraland, Namibia, south in the west of Namibia, inland of the Namib Desert, to the Richtersveld and basin of the lower Orange to the coast at Port Nolloth. In the interior and east of Little Namaqualand, south to Clanwilliam and the Citrusdal areas, and east to Upington, Carnarvon and Victoria West. Localities:- *Namibia*: Great Karas Mtns. *Cape*: Goodhouse, Namees, Noisabis, Pofadder, Upington, Port Nolloth, Carnarvon, Kamiesberg, Garies, Vanrhynsdorp, Lokenburg (Calvinia), Clanwilliam, Citrusdal, and localities immediately to the east of southern N. Cape.

Remarks. One or two specimens from near Garies and Vanrhynsdorp in Little Namaqualand show a small amount of white in the remiges, revealing a measure of intergradation towards *P. l. barnesi*, although retaining the diagnostic lighter mouse-grey to the upper-parts and wings.

Parisoma layardi subsolanum Clancey 1963, *Durban Mus. Novit.* 6, p. 253: Aprilskraal siding, Molteno, northeastern Cape.

Compared with *P. layardi* differs in being less starkly white over the ground of the fore-throat, and with the breast darker, more buff, less whitish, and with the sides of the body and the flanks much darker grey, with less white medio-ventrally. Upper-parts and wings slightly darker, especially over the pileum, but not as dark and blue as in *P. l. barnesi*.

Range. The highlands of the southwestern Cape, extending east through the southern mountain ranges and adjacent regions of the Karoo to the eastern and northern Cape and the Orange Free State. Localities:- Hanover, Williston, Laingsburg, Oudtshoorn, Campherspoort (East London), Huisrivierpas, Danebury, Graaff-Reinet, Rossouw, Murraysburg, Jamestown, Teebus, Lelykpoortjie, Molteno, Sterkstroom, Griquatown and Aliwal North.

Remarks. This subspecies lies close to the nominate one in lacking a starkly white wing-stripe and loral mark, but its darker ventral parts in a sense link the two dark forms of *P. l. barnesi* lying to the east and west of it.

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Range extensions of cloud forest birds from the high Andes of Ecuador: new sites for rare or little-recorded species

by Niels Krabbe, Bent Otto Poulsen, Amy Frølander & Orfa Rodriguez Barahona

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A comparative survey was made of the avifauna at ten sites with humid forest in the temperate zone of Ecuador (Fig. 1) in January and February 1995 and 1996. The major comparison of diversities will be published elsewhere, but we here give the records that represent altitudinal or southward range extensions, and, for rare or little-recorded species, we also list the sites where we found them. Most records are from within the study sites, which all ranged from 3000 to 3350 m in altitude, but some are from above or just below the sites, and for some records, additional observations have been included.

Abbreviations of localities are (province and locality coordinates in parenthesis): East slope (north to south): Oyacachi=below Oyacachi (Napo: 00°13′S, 78°02′W); Anatenorio=Río Anatenorio (Napo: 00°59′S, 78°17′W); Matanga=Páramos de Matanga (Morona-Santiago: 03°16′S, 78°54′W); Toledo=Cerro Toledo (Zamora-Chinchipe: 04°23′S, 79°06′W); Lagunillas=Cordillera Las Lagunillas (Zamora-Chinchipe: 04°46′S, 79°25′W). West slope (north to south): Intag=Intag (Imbabura: 00°20′N, 78°25′W); Corazón=Volcán Corazón (Pichincha: 00°33′S, 78°43′W); Salinas=10 km northwest of Salinas (Bolívar: 01°21′S, 79°05′W); Chaucha=above Chaucha (Azuay: 02°52′S, 79°23′W); Mazan=Río Mazan (Azuay: 02°52′S, 79°07′W).

Río Mazan is here considered west slope (it lacks 22 species restricted to the east slope), but its avifauna includes some eastern and southwestern (as well as endemic) elements.

Other abbreviations used in the text: ANSP (Academy of Natural Sciences of Philadelphia), MECN (Museo Ecuatoriano de Ciencias Naturales, Quito), ZMUC (Zoological Museum, University of Copenhagen), NK (Niels Krabbe) and BOP (Bent Otto Poulsen).

Altitudinal records

HIGHLAND TINAMOU *Nothocercus bonapartei*

One was observed at close range for several minutes on two occasions at 3075 m at Oyacachi. Previously only known up to *c.* 2200 m in Ecuador and Colombia (Robbins *et al.* 1987, Hilty & Brown 1986), but recorded to 2500 m in Venezuela (Meyer de Schauensee & Phelps 1978).

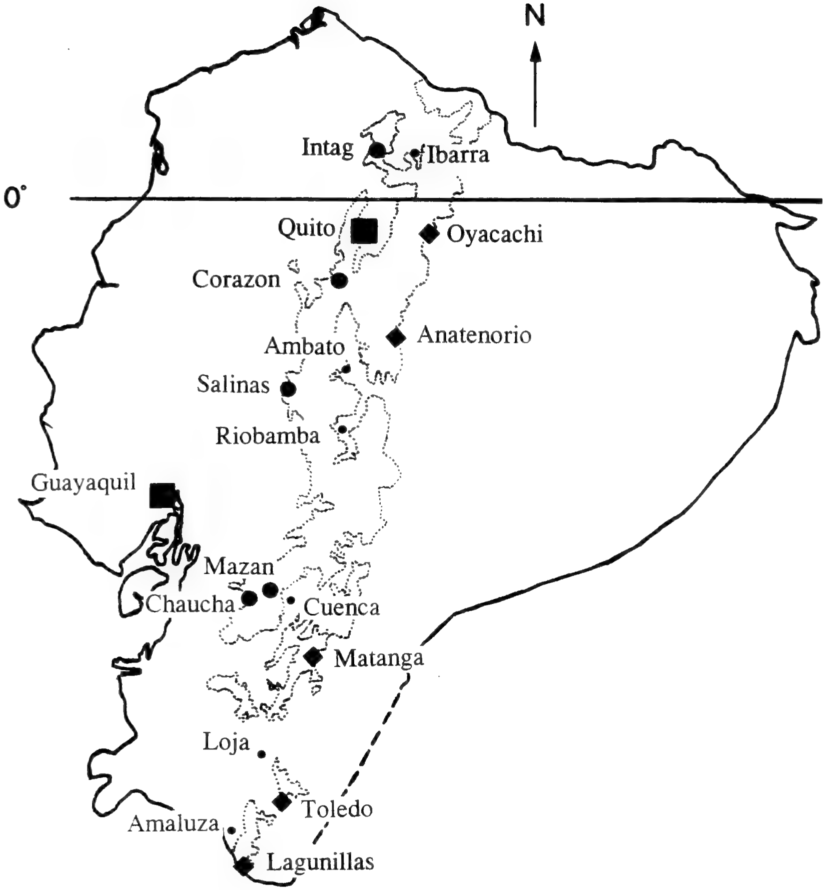

Figure 1. Map of Ecuador showing the five eastern slope (rhombuses) and the five western slope sites (large circles) investigated in this study. The two largest cities (squares) and some principal Andean cities (small circles) are also shown. The 3000 m contour is stippled.

ROADSIDE HAWK *Buteo magnirostris*

A pair was seen at Oyacachi and a pair at Anatenorio, both at 3000 m. Previously known up to *c.* 2500 m (own obs.).

AMETHYST-THROATED SUNANGEL *Heliangelus amethysticollis*

A single male was seen at 3025 m at Lagunillas. Previously known up to 2400 m in Ecuador (also at Lagunillas) (M. B. Robbins pers. comm.), but recorded up to 2600 m in immediately adjacent Peru (Parker *et al.* 1985), to 3000 m in Colombia and Venezuela (Hilty & Brown 1986, Meyer de Schauensee & Phelps 1978), and sighted by NK to 3200 m in Cuzco, Peru (Fjeldså & Krabbe 1990). Its lower altitudinal limits throughout lie at 1800–2000 m.

EMERALD TOUCANET *Aulacorhynchus prasinus*

To 3250 m below Oyacachi, whence come three old specimens without exact altitudes given (Chapman 1926). Previously only definitely known up to 2750 m in Ecuador (Krabbe 1991), to 2200 m in Peru (Parker *et al.* 1985, Fjeldså & Krabbe 1990) but recorded to 3000 m (once to 3700 m) in Colombia (Hilty & Brown 1986).

BARRED ANTTHRUSH *Chamaeza mollissima*

A pair was observed at 3075 m at Oyacachi. Previously not known above 2300 m in Ecuador (own obs.), but in Colombia known to 3100 m (Hilty & Brown 1986).

BARRED BECARD *Pachyramphus versicolor*

Recorded to 3000 m at Oyacachi and to 3050 m on Toledo. The only previous record from above 2850 m in Ecuador is of a bird mist-netted and photographed (BOP, T. Læssøe) at 3500 m on Volcán Pichincha (Fjeldså & Krabbe 1990). In Colombia not reported above 2600 m (Hilty & Brown 1986), but known up to 2950 m in northern Peru (Parker *et al.* 1985).

SLATY-BACKED CHAT-TYRANT *Ochthoeca cinnamomeiventris*

At Lagunillas singing birds were observed to 3320 m. Previously known up to 3000 m (Fjeldså & Krabbe 1990). Occasionally strays higher: in Cordillera de Los Llanganates, southern Napo Province, one bird appeared at 3600 m in early May 1992, sang intensely for a few hours, and then flew down slope, not to be seen or heard there again over the next days (NK).

GREATER PEWEE *Contopus fumigatus*

To 3000 m at Oyacachi. Previously only known up to *c.* 2500 m in Ecuador (Krabbe 1991), but locally to 3000 m in Colombia (Hilty & Brown 1986).

BLACK-COLLARED JAY *Cyanolyca armillata*

Found to 3150 m at Oyacachi, whence originates a specimen taken in 1950 (ANSP) without an exact altitude. Otherwise only known in Ecuador from two specimens taken at Río Pun in northeastern Carchi or adjacent Sucumbíos Province (Salvadori & Festa 1899) without altitudes given, but probably between 2200 and 2600 m, and a specimen taken by J. C. Matheus at 2320 m at La Alegría below Pun (MECN) and sightings down to 2050 m below La Alegría (NK). The two species (*C. armillata* and Turquoise Jay *C. turcosa*) may thus replace each other altitudinally in the Río Pun valley, where the east slope forest meets the interandean forest. On the interandean slope not far south of the Río Pun valley *C. turcosa* occurs up to 3350 m (Robbins *et al.* 1987). At Oyacachi, however, we found *C. armillata* up to 3150 m, and no *C. turcosa*, so they apparently exclude each other locally. In the next valley to the south of Oyacachi (Papallacta), *C. turcosa* occurs on the entire slope, at least down to below 2500 m (own obs.). Hilty & Brown (1986) reported *C. turcosa* from both slopes of Nariño, Colombia at 2600–3000 m, but did not provide any details of altitudinal distribution in eastern Nariño, where the two species overlap. Vocally, they differ distinctly (own obs.).

GLOSSY-BLACK THRUSH *Turdus serranus*

Mostly known from below 2800 m. Singing up to 3150 m at Intag and Anatenorio, and to 3350 m at Oyacachi. In mid-March 1996 several singing birds were tape-recorded as high as 3750 m at Loma Yanayacu on Volcán Pichincha (NK), where, despite many visits by birdwatchers, they had not been recorded before.

RUFOUS-BROWED PEPPERSHRIKE *Cyclarhis gujanensis*

One singing bird of the southeastern subspecies *contrerasi* was observed and tape-recorded at 3100 m on Páramos de Matanga. This form had previously not been found above 1900 m in Ecuador (own obs.).

BROWN-CAPPED VIREO *Vireo leucophrys*

Two birds, clearly a pair, were observed and their song and calls tape-recorded at 3150 m at Oyacachi. Previously not known above 2650 m in Ecuador (Krabbe 1991). In Colombia recorded up to 2800 m (Hilty & Brown 1986).

GRASS-GREEN TANAGER *Chlorornis riefferii*

Observed up to 3175 m at Intag and to 3500 m on Corazón. Previously known up to 2900 m in Ecuador (Krabbe 1991). In Colombia rarely recorded to 3300 m (Hilty & Brown 1986).

CHESTNUT-CAPPED BRUSH-FINCH *Buarremon brunneinucha*

Seen up to 3150 m on Toledo. The only previous record above 2750 m in Ecuador is of a bird that died in a mist-net at 3150 m at Acanamá, northern Loja Province (R. Williams, J. Tobias; skeleton in Salango Museum, NK preparation). No *Buarremon torquatus* was recorded at Toledo (see Remsen & Graves 1995).

Southward range extensions

RUFOUS-BANDED OWL *Ciccaba albitarsus*

Found at all five sites on the west slope, where it had previously not been found south of Pichincha (Chapman 1926).

RUFOUS-BELLIED NIGHTHAWK *Lurocalis rufiventris*

Found at Chaucha. Previously known only south to western Chimborazo on the west slope (Berlepsch & Taczanowski 1884). There is an unpublished record (by NK) from near Molleturo just north of Chaucha.

BUFF-WINGED STARFRONTLET *Coeligena lutetiae*

Found at Salinas. Only previous record from south of Pichincha on the Pacific slope is from western Cotopaxi (Krabbe 1991).

ANDEAN TIT-SPINETAIL *Leptasthenura andicola*

Found at 3250–3300 m at Lagunillas. It had been overlooked at this locality during earlier surveys (ANSP team pers. comm., own obs.), and undoubtedly also at Cerro Chinguela in immediately adjacent Peru (Parker *et al.* 1985). In Ecuador the species had previously been recorded south to Cajas in Azuay (Gretton in Robinson 1987, own obs.) (subspecies *andicola*), some 200 km north of Lagunillas. The northernmost Peruvian record (subspecies *peruviana*) is from Cordillera Blanca, Ancash, some 400 km south of Lagunillas (Fjeldså & Krabbe 1990). The Lagunillas birds may thus represent an undescribed subspecies.

BARRED FRUITEATER *Pipreola arcuata*

Recorded at Salinas. The southernmost previous record on the west slope is from Pichincha (Chapman 1926).

SLATY-BACKED CHAT-TYRANT *Ochthoeca cinnamomeiventris*

In Cordillera de Chilla, northwesternmost Loja Province, we observed this species between Selva Alegre and Manu. We also found it to 3050 m at Río Mazan. On the west slope previously not reported from south of Chimborazo (Chapman 1926). It has undoubtedly been overlooked on the Pacific slope in Azuay.

BLACK-CAPPED TYRANNULET *Phyllomyias nigrocapillus*

Found at Salinas and Chaucha. Previously not recorded south of Pichincha on the west slope (Chapman 1926).

RUFOUS WREN *Cinnycerthia unirufa*

Recorded at Salinas. On the west slope, previously known south to western Cotopaxi (Krabbe 1991).

BLACK-BACKED BUSH-TANAGER *Urothraupis stoltzmanni*

A flock of ten was observed in treeline scrub down to 3300 m at Matanga. Previously unrecorded south of Zapote-Najda mts. (Fjeldså & Krabbe 1986). Like Crescent-faced Antpitta *Grallaricula lineifrons* (see below), it undoubtedly ranges along the entire eastern Andes of Ecuador south to Río Zamora.

New localities for rare or little-recorded species

IMPERIAL SNIPE *Gallinago imperialis*

Roding at all five eastern, and the two northernmost western sites. At five localities it had not been recorded earlier. In Ecuador the species appears to be continuously distributed along the entire east slope and, though as yet unrecorded in western Carchi, along the west slope south to Volcán Iliniza. The twelve Ecuadorian localities known are:

1. Intag, Imbabura, 00°20′N, 78°25′W, 3330–3350 m: present study (5–11 January 1995).
2. Volcán Pichincha, Pichincha, 00°08′S, 78°35′W, 3600–3800 m: Krabbe (1991, 1992). Roding only in the rainy season (October to May). NK collected a male specimen here on 8 March 1992 (MECN 6015). Although roding, it had only medium-enlarged testes. It had worn wings and tail, and was in heavy body moult. Measurements in mm: wing chord 155, wing flat 160, tail 55, bill from feathers 76, tarsus 35. Body mass 196 g. Only three other specimens exist, two of them without data (Terborgh & Weske 1972).
3. Volcán Corazón, Pichincha, 00°33′S, 78°43′W, 3150–3750 m: present study (17–24 January 1995).
4. Cerro Mongus, Carchi, 00°27′N, 77°52′W, 3200–3500 m: L. Petersson tape-recordings 5–6 July 1995 (Petersson 1996).
5. Below Oyacachi, Napo, 00°13′S, 78°02′W, 3350 m: present study (10–14 January 1996).
6. Río Anatenorio, Napo, 00°59′S, 78°17′W, 3300–3350 m: present study (18–22 January 1996).
7. Cordillera de los Llanganates, Napo, 01°06′S, 78°18′W, 3500 m: NK tape-recordings (26–28 May 1992).
8. Páramos de Matanga, Morona-Santiago, 03°16′S, 78°54′W, 3100–3300 m: NK tape-recordings (14–15 November 1992); present study (6–10 February 1996).
9. Acanamá, Loja, 03°40′S, 79°14′W, 3200 m: NK tape-recording (6 November 1992).
10. Cajanuma, Loja, 04°06′S, 79°09′W, 2800–3000 m: Pearman (1994) (7–10 December 1990); tape-recordings by R. Williams (January–February 1991); individual seen foraging and photographed by Poulsen (1993) (March 1992); chick found by M. Lysinger (February 1993).
11. Cerro Toledo, Zamora-Chinchipe, 04°23′S, 79°06′W, 3030–3350 m: present study (20–24 February 1996).
12. Cordillera Las Lagunillas, Zamora-Chinchipe, 04°46′S, 79°25′W, 3050–3150 m: NK tape-recordings (12–13 November 1992); present study (12–18 February 1996).

RED-FACED PARROT *Hapalopsittaca pyrrhops*

Two pairs with one and two young were observed at Páramos de Matanga. There are few known sites for this endangered parrot (Collar *et al.* 1992).

WHITE-THROATED SCREECH-OWL *Otus albogularis*

Recorded at all sites except Mazan and Lagunillas.

RUFOUS-BANDED OWL *Ciccaba albitarsus*

Recorded at all sites except Toledo.

RUFOUS-BELLIED NIGHTHAWK *Lurocalis rufiventris*

Recorded at all sites except Toledo and Salinas. Only doubtfully recorded at Mazan.

NEBLINA METALTAIL *Metallura odomae*

Netted at Toledo (3080–3350 m) and Lagunillas (3050–3350 m). Previous Ecuadorian records are summarized by Collar *et al.* (1992). There are as yet no specimens to document the reported sympatry of *M. williami* with *M. baroni* and *M. odomae* (Collar *et al.* 1992).

MOUNTAIN AVOCETBILL *Opisthoprora euryptera*

Found to be fairly common at Oyacachi and Anatenorio, uncommon at Toledo. Previously considered rare to uncommon throughout eastern Ecuador (Ridgely 1980, own obs., R. S. Ridgely pers. comm.). Rather inconspicuous and difficult to record except by its distinctive call or by mist-netting or observing near flowers of the genus *Centropogon* (Campanulaceae). *Contra* Fjeldså & Krabbe (1990), the species appeared to exploit no other source of nectar. On several occasions it was observed to feed on nectar from these flowers by piercing them near the base of the corolla. Its pointed, upturned bill shape may be an adaptation to this previously undescribed behaviour.

Ornelas (1994) has suggested that bill serrations are an adaptation for nectar robbing (facilitating 'illegal' access through corollas to protected nectaries). However, the ZMUC specimen of *Opisthoprora euryptera* does not have serrate tomia despite being a specialised nectar robber perforating the base of long-tubed corollas, and the species is not listed in Ornelas (1994) as a hummingbird with serrations on the tomia. Thus, serrations and pointed/upturned bills are distinct tools which may have either different functions (manipulation of insects and penetration of corollas, respectively) or a common function (corolla piercing). As stated by Ornelas (1994) more evidence is needed from ontogenetic, phylogenetic and behavioural studies to support one or the other of these views.

CRESCENT-FACED ANTPITTA *Grallaricula lineifrons*

A single bird was called in with tape-recordings of song on three occasions at 3320 m at Oyacachi, the type locality. It did not vocalise. At Matanga, where it had not been recorded before, we tape-recorded songs of it and of the generally lower-elevational *Grallaricula nana* in two adjacent valleys, both at 3085–3150 m, only one species in each valley. *G. lineifrons* was also tape-recorded higher, at 3250 m at Matanga. No altitude was given for the type specimen (Chapman 1926; *contra* Fjeldså & Krabbe 1990). All known records of *G. lineifrons* lie between 3000 and 3400 m altitude, in the southern Central Andes of Colombia and in the eastern Andes of Ecuador south to Río Zamora (Robbins *et al.* 1994).

PALE-FOOTED SWALLOW *Notiochelidon flavipes*

Found at Anatenorio, Toledo, and Lagunillas. These records fill out important distributional gaps in Ecuador of this overlooked cloud-forest swallow, which is probably more or less continuously distributed from Santa Cruz Department in Bolivia, through Peru, Ecuador and Colombia to Trujillo Province in Venezuela (Parker *et al.* 1985, Davis *et al.* 1994, Ryan & Lentino 1995).

GREATER SCYTHEBILL *Campylorhamphus pucherani*

We observed one of this rare and local species once, at Toledo in heavily moss-covered *Weinmannia* (Cunoniaceae) forest at 3050 m.

MASKED MOUNTAIN-TANAGER *Buthraupis wetmorei*

Found in treeline scrub at Matanga (3250 m), Toledo (3150–3350 m), and Lagunillas (3300 m). Probably also occurs at Oyacachi and Anatenorio, above 3350 m. In 1985, the species was only known in Ecuador from one locality (Parker *et al.* 1985). Recently, it has been found in Ecuador at Cerro Mongus, Carchi Province (Robbins *et al.* 1994), Los Llanganates, Napo Province (by NK) and at Cajanuma, Loja Province (Bloch *et al.* 1991). It may thus be distributed throughout in Ecuador on the eastern slope in suitable treeline habitat.

WHITE-CAPPED TANAGER *Sericossypha albocristata*

Found at Oyacachi. There are few records from northern Ecuador. Also recorded at Matanga and Toledo.

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Observations on the breeding, diet and behaviour of the Red-faced Parrot *Hapalopsittaca pyrrhops* in southern Ecuador

by E. P. Toyne & J. N. M. Flanagan

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The Red-faced Parrot *Hapalopsittaca pyrrhops* is endemic to southern Ecuador and immediately adjacent Peru where it is confined to the temperate Andean forests between 2300 and 3500 m (Collar *et al.* 1992). It is regarded as "critically endangered" (Lambert *et al.* 1993) and listed with other birds "for which their situation was serious and action is urgent" (Collar *et al.* 1992). Red-faced Parrot was previously dealt with as a subspecies of the Rusty-faced Parrot *Hapalopsittaca amazonina* but strong evidence to treat it as a full species has now been provided (Graves & Uribe Restrepo 1989). Prior to this study virtually nothing was known about the biology of this parrot or other members of the genus (Forshaw 1989, King 1989, Fjeldså & Krabbe 1990, Rasmussen *et al.* 1996). Here we present data on nesting chronology, diet and behaviour; information on nesting and vocalizations is presented elsewhere (Toyne *et al.* 1995, Toyne & Flanagan 1996).

Study area and methods

The forests of Loja Province were surveyed as part of the series of Imperial College "Parrots in Peril" expeditions which documented the status, distribution and biology of parrots in southern Ecuador (Toyne 1996). Suitable habitat for Red-faced Parrots was surveyed in Loja Province in two areas: around Saraguro (3°37′S, 79°14′W) and in Podocarpus National Park (PNP) (4°06′S, 79°09′W). Fieldwork was conducted in March–May 1992 and October 1994–February 1995. In addition, J.N.M.F. visited the Saraguro area intermittently between March 1995 and December 1996. For details of localities and habitat descriptions see Toyne *et al.* (1995) and Rasmussen *et al.* (1996).

Data on breeding biology were collected at a nest-site near Saraguro (Toyne & Flanagan 1996), which was visited between 10 November 1994 and 8 February 1995, and from general observations throughout the study. Behavioural data were collected at the nest-site during different stages of breeding. The nest was monitored during the incubation period over seven days between 10 November and 1 December 1994 for approximately 49 hours. On three days (11–12 and 30 November) the nest was watched from dawn to dusk. During the nestling period the nest-site was visited on six days and observational data were collected on four days (30 December 1994, 3–4 and 14 January 1995). On these days a total of approximately 41 hours was spent watching the nest. Nestlings were measured using standard techniques (Spencer 1984). Elsewhere, when parrots were located, basic ecological data such as flock size and food sources were collected (see Toyne *et al.* 1992 for methods). Specimens of the food plants were collected under licence and deposited at the National Herbarium of the Museo Ecuatoriano de Ciencias Naturales, Quito; the herbarium of Universidad Nacional de Loja, Loja; the Royal Botanical Gardens, Kew; and Missouri Botanical Gardens, U.S.A.

Results

Flock size

Red-faced Parrots were encountered in pairs throughout the study period and also in flocks of up to 19 individuals. In April and May flocks were large (up to 18 individuals) and it was presumed that they contained family groups as they comprised adults and newly fledged young. In November and December flocks were mostly between four and ten. A flock of 19 individuals in November 1994, at Selva Alegre near Saraguro, was the largest recorded, but the age class composition of this flock was not known. Flocks were usually observed flying above the tree canopy (30 m from the ground), or low (1–2 m) on short flights (less than 200 m) over open ground between wooded habitats. We rarely saw them flying very high (≥60 m from the ground) as some other parrots do. Occasionally they perched on isolated trees in open land.

During the survey their numbers appeared to be stable with similar sized flocks encountered in the same areas in 1992 and 1994–96.

Timing of breeding season

The Red-faced Parrot's breeding season in Loja Province appeared to be between October and January. These dates were based on monitoring one successful nest (Toyne & Flanagan 1996), observations of nest-prospecting pairs in the same area during November and December, and sightings of juveniles (identified by plumage differences) during January, April and May in three different forests.

The October–April period, which includes the dry season, is probably the breeding season for many bird species in this area, as suggested by the following records: Red-backed Hawk *Buteo polyosoma*—with young; Speckle-faced Parrot *Pionus tumultuosus*—nesting; Streaked Tuftedcheek *Pseudocolaptes boissonneautii*—nesting; Cinnamon Flycatcher *Pyrrhomyias cinnamomea*—nesting; Turquoise Jay *Cyanolyca turcosa*—nest-building; Great Thrush *Turdus fuscater*—pair copulating; Rufous-collared Sparrow *Zonotrichia capensis*—courtship feeding; Mountain Cacique *Cacicus leucorhamphus*—nesting.

Red-faced Parrots nested in habitat they used between October and June (no surveys have been conducted between July and September), suggesting that they were sedentary. Evidence from successful breeding in a cavity of a lauracous tree (Toyne & Flanagan 1996) and from three pairs prospecting cavities in four trees *c.* 500 m from this nest indicated that they are cavity nesters like the vast majority of parrot species. Three of the four cavities were natural holes in *Styrax* sp. (Styracaceae), *Symplocos* sp. (Symplocaceae) and an unidentified tree. The fourth hole looked like a previously used nest-hole in an unidentified tree. On two occasions flocks of six parrots were observed visiting these holes in November and December. These flocks split into pairs, each of which visited different cavities. On one occasion two individuals from different pairs fought to enter a hole. Despite several checks none of the four cavities was used between November and January. One bird, which visited a Streaked Tuftedcheek's cavity nest in a tree, was presumed to be nest-prospecting.

The approximate nesting chronology of Red-faced Parrots could be estimated from observations at the successful nest. On 10 November, when the nest was discovered, the hen spent several hours in the nest but also left the nest for longer periods than we observed later, when she certainly was incubating. We suspect the hen was either laying or had just started incubation. On 21 November 1994 the nest tree was climbed and the nest (17.5 m above the ground) was inspected, and contained two creamy matt white, ovoid eggs. When the nest was next inspected on 10 December 1994, it contained two featherless nestlings, covered in grey down and with closed eyes. They were estimated to be 2–4 days old ± 1 day. On 3 January 1995 the nestlings were re-examined; on this date one was noticeably larger than its sibling (see Toyne & Flanagan 1996) and both were aged at 27 ± 2 days. This age was later validated by aviculturists independently from photographs (T. Arndt *in litt.* 1995). On 14 January 1995 both nestlings (*c.* 38 days old) were seen at the nest entrance. They still had down on their wings and backs, and their heads (crown, forehead and chin/throat) were strongly marked red. In this they differed from adults, which have a green throat and crown with red forehead and lores. By 25 January 1995 both young had fledged and were seen around the nest. Juveniles, some of which were fed by adults, were recorded in PNP and at two woods near Saraguro in April 1992. Juveniles were also observed in the same wood as the nest between 9 and 11 May 1989 (Rasmussen *et al.* 1996) and in January 1994. These data give an idea of the nesting chronology: pre-laying period, October; egg-laying and incubation period (*c.* 26–29 days), November–December; nestling period (*c.* 49–52 days), December–January; post-fledging period, January–May.

During October–December 1995 and November–December 1996 the nest was not re-used, although Red-faced Parrots were seen around the nest tree.

Behaviour of adults during incubation and nestling period

As both adults were of similar plumage it was not possible to tell for certain if the pair shared incubation and care of nestlings. However, the behaviour of the non-incubating bird, presumed to be male, was similar throughout the incubation and nestling period. So we assumed the female incubated and brooded the young, as is usual for most parrots (Forshaw 1989).

The average time a bird spent incubating during daylight hours, i.e. between returning to the nest and leaving it, was 192 minutes (n=7, range 115–290, s.d. 59.2). At feeding time one parrot approached the nest-site, calling. The incubating bird would then climb to the entrance of the nest and after 1 or 2 minutes they would fly off silently together. They flew 20 m to a mature lauraceous tree where the non-incubating bird would feed its partner with regurgitated food. The parrots would leave the nest unattended for an average of 9 minutes ($n=11$, range 1–21, s.d. 7.8). The incubating bird was fed three times a day, generally between 07.00–08.30, 12.00–13.00 and 15.00–17.00 hours. The incubating bird was nearly always called off the nest by its mate and flew to a neighbouring tree to be fed by it; only once was it fed at the nest entrance.

The nestlings when *c.* 23+days old were not brooded but left unattended throughout most of the day until one adult returned to the nest, presumably to feed them. The average time between feeds was 113 minutes ($n=13$, range 14–250, s.d. 90.2). Adults fed the nestlings with regurgitated food on average five times a day. The adults spent little time at the nest (5.8 minutes, $n=12$, range 2–11, s.d. 2.9). The nestlings were brooded at night by an adult who entered the nest around 18.25 h.

On 14 January 1995 the young were at least 38 days old and, during that day, they were fed on four occasions at the nest entrance. During feeds each nestling was fed twice with regurgitated food. The nestlings were brooded that night.

The parrots did not appear to defend their nest against intruders; at any rate they showed no alarm when Mountain Caciques or Turquoise Jays landed on the nest tree and perched near or on the nest entrance. On 14 January 1995 a Strong-billed Woodcreeper (*Xiphocolaptes promeropirhynchus*) on two separate occasions landed at the nest entrance and looked into the nest but did not enter; both adult parrots were absent from the nest. Once a pair of Red-faced Parrots visited the nest tree and one of them entered the nest whilst the nest was occupied by a brooding bird and the two nestlings. The intruder left, presumably because it found the nest occupied.

Roosting habitat and roosting behaviour

On the evenings of 12 and 14 April 1992 Red-faced Parrots roosted in the 1994 nest tree. Although this tree was in fruit, no parrots were seen to feed from it. Roosting numbers increased each day; 4 on day one, 7 on day two and 18 on day three (observations then had to cease). In the morning (06.00–07.00 h) they left the roost and settled in adjacent trees before finally dispersing in small groups of two to six in all directions. The parrots arrived at the tree in small flocks (3–7) between 17.30 and 18.50 h. Before landing in the roost tree they would fly around the perimeter of the field, landing in the adjacent trees and calling loudly. While doing so, they would be joined by late-comers. On 14 April, when 18 birds came to roost, some flew into a nearby tree before entering the roost tree, whilst others flew directly into the top quarter of the roost tree. On all evenings, when the parrots were settling down to roost one parrot would perch on the crown of the tree in a look-out position and generally wait for 10 minutes before disappearing to roost with the rest of the flock.

Feeding ecology

Red-faced Parrots were recorded feeding on the following plants, all except *Myrcianthes* sp. in the Saraguro area. The only food previously recorded is *Phytolacca* berries (Fjeldså & Krabbe 1990).

Vriesea sp. (Bromeliaceae). The white stamens within the terminal inflorescence of these epiphytic plants were eaten in February 1995. The flowers were not open and the parrots had to remove the exterior petals with their bills to reach the stamens. In December one *H. pyrrhops* was observed drinking water that had collected in the leaves of an epiphytic bromeliad.

Virburnum leptophyllum (Caprifoliaceae). The berries of this tree were eaten in April 1992.

Weinmannia latifolia and *Weinmannia pinnata* (Cunoniaceae). The shoots, flowers and seeds of these trees were eaten in April 1992. One adult fed *W. latifolia* to a begging juvenile (Toyne *et al.* 1995).

Weinmannia elliptica (Cunoniaceae). The flowering parts and shoots from four trees of this species were eaten in late November 1994 and January 1995. In the latter month adults were observed feeding juveniles with this food.

Miconia jahnii (Melastomataceae). The berries of this tall tree were eaten in April 1992.

Miconia sp. (Melastomataceae). The green berries of this tall tree were eaten in November 1994 and February 1995.

Miconia sp., or *Calyptrella stellata* (Melastomataceae). The yellow seed pods were eaten throughout November and January (1994/95).

Myrcianthes rhopaloides (Myrtaceae). The seed pods of this tree were eaten during November and December in 1994 and 1996.

Myrcianthes sp. (Myrtaceae). The flowers of this tree were eaten at Cajanuma (PNP) in January 1995.

Aegiphila sp. (Verbenaceae). The dark green seed pods of this tree were eaten in November 1994 and February 1995.

Clethra revoluta (Clethraceae). The white flowers and seed pods were eaten in April 1992.

Cavendishia bracteata (Ericaceae). The berries from this 8 m tall plant growing in secondary forest were eaten in May 1992.

Disterigma alaternoides (Ericaceae). The berries from this plant, a scrambling 5 m tall shrub in secondary growth forest, were eaten in May 1992.

On 24 November 1996 J.N.M.F. observed a flock of 13 land on the ground next to the base of a tree stump. The ground there consisted of grass and bare soil. One parrot perched on the stump whilst the others foraged on ground that was selected as it was in the shade and provided some cover from predators. The look-out parrot changed several times. This observation is interesting as it probably represents the only case of this species foraging on soil, presumably for minerals.

Discussion

Clearly, one cannot draw many conclusions about the Red-faced Parrot's breeding biology from observations of one nesting attempt.

Due to the lack of data on *Hapalopsittica* species our data can only be compared to other similar sized parrots such as *Pionopsitta* species (Forshaw 1989). The Pileated Parrot *Pionopsitta pileata* has an incubation period of 24 days (*cf.* Red-faced Parrot: 26–29 days), fledging between 52–54 days of age (*cf.* Red-faced Parrot: 49–52 days) and self-feeding when 57–59 days old (Forshaw 1989). These data suggest that the Red-faced Parrot's incubation and fledging periods are similar to those of other parrots of similar size.

The fact that Red-faced Parrots feed on common Andean plant genera such as *Miconia*, *Myrcianthes*, *Weinmannia* and *Clethra* suggests that their restricted range and their rarity are not due to a dependence on certain foods. However, they may require special plants at certain times such as their breeding season. For example in October, the pre-laying period of most birds in the yungas of Cochabamba, Bolivia, Black-winged Parrots *Hapalopsittaca melanotis* were found to specialise on the fruits of cloud-forest mistletoes of the genus *Gaiadendron*, which may represent a high-nutrition food source (J. Fjeldså *in litt.* 1993).

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The history and taxonomic status of the Hispaniolan Crossbill *Loxia megaplaga*

by P. William Smith

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In October 1916, W. L. Abbott collected a pair of hitherto unknown and unexpected crossbills near El Rio, in the Cordillera Central of the Dominican Republic, on the West Indian island of Hispaniola. These were described by Riley (1916) as *Loxia megaplaga* (holotype USNM 249515), and were compared in plumage and morphology primarily with the palearctic *L. bifasciata*, then generally considered a species distinct from the nearctic *L. leucoptera*, the White-winged Crossbill (but see Hartert 1910). In his comments, Riley asserted that *megaplaga* "can be told at a glance" from *leucoptera* by its heavier, less attenuated bill, a difference further discussed and illustrated by Richmond (1916). As he was leaving Hispaniola, Abbott encountered Rollo Beck, then collecting for the Brewster-Sanford Collection. Told by Abbott of this and other interesting discoveries, Beck spent much of late February and March 1917 in the Cordillera Central (Beck 1921), eventually securing a series of thirty-one specimens of *megaplaga*, including several recent fledglings. Twenty-three of these are now at the American Museum of Natural History and four are at the British Museum (Natural History). In a search of likely museums I was able to learn of less than ten specimens taken subsequently, suggesting that fewer than fifty exist.

When Beck's series came to the attention of Frank Chapman at the American Museum of Natural History, Chapman described the discovery as "one of the ornithological sensations of recent years" (Chapman 1917). After saying that he had no specimens of *bifasciata* for comparison, he speculated how a "race" (Chapman's word, although he maintained binomial nomenclature and referred to it as a "species" elsewhere in his note) of the North American White-winged Crossbill *leucoptera* (*s.s.*) could occur in such a remote, tropical environment. He suggested that White-winged Crossbills, as well as the pines to which they were adapted (*sic*, *infra*), may have been more widespread during the previous ice age. Neither Bond (1928), Wetmore & Swales (1931), nor the A.O.U. (1931) considered *megaplaga* (or *bifasciata*) to be a subspecies of *leucoptera*, although Wetmore & Swales (1931) stated that "Obviously the three are from common stock".

The first explicit treatment of *megaplaga* as a subspecies of *leucoptera* (*s.l.*) seems to have been by Hartert & Steinbacher (1932). Bond (1936) also used trinomial treatment, as did Hellmayr (1938), although neither cited Hartert & Steinbacher (1932); Griscom (1937), on the other hand, did so. The A.O.U. formally adopted subspecific treatment for *megaplaga* several years later (A.O.U. 1944), citing Hellmayr (1938). It is not evident that any of those authors were expressing other than the emergent taxonomic philosophy of the era, which focused more on apparent similarities between taxa than differences. Bond (1945) wrote, "The presence of a White-winged Crossbill in Hispaniola is probably the result of an invasion of the species during the Pleistocene", a notion for which Chapman (1917) apparently laid ground and which Wetmore & Swales (1931) had developed further.

Griscom (1937) is the principal author to have analysed the alignment of *megaplaga* with *leucoptera*, his discussion also including *bifasciata*. He rejected six of nine possible criteria proposed by other authors to diagnose *L. leocoptera* (*s.l.*) from *L. curvirostra* (*s.l.*) as overlapping: smaller size and bill; proportionately more slender bill; pinker or paler shades of red in adult males; yellower olive tones in adult females; two well-developed white wing-bands (!); and different breeding and winter plumage of adult males. He accepted only broad white tips to the tertials, blackish remiges and rectrices, and black upper tail coverts as characters shared by all forms of *leucoptera* and no forms of *curvirostra*.

Meanwhile, *megaplaga* largely slipped from ornithological consciousness. It apparently went unreported in field literature for the forty years following Bond's collecting five in Haiti in 1930 (unpublished, M. Robbins *in litt.*). Annabelle Stockton Dod then claimed to "rediscover" crossbills on Hispaniola in 1971 in the Sierra de Baoruco, an extension of the Haitian Massif de la Selle into the southwestern Dominican Republic (Dod 1978). In fact, J. W. Terborgh had reported them both there and in the Cordillera Central a year earlier (Bond 1971). In April 1971, Dod and the Keplers found the first nest of *megaplaga* recorded, near the Dominican-Haitian border in those same mountains (Kepler *et al.* 1975). At least three crossbills identified carefully and credibly as *megaplaga* were observed in introduced pines in the Blue Mountains of Jamaica for several months beginning in December 1970 (Lack *et al.* 1972, notwithstanding Bond's 1972 disbelief), where no species of pine is native. There apparently are no other known reports of crossbills in Jamaica (R. Sutton) or elsewhere in the West Indies.

Since its "rediscovery", *megaplaga* has been reported occasionally in the Dominican Republic by resident and visiting birdwatchers and scientists, both in the Cordillera Central and the Sierra de Baoruco. Because of near total deforestation, its current status in Haiti is uncertain, although apparently it is not completely extirpated there (Benkman 1994). Benkman (1994) observed and studied its morphology and ecology in the Dominican Republic and concluded that it was a specialist adapted to forage solely on *Pinus occidentalis*, Hispaniola's sole native conifer, found only there and in the Sierra Maestra of Cuba (Sauget & Liogier 1946, Mirov 1967). He suggested that its bill structure was so different from *leucoptera* (*s.s.*), primarily a spruce-feeding specialist (Benkman 1992), that hybrids would be selectively disadvantaged (Benkman 1994). Benkman (1994) computed a likely population size for *megaplaga* of less than 1000 remaining individuals.

In March, 1996, assisted by tape playback of vocalizations which Reynard (1981) secured both in Haiti and near El Aguacate, Dominican Republic (G. Reynard *in litt.*), L. Manfredi and I searched unsuccessfully for crossbills for five days between *c.* 700 and 1200 m in the Cordillera Central within *c.* 50 km of Jarabacoa, including the area of El Rio where most of Beck's specimens had been taken. Although there still are many patches of pines in that region, few remaining trees appear to consist of old growth. An intensive two-year study in a portion of the area we surveyed failed to encounter the species (Latta & Wunderle 1996), although ornithologists working in the area's pines occasionally do encounter crossbills (Benkman 1994, J. Wunderle). Then moving to the Sierra de Baoruco on 26 March to the vicinity of the abandoned Zapotén logging camp, 5 km south of El Aguacate on the Haitian border at *c.* 1500 m, we attracted a family group of crossbills (male, female, and three juveniles) to our location within a few minutes of our arrival in an area of old growth by playing the Reynard (1981) recording.

We made leisurely telescopic studies for about an hour between 8–9 a.m. Our most unexpected observation in light of Griscom's (1937) diagnosis of *leucoptera* (*s.l.*) including *megaplaga*, was that the remiges, rectrices, and upper tail coverts did not appear "blackish" but instead appeared brown, and the tertials of the adults did not seem at all white-tipped (those on the juveniles were narrowly edged with white). Other characters noted included the massive beaks and the fact that the greater covert tips seemed only narrowly white, narrower than the median covert tips. The birds seemed remarkably silent for crossbills, although the male did warble faintly for lengthy periods as we watched. Their principal vocalizations, made occasionally during their slow approach to our vicinity as we played the recording, were aurally indistinguishable to us from those published by Reyard (1981).

I examined the series of twenty-three specimens of *megaplaga*, all secured by Beck, at the American Museum of Natural History. Susan A. Smith and I took measurements of most adults (Table 1), and to the extent specimens were available, we also took equivalent measurements of a comparable number of adult *leucoptera* (*s.s.*), *bifasciata*, and *Loxia curvirostra mesamericana*, the geographically nearest member of *Loxia*, which is found primarily in pine forest from Guatemala to Nicaragua (Howell *in* Paynter 1968). Additionally, through the courtesy of Brian Nelson, I obtained sonagrams of *megaplaga*'s basic vocalizations from Reynard (1981) (Fig. 1).

In comparing the series of *megaplaga* with those of other crossbill taxa, I failed to discern that *megaplaga* (or *bifasciata*) had blackish remiges, rectrices, or upper tail coverts, *contra* Griscom (1937). My judgement was that all *Loxia* have those feathers concolorous. *Leucoptera*'s (*s.s.*) indeed are black, but all other taxa are shades of brown, those of *bifasciata* appearing hardly darker than most *curvirostra*'s and lighter than some. *Megaplaga*'s feathers are a darker shade of brown than *bifasciata*'s. Adult *megaplaga* in series also lack prominent white tertial tips as shown by many *leucoptera* (*s.s.*) and *bifasciata*. I thus concluded that the specimens of *megaplaga* generally agreed with my field observations, but not with Griscom's (1937) museum basis for including *megaplaga* within *leucoptera* (*s.l.*), a discrepancy I cannot explain inasmuch as the same material was largely used.

TABLE 1
Measurements of adult Hispaniolan Crossbills

Catalog no.	Date	Sex	Bill Length	Bill Width	Bill Depth	Volume index	Wing	Tail	Wing:tail	Width gr. cov. tips
AMNH 164844	19/3/1917	M	17.05	6.34	10.93	11.82	88	57	1.54	4.14
AMNH 164845	2/3/1917	M	16.93	6.66	11.69	13.18	89	58	1.53	3.61
AMNH 164847	5/3/1917	M	16.97	7.28	11.25	13.90	88	56	1.57	4.34
AMNH 164848	23/2/1917	M	17.16	6.10	11.30	11.83	87	58	1.50	3.62
AMNH 164849	23/2/1917	M	17.05	7.08	11.02	13.30	90	59	1.53	4.01
AMNH 164851	2/3/1917	F	16.38	7.28	10.66	12.71	88	55	1.60	2.86
AMNH 164855	10/3/1917	F	16.75	7.32	10.58	12.97	84	56	1.50	3.40
AMNH 164857	16/3/1917	F	16.26	6.93	11.01	12.41	83	53	1.57	3.58
AMNH 164858	10/3/1917	F	16.54	6.60	10.65	11.63	86	56	1.54	3.54
AMNH 164859	5/3/1917	F	15.49	7.08	10.55	11.57	82	53	1.55	0.88

TABLE 2
Summary (mean, s.d.) measurements of adult crossbills

Taxon	*n*	Bill volume index	Greater covert tips	Wing	Tail	Wing:Tail
megaplaga	10	12.53, 0.767	3.40, 0.927	86.5, 2.54	56.1, 1.92	1.54, 0.030
bifasciata	9	9.64, 2.456	8.18, 2.198	90.8, 2.48	60.2, 1.47	1.51, 0.040
leucoptera	9	5.93, 0.711	9.75, 1.977	86.0, 3.37	59.6, 2.01	1.44, 0.044
mesamericana	6	12.50, 1.148	N/A	93.8, 3.29	52.8, 0.90	1.78, 0.060

Note. Measurements in mm. Bill volume index=L × W × D/100.

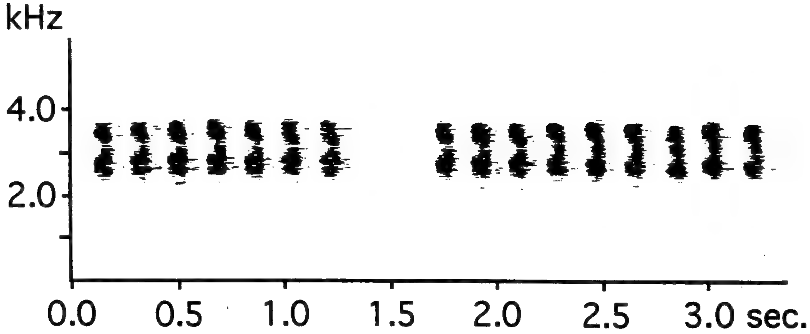

Figure 1. Hispaniolan Crossbill vocalizations (from Reynard 1981).

Unlike either *leucoptera* (*s.s.*) or *bifasciata*, *megaplaga* has relatively narrow white tips to the greater coverts (Table 2), with most such feathers being medially dark almost to the edge. This character agrees more with the rare, so-called '*rubrifasciata*' morph of *curvirostra* (Eck 1981, Cramp & Perrins 1994). But for the presence of wingbars, the only morphological character of *megaplaga* that suggests commonality with *leucoptera* (*s.l.*) is the wing:tail ratio (Table 2, Eck 1981). Even that feature is somewhat ambiguous, however, for *megaplaga*'s ratio is larger than either *leucoptera*'s (*s.s.*) or *bifasciata*'s (nearer the latter than the former) and begins to approach the various forms of *curvirostra* (*s.l.*) (Table 2, Eck 1981, Cramp & Perrins 1994).

The vocalizations of *megaplaga* (Fig. 1) consist mainly of a series of somewhat harmonic 100 ms notes *c.* 1.2 kHz in range, centred at *c.* 3.1 kHz and uttered at a rate of *c.* 5.5/sec. Among the several calls of *leucoptera* (*s.s.*) documented by Mundinger (1979), the "chutter" consists of notes structurally similar to those of *megaplaga* but of about one-fourth the duration delivered about four times as fast. All other calls recorded by Mundinger (1979) are more different structurally. The song of *leucoptera* (*s.s.*) shown in Cramp & Perrins (1994) consists mainly of similar-structured notes of slightly higher frequency than those of *megaplaga*, delivered about twice as fast. I am uncertain whether the vocalizations of *megaplaga* on Reynard (1981) or heard by us should be characterized as "song" or "calls". The calls of *bifasciata* documented in Cramp & Perrins (1994) have more harmonic qualities, are longer and are given more slowly than vocalizations of *megaplaga*, but span roughly the same frequency. Mundinger (1979) argues that vocalizations of carduelines are learned in a social context, thus one would expect those of modern isolated *megaplaga* to have drifted from their progenitor. Although Groth (1993) did not study vocalizations of *mesamericana*, none of the calls of North American *curvirostra* (*s.l.*) that he did document seem as similar structurally to those of *megaplaga* as were those of either *leucoptera* (*s.s.*) or *bifasciata*.

Bond (1945) and others supposed that *megaplaga* was a relict of a Pleistocene irruption of *leucoptera* (*s.s.*). While one cannot dismiss such a theory, no particular evidence supports it. Bond's (1940) supposition that *megaplaga*'s presence on Hispaniola "... is probably due to some accidental invasion in the past, the birds becoming established on finding conditions suitable" failed to recognize *leucoptera*'s (*s.s.*) adaptation to *Picea* (Benkman 1992). *Megaplaga* is the only member of *leucoptera* (*s.l.*) adapted to feed on large cones of *Pinus* (Benkman 1994). Mirov (1967) found chemical similarities between Hispaniolan *P. occidentalis* and various species of pine found in central and western North America which are lacking from all pine species found in eastern North America. Thus, *P. occidentalis* probably evolved from mesamerican pine stock. It seems plausible, therefore, that *megaplaga* either evolved *in situ* or colonized from a Central American ancestor. It is striking that *megaplaga*'s bill is rather similar in size to *mesamericana* (Tables 1, 2), which suggests a common ancestor or convergence due to similarity in cone structure of the resident pines. Its ancestor may have been unlike modern *leucoptera* (*s.s.*), which may have evolved its spruce-adapted bill structure *after* that supposed invasion, given that there is no evidence that small-coned conifers ever were present in the West Indies.

In plumage and morphology, *megaplaga* reflects a mosaic of characters found in *Loxia*. As recognized by its describer (Riley 1916), it shows more morphological similarity to the palearctic *bifasciata* than the nearctic *leucoptera* (*s.s.*). The colour of its flight feathers and the width of the white on its greater covert tips are intermediate between *leucoptera* (*s.s.*) and *curvirostra* (*s.l.*). Its wing:tail ratio is closer to *leucoptera* (*s.l.*) than to *curvirostra* (*s.l.*) but is intermediate and more like *bifasciata* than *leucoptera* (*s.s.*). It shows morphological similarity to the Central American Red Crossbill *L. curvirostra mesamericana* but with '*rubrifasciata*'-like wingbars and a smaller wing:tail ratio. Its vocalizations are more like *leucoptera* (*s.l.*) than any population of *curvirostra* (*s.l.*) for which recordings are available (Mundinger 1979, Groth 1993, Cramp & Perrins 1994).

The evolutionary history of *megaplaga* can be unravelled with certainty only by use of genetic techniques. Nevertheless, it now is so isolated spatially, morphologically, and ecologically from *leucoptera* (*s.s.*) (Benkman 1994, this study) that nothing seems served by combining it with *bifasciata* and *leucoptera* into a composite species which is questionably diagnosable (Griscom 1937, this study). I therefore agree with Benkman (1994) that *Loxia megaplaga* should be recognized as a full species, the Hispaniolan Crossbill, as it was described originally.

Such recognition might also help bring more attention to this evidently endangered taxon. Nothing in my travels in the Dominican Republic since 1987 has led me to believe that Benkman's (1994) population estimate of under 1000 individuals was unduly pessimistic. Most reports of *megaplaga* since 1970 have been along the Haitian border in the Sierra de Baoruco. Although this region is gazetted as National Park, there seems to be no active protection. I observed widespread poaching of trees by Haitians, who widely lack their own trees, and several active charcoal-making sites along the border in the

Zapotén area. Without more active protection, the trees to which *megaplaga* is specifically adapted seem likely to disappear, as they largely have across the border. So probably would vanish a unique avian relict.

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New and noteworthy bird records from Belize including the first record of Chestnut-collared Swift *Cypseloides rutilus*

by Andrew C. Vallely & Thomas Aversa

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Over thirty years have passed since Russell (1964) summarized what was then known about the status and distribution of birds in the Central American country of Belize. Among the more recent publications that have added to our understanding of avian distributions in that area are those of Howell *et al.* (1992), Barlow *et al.* (1969, 1970, 1972), Mills & Rogers (1988), and Miller & Miller (1992).

Since 1992, we have spent a combined total of 45 weeks in Belize. The following notes are all based on sight records made during the period January 1992 to April 1996. Included are the first record of Chestnut-collared Swift *Cypseloides rutilus* for Belize as well as notes on seven other species of poorly known or marginal occurrence in that country. It is noteworthy that while most of our time was spent in northern Belize, four of the eight observations detailed below resulted from less than four weeks spent in the poorly known southern half of the country. Further investigations in southern Belize will doubtless bring to light additional unusual records and range extensions (S. N. G. Howell pers. comm.).

CINNAMON TEAL *Anas cyanoptera*

Although described by Wood *et al.* (1986) as a very rare transient, Belize was not included in the range of this species by Howell & Webb (1995). An adult male Cinnamon Teal was observed feeding and roosting in flooded rice fields in the company of some 400 Blue-winged Teal *A. discors* and eight American Wigeon *A. americana*, approximately 3 km west of San Felipe, Orange Walk District, on 2 March 1996. This bird was identified by its overall bright cinnamon coloration and red eye.

BICOLORED HAWK *Accipiter bicolor*

Russell (1964) listed three records of this species from Belize. Wood *et al.* (1986) described it as a very rare permanent resident in Belize. On 9 April 1996, an adult Bicolored Hawk was observed carrying nesting material into a dense vine tangle along a logging road at Gran del Oro, Cayo District. As far as we know, this observation represents the first evidence of nesting by this little known species in Belize.

CHESTNUT-COLLARED SWIFT *Cypseloides rutilus*

At least four adult Chestnut-collared Swifts were present in a concentration of approximately 40 *Chaetura* swifts (probably *Chaetura vauxi*) at The Cockscomb Basin Wildlife Sanctuary, Stan Creek

District, on 15 March 1993. Identification of these birds was based on their clearly visible chestnut collars. It is possible that several other (uniformly dark) swifts, seen with these birds, may have been *C. rutilus* immatures. Subsequently, S. N. G. Howell (*in litt.*) observed a single individual of this species on 22 March 1996 at Monkey Bay Wildlife Sanctuary, Belize District. Howell & Webb (1995) noted that *C. rutilus* seems to withdraw from montane areas during the northern winter and that there is some evidence for migratory behaviour in this species. As far as we know, these observations represent the first records of this species from Belize.

BLUE-THROATED GOLDENTAIL *Hylocharis eliciae*

The first record for Belize was reported recently from Cayo District (Mills & Rogers 1988). A single male of this species was closely observed on 3 April 1994 as it perched and called in a *Heliconia* thicket along a disturbed creek-bed near Columbia Village, Toledo District.

WHITE-WINGED BECARD *Pachyramphus polychopterus*

Wood *et al.* (1986) described this species as a rare permanent resident in the southern half of the country, and Howell *et al.* (1992) reported a single mist-netted bird from Gallon Jug. On 30 March 1996, a single male White-winged Becard was found in the company of a mixed flock at the edge of a pasture at Bermudian Landing, Belize District. Identification was based on the absence of a whitish supraloral mark, thus ruling out *P. major*.

NASHVILLE WARBLER *Vermivora ruficapilla*

Russell (1964) listed two sight records of this species (both perhaps involving the same individual) three days apart at Gallon Jug, Orange Walk District. Lacking a specimen, he considered the species hypothetical in Belize. Wood *et al.* (1986) described it as a "very rare" transient. T. Aversa observed a single individual feeding with a flock of migrants at the edge of a clearing at Bermudian Landing, Belize District, on 31 March 1996. The identification of this bird was based on its small size, all-yellow underparts, grey cap and whitish eye-ring.

CERULEAN WARBLER *Dendroica cerulea*

Russell (1964) listed three records of this species from Belize. Wood *et al.* (1986) considered it a rare transient and (incorrectly) winter resident. Parker (1994) hypothesized that the Maya Mountains may form an important staging area for this species during spring migration. We noted a single male feeding in the mid-story along a logging road during a brief visit to New Maria Camp, Cayo District, on 7 April 1996. This date is consistent with Parker's (1994) observations made during 3–13 April 1992 at Toledo District.

BLUE SEEDEATER *Amaurospiza concolor*

Howell *et al.* (1992) listed several records of this species from Monkey Bay and reported a mist-netted bird from Bermudian Landing, Belize District. T. Aversa saw at least two individuals (at least one male and one female) in bamboo thickets along the Belize River at Bermudian Landing on 30 March 1996.

GRASSLAND YELLOW-FINCH *Sicalis luteola*

Wood *et al.* (1986) described it as a rare permanent resident in Belize. Howell & Webb (1995) noted that this species is "somewhat nomadic". We observed a flock of 40–50 Grassland Yellow-finches as they flew and called over rice fields 3 km west of San Felipe, Orange Walk District, on 17 January 1994. Numerous subsequent visits to this site failed to produce further observations.

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New and noteworthy observations on the Paraguayan avifauna

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Paraguay is divided by the Río Paraguay into two discrete biogeographical regions. To the west lies the Chaco, a vast expanse of thorn scrub forests and seasonally inundated palm savannas. To the east, the Oriente combines several distinct ecosystems, and its avifauna is correspondingly diverse (Hayes 1995). In the northeast lie *cerrado* (Brazilian *cerradão*; defined by Stotz *et al.* 1996 as "open *campo* grasslands with a sparse cover of shrubs and trees"), in the southwest lie natural grasslands and marshes, and to the east is the humid Interior Atlantic Forest.

Habitat destruction, of both the humid subtropical forests and the virgin grasslands, along with disturbance through hunting, trapping, pollution and infrastructural development, is rapidly depleting Paraguay's avifauna. Less than 13% of the country's Atlantic Forest remains, and almost all of this is partially degraded (Bozzano & Weik 1992, DOA 1996). The grasslands of central South America are severely threatened by conversion to agricultural uses and have been long neglected as a conservation issue (Collar *et al.* 1992). No less than 24 of the bird species now recorded in Paraguay are listed as threatened with global extinction by Collar *et al.* (1994).

From July to December 1995, we carried out over 2000 hours of ornithological fieldwork in a variety of habitats at fourteen sites in the Oriente and one site in the Chaco. The conservation results of this fieldwork have been published elsewhere (Lowen *et al.* 1996a, 1996b). From these surveys, and from other recent unpublished fieldwork, we present noteworthy observations of 43 species, about 7% of the country's avifauna (645 species: Hayes 1995).

We define "noteworthy" as follows: (a) first reliable country records (seven species: Russet-crowned Crake *Anurolimnas viridis*, Ocellated Crake *Micropygia schomburgkii*, Spot-tailed Nightjar *Caprimulgus maculicaudus*, White-winged Nightjar *Caprimulgus candicans*, Hellmayr's Pipit *Anthus hellmayri*, Masked Tityra *Tityra semifasciata* and Yellow-bellied Seedeater *Sporophila nigricollis*); (b) first reliable country records for 50 years (eight species); (c) species with five or fewer reliable country records (an additional 24 species); (d) first reliable records for the Oriente (two species, excluding new country records) or the Chaco (four species, excluding new country records). Hayes (1995) provides appropriate baseline data with which to categorise our records, and subsequent fieldwork (e.g. Madroño & Esquivel 1995, Madroño & Esquivel 1997) is cited where relevant.

We publish elsewhere (Lowen *et al.* in press) a reassessment of the abundance and distribution of birds in Paraguay, which includes first records of 26 species for five of the seven biogeographic regions into which Hayes (1995) divides Paraguay.

Abbreviations, conventions and species accounts

Dpto.=Departmento; MN=Monumento Natural; MNHNP=Museo Nacional de Historia Natural del Paraguay; PN=Parque Nacional; RNBM=Reserva Natural del Bosque Mbaracayú, Dpto. Canindeyú; RNP=Reserva Natural Privada; RVS=Reserva de Vida Silvestre.

Where possible, records were formally documented in one or more of the accepted manners (e.g. good quality photograph or tape-recording) and this is indicated in the text. For all mist-netted birds, full biometric data and a blood sample were taken before being photographed and released. Photographs and biometrics are available from the authors. Blood samples have been deposited with the Centre for Tropical Biodiversity, Copenhagen. Tape-recordings have been deposited at the National Sound Archive, Wildlife Section, London. We distinguish single- and multi-person records, listing up to three observers in alphabetical order. Authors are indicated by their initials; other observers are named in full. We use "*et al.*" to indicate that more than three observers were involved. All sight/aural records are supported by extensive field notes. No specimens were taken.

Taxonomy and nomenclature for non-passerines follows Clements (1991), for passerines Ridgely & Tudor (1989, 1994). Species order follows Clements (1991). In each account, we give the species' global status (if listed in Collar *et al.* 1994) and its status in Paraguay (according to Hayes 1995). We follow this with our records and summarise their significance. In certain cases, we include a brief discussion of status or identification features. For all localities mentioned, Appendix 1 lists details of department and co-ordinates. All sites are at low altitude (100–450 m).

First reliable records of seven species for Paraguay

RUSSET-CROWNED CRAKE *Anurolimnas viridis*

Occurs from the Guianas and Venezuela to Brazil, where it is found south to Rio de Janeiro and Mato Grosso states (Sick 1993). Hayes (1995) does not list *A. viridis* for Paraguay. At Aguará Ñu in the RNBM, Dpto. Canindeyú, two calling birds were seen and tape-recorded on 19–20 September 1995, and one on 21 September (K. Zyskowski *et al.*). What were probably the same two birds were recorded at the same site 6–13 December 1995 (BLL). Both individuals were in an area of scrubby secondary growth on a dry substrate, within 20 m of an extensive marsh adjacent to a river. Both responded to playback, calling repeatedly and occasionally emerging from cover. *Anurolimnas viridis* has recently been found in Bolivia (Bates *et al.* 1992); its range may be expanding with the spread of its favoured secondary growth habitat.

OCELLATED CRAKE *Micropygia schomburgkii*

This near-threatened grassland rallid has an extensive range in South America (Collar *et al.* 1994). In Brazil, it occurs locally in Goiás, Mato Grosso, Bahia and São Paulo states (Sick 1993). In Bolivia, it has recently been found to be widespread in a variety of habitats (Parker *et al.* 1991, Pearce-Higgins *et al.* 1995). *M. schomburgkii* was not previously known from Paraguay, although it has been erroneously listed for the country (Hayes 1995).

We recorded the species at two sites in the RNBM, Dpto. Canindeyú. At Lagunita, a minimum of eight calling individuals were present 9–13 September 1995 (MP *et al.*). One individual was tape-recorded and lured into mist-nets with playback. A photograph appears in Lowen *et al.* (1996a). Birds had first been heard, but not identified, on 21 November 1994 (RPC, AMN). At Aguará Ñu, at least two individuals were heard (and tape-recorded) 14–19 September 1995 (JMB *et al.*). All birds were in tall dry grassland (often adjacent to wetter areas or lakes) and dry *campo limpio* type *cerrado*. The nearest known population is in Mato Grosso state, Brazil (Sick 1993). *Micropygia schomburgkii* is likely to be rare in Paraguay, but may well be found in similar habitat further north in Dptos. Amambay and Concepción.

SPOT-TAILED NIGHTJAR *Caprimulgus maculicaudus*

Caprimulgus maculicaudus has a disjunct range from Mexico south to north Bolivia and southeast Brazil (Hilty & Brown 1986, Howell & Webb 1995). In Brazil it is widespread but local, with only a few records from Mato Grosso south to Espírito Santo, Rio de Janeiro, São Paulo and Paraná (Sick 1993). Its presence in São Paulo has recently been reconfirmed (Willis & Oniki 1993). Hayes (1995) does not list it for Paraguay.

At Aguará Ñu in the RNBM, Dpto. Canindeyú, two birds were calling 14–18 September 1995 (AMN *et al.*). A male was mist-netted on 16 September. It was photographed in the field and then recaught by hand on 17 September. This photograph is published in Lowen *et al.* (1996a). All records were in a wet marshy valley and on adjacent drier hill slopes adjacent to gallery forest.

WHITE-WINGED NIGHTJAR *Caprimulgus candicans*

This poorly known nightjar, considered Critically Endangered by Collar *et al.* (1994), is only known from two old specimens in the grasslands of Mato Grosso and São Paulo in central Brazil, a series of modern records from Emas National Park in Goiás, Brazil, and a specimen from Yucuma province, Bolivia, in 1987 (Collar *et al.* 1992, Sick 1993, Davis & Flores 1994). Hayes (1995) lists it as "hypothetical" for Paraguay. In common with most authors (e.g. Collar *et al.* 1992), Hayes rejects the reports by Azara (1802–5), which lack details of localities and dates.

At Aguará Ñu in the RNBM, Dpto. Canindeyú, we found *Caprimulgus candicans* to be not uncommon in *cerrado*, with records 14–20 September (JMB *et al.*) and 6–13 December 1995 (BLL). At least seven different males were recorded in the first hour after dusk on 20 September, and a minimum of 14 birds were found during December surveys. On 20 September and 6–13 December seven birds (of two plumage types) were caught by hand. Photographs of one September male are published in Lowen *et al.* (1996a) and Tobias & Lowen (1996). A male was photographed in the field on 19 and 20 September. Males appear to produce mechanical noises during display and these were tape-recorded on 10 December. Birds have again been recorded at Aguará Ñu during 1996, with the first observation on 27 August (EZE).

These are the first documented records for Paraguay. However, Azara's (1802–5) published description is identical to our males, and we consider that his records should be treated as genuine, albeit without locality. There may be as many as 20 males in the 8000 ha of suitable habitat at Aguará Ñu (although only 5500 ha is protected), and the site is evidently of critical importance for the conservation of this species (Lowen *et al.* 1996b). Birds showed a predilection for recently burnt areas; their ecological requirements would repay careful study.

MASKED TITYRA *Tityra semifasciata*

Widespread, occurring from northern Mexico south to Bolivia and Amazonian Brazil (Ridgely & Tudor 1994). Hayes (1995) does not list *T. semifasciata* for Paraguay.

The first record for Paraguay comes from the Carapá waterfall trail in the northeast of the RNBM, Dpto. Canindeyú, where six birds were watched closely on 6 August 1995 (D. Finch *et al.*). Birds were seen again in this area during 1996 (EZE, AMN). At PN Cerro Corá, Dpto. Amambay, a single male was seen well but briefly on 10 October 1995 (JMB, EZE, BLL). The Cerro Corá bird was easily distinguished from the congeneric Black-crowned Tityra *T. inquisitor* and Black-tailed Tityra *T. cayana* by its strikingly whitish upperparts and crown, broad white terminal tail band, restricted black forehead and facial area, and extensive red bill and bare skin around eyes. Being widespread over much of South America, it is not surprising that *T. semifasciata* should occur in Paraguay.

HELLMAYR'S PIPIT *Anthus hellmayri*

Anthus hellmayri occupies a disjunct range in the Andes of south Peru, west Bolivia, west Argentina and south Chile, with a separate population in southeast Brazil, Uruguay and east Argentina (Ridgely & Tudor 1989). Hayes (1995) lists it as "hypothetical" in Paraguay, treating the two reports by Podtiaguin (1944) from the Chaco as unreliable: they lack plumage description and date.

At RVS Yabebyry, Dpto. Misiones, we found up to ten birds daily 28–31 October 1995 and estimated that six pairs were present (MP *et al.*). Most records were of birds singing from song posts (e.g. fences), a habit noted by Ridgely & Tudor (1989). Two individuals were photographed and two singing birds tape-recorded. These are the first documented records for Paraguay. It is likely to breed at RVS Yabebyry, and may have been overlooked in previous fieldwork in the south of the country.

YELLOW-BELLIED SEEDEATER *Sporophila nigricollis*

Sporophila nigricollis is widespread in the lowlands from Costa Rica to north and east Bolivia, southern Brazil and northeast Argentina, though it is apparently absent from much of central Amazonia (Ridgely & Tudor 1989). Hayes (1995) does not list *S. nigricollis* for Paraguay.

At Puente Remanso, Dpto. Presidente Hayes, two adult males were seen on 3 November 1995 at the start of the Ruta TransChaco (M. Robbins, K. Zyskowski). In the Bahia de Asunción, Dpto. Central, at least one male and a probable female were seen on 3 December 1995 (RPC, EZE). These birds were in an overgrown garden in an area of marshy pools and low shrubs. *Sporophila nigricollis* is common and widespread north of Paraguay, and it is surprising that it has not been previously reported from the country. Further fieldwork will undoubtedly produce additional records.

Eight species not reliably recorded in Paraguay for at least 50 years

GREY-BELLIED GOSHAWK *Accipiter poliogaster*

Near-threatened (Collar *et al.* 1994). There have been six records in Paraguay, but none since 1938 (F. E. Hayes *in litt.* 1996). At RNP Itabó, Dpto. Canindeyú, pairs were seen on 15 (JCL) and 22 (JMB) October 1995, with singles on 17 and 18 October (BLL). All sightings were within 2 km of each other and presumably refer to the same birds.

TINY HAWK *Accipiter superciliosus*

Hayes (1995) lists three reliable records for Paraguay. All come from the Alto Paraná region, in 1897 and 1934 (two). Hayes considers a recent record from Lago Ypacaraí, Dpto. Central/Cordillera (Gonzáles Torres & Gonzáles Romero 1985), to be doubtful. At RNP Ypetí, Dpto. Caazapá, a single male was seen on 6 February 1994 (AMN). At Jejui-mí, RNBM, Dpto. Canindeyú, a female was seen well on 30 September 1995 (RPC). The very small size and comparatively short tail of this forest *Accipiter* are distinctive: both observers are familiar with the species.

PURPLE-WINGED GROUND-DOVE *Claravis godefrida*

Critically Endangered (Collar *et al.* 1994). There are two records in Paraguay, both of pairs in Dpto. Alto Paraná in the early 1890s (Bertoni 1901). The specimens have been lost (Hayes 1995). At RNP Itabó, Dpto. Canindeyú, a female was seen briefly but well on 6 December 1994 (RPC). The bird was distinguished from female Blue Ground-dove *Claravis pretiosa* by its slightly larger size, lack of rufous rump and tail, off-white sides and white tips to splayed tail, and two obvious violaceous-brown wing-bars with darker borders. Additionally, a *Claravis* sp., probably *C. godefrida*, was heard (but not tape-recorded) in flowering *Chusquea* bamboo some 5 km away two days later. No additional records have been obtained during the 800 hours of fieldwork now conducted at the site (Brooks *et al.* 1993, Lowen *et al.* 1996b).

Given the lack of other records from eastern Paraguay (e.g. not being found during bamboo flowerings in 1977; R. S. Ridgely *in litt.* 1991), it seems likely that Paraguay has always been on the edge of the species' range. This record may represent a wandering individual either displaced by the disruption of the bamboo flowering cycle in Brazil or from a remnant population in Misiones province, Argentina (Lowen *et al.* 1996b).

LARGE-TAILED ANTSHRIKE *Mackenziaena leachii*

Hayes (1995) lists three records for Paraguay, all of lost specimens from the Alto Paraná region prior to 1936. At PN Caaguazú, Dpto. Caazapá, two individuals were seen and heard daily in different areas 21–23 July 1995 (TMB, RPC). At PN San Rafael, Dptos. Itapúa/Caazapá, a pair was seen and heard 28–29 July 1995 (RPC *et al.*), with an additional bird heard on 29 July (JMR). All records were in bamboo-dominated secondary scrub on the forest edge. In Misiones province, Argentina, it is fairly common, favouring degraded forest and open forest areas (*per* JMB and MP). It was thus to be expected in southeast Paraguay.

SPECKLE-BREASTED ANTPITTA *Hylopezus nattereri*

Hylopezus nattereri has recently been re-allocated full specific status (Whitney *et al.* 1995). Hayes (1995) lists just one record for Paraguay, from the Alto Paraná region about 1903 (Bertoni 1904). At PN Caaguazú, Dpto. Caazapá, up to four individuals were calling in three separate areas daily 18–24 July 1995 (JCL *et al.*). One bird was tape-recorded distantly. At PN San Rafael, Dptos. Itapúa/Caazapá, at least six individuals were calling in four areas on five dates 26–31 July 1995. One bird was mist-netted on 31 July and a photograph appears in Lowen *et al.* (1996a). At Estancia Kaa'gua Rory, Dpto. Caaguazú, one or two birds were calling on 30 August, 2 and 7 September 1995 (RPC *et al.*). These latter records may lend credence to local Aché indian reports of the species in the RNBM, Dpto. Canindeyú (AMN).

The species' presence in southeast Paraguay was to be expected; it is locally fairly common in bamboo-dominated forest in the adjacent Misiones province, Argentina (Benstead *et al.* 1993, MP). Whitney *et al.* (1995) note that, in the southern part of its range (including Paraguay), *H. nattereri* occurs at less than 300 m elevation, much lower than in the north. This pattern is reflected in other species with a similar geographical distribution, some of which are discussed in this paper (e.g. Large-tailed Antshrike and Bertoni's Antbird).

LESSER ELAENIA *Elaenia chiriquensis*

Hayes (1995) only lists just one confirmed record in Paraguay (a specimen from the Alto Paraná region in 1909) plus a hypothetical record in 1930. At Aguará Ñu, RNBM, Dpto. Canindeyú, it was fairly common, with up to 12 seen daily in *cerrado* 14–19 September 1995 (JAT *et al.*). One bird was tape-recorded and photographed in the field. At the nearby Estancia Jiménez, Dpto. Canindeyú, two calling birds were seen in a small area of *cerrado* on 27 September 1995 (MP).

E. chiriquensis is probably under-recorded in Paraguay: it is an abundant passage migrant in the *cerrado* of Mato Grosso state, Brazil, during August and September (Sick 1993).

BLACK-MASKED FINCH *Coryphaspiza melanotis*

Vulnerable (Collar *et al.* 1994). Hayes (1995) lists one confirmed and one possible record for Paraguay, both prior to 1930. At Aguará Ñu, RNBM, Dpto. Canindeyú, up to nine birds were encountered on each of six dates 14–21 September 1995 (JAT *et al.*). These included at least five territorial males, all in an area of *cerrado* comprising tussocky grass never taller than 50 cm and small areas of bare ground. Unidentified scattered bushes and dwarf yata'i palms (*Butia* sp.) were used as song perches; birds were otherwise terrestrial (Lowen *et al.* 1996b). One singing male was photographed and two birds tape-recorded. Several males were still singing during 6–13 December 1995 (BLL). Single juveniles were seen in both September and December, indicating breeding at the site.

As Sick (1993) suggests for Brazil, *C. melanotis* is probably overlooked in Paraguay. It is likely to occur in similar *cerrado* habitat in Dptos. Amambay and Concepción.

RED-RUMPED WARBLING-FINCH *Poospiza lateralis*

Hayes (1995) lists one certain record in Paraguay in 1911, plus one undated lost specimen. At PN Caaguazú, a male was watched at close range in scrub on the forest edge on 20 July 1995 (N. I. Etcheverry *et al.*). Renewed reports of this species were to be expected in southeast Paraguay, as it is locally common in a variety of habitats in northeast Argentina (JMB, MP).

Species with five or fewer reliable records in Paraguay

LEAST BITTERN *Ixobrychus exilis*

Hayes (1995) lists five records for Paraguay. In the Chaco, we recorded *Ixobrychus exilis* at RNP La Golondrina, Dpto. Presidente Hayes: a male was seen well on 6 November 1995 (JCL). The first record for the Oriente came from PN Ypacaraí, Dpto. Cordillera, where one was seen on 10 December 1995 (RPC, EZE, K. Zyskowski).

CINEREOUS HARRIER *Circus cinereus*

Hayes (1995) lists three reliable records from the Oriente and one hypothetical report from the Chaco. At Base Aerea, MN Bosque de Arary, Dpto. Itapúa, a pair were watched for a prolonged period on 20 December 1995 (RPC, BLL).

SWAINSON'S HAWK *Buteo swainsoni*

Hayes (1995) lists just three records for Paraguay. At RNP Itabó, Dpto. Canindeyú, a light-phase bird was seen on 8 December 1994 (RPC). At RNP Ypetí, Dpto. Caazapá, two light-phase birds were seen on 5 December 1995 (RPC). Two of the previous records for Paraguay were also in December (Hayes *et al.* 1990).

GREY-BREASTED CRAKE *Laterallus exilis*

Hayes (1995) lists two records: one in the Chaco in 1979 and one in the Oriente in 1994. At MN Bosque de Arary, Dpto. Itapúa, three birds were calling daily (and one tape-recorded) at Puerto Turi, 3–5 November 1995 (MP *et al.*). These add credence to Hayes' (1995) speculation that it may breed in Paraguay.

SPOT-WINGED PIGEON *Columba maculosa*

There are only three acceptable Paraguayan records, all from the Chaco (Hayes 1995). The species is considered "hypothetical" in the Oriente (Hayes 1995). At RVS Yabebyry, Dpto. Misiones, seven birds were seen on 28 October, and two birds on 29 October 1995 (MP *et al.*). All birds were well seen flying over grassland with islands of forest. These are the first records for the Oriente.

RED-SPECTACLED AMAZON *Amazona pretrei*

Endangered (Collar *et al.* 1994). This Atlantic Forest endemic is virtually restricted to *Araucaria angustifolia* forest in Rio Grande do Sul state, Brazil, with a few recent records from Misiones province, Argentina (Collar *et al.* 1994). Hayes (1995) lists *Amazona pretrei* as "hypothetical" in Paraguay despite three reports which include a well-described bird at RNP Itabó, Dpto. Canindeyú, on 15 August 1992 (Brooks *et al.* 1993, 1995). At this site, which is a stronghold for the threatened Vinaceous Amazon *A. vinacea*, a pair were seen at close range on 2 August 1995 (DL). They were flushed several times from the subcanopy of open marshy woodland, always landing in dense vegetation. When seen at close range in flight, both birds showed a large red patch on the carpal joint, extensive red on the head, a clean green breast, and yellower vent. This combination of characters appears to eliminate all other *Amazona* species.

Hayes (1995) treats *A. pretrei* as "hypothetical" in Paraguay in view of the lack of formal documentation for existing reports and the lack of records from the adjacent Brazilian state of Paraná. However, continuing to consider the species "hypothetical" in Paraguay may not be helpful for its conservation. *Amazona pretrei* moves northwards from Rio Grande do Sul during the austral winter (Collar *et al.* 1992), breeds in lowland riverine forest and utilizes several non-araucaria food sources (Varty *et al.* 1994). It is thus not inconceivable that stragglers reach Paraguay (where *Araucaria angustifolia* is now all but absent) fairly regularly in winter.

TAWNY-BROWED OWL *Pulsatrix koeniswaldiana*

There are three records for Paraguay (Hayes 1995). These comprise an undated, historical specimen (Bertoni 1901), now lost (Hayes 1995), and 1992 records at sites in Dptos. Canindeyú and Caazapá (Brooks *et al.* 1993). We recorded *P. koeniswaldiana* at one of the 1992 sites: RNP Itabó, Dpto. Canindeyú. Up to four individuals were heard and seen on six dates 17–23 October 1995 (DL *et al.*). Calls of at least three individuals were tape-recorded. This species is apparently rare in Paraguay, and may be restricted to humid forests of the extreme east.

BLACK-BANDED OWL *Strix huhula*

Hayes (1995) treats *S. huhula* as "hypothetical" in Paraguay, considering the 1992 aural records published by Brooks *et al.* (1993, 1995) for RNP Itabó, Dpto. Canindeyú, to be insufficiently documented. Ericson & Amarilla (1997) subsequently described the first confirmed record for Paraguay: a female collected on 30 September 1993 at PN Caaguazú, Dpto. Caazapá. We have recorded *S. huhula* during subsequent fieldwork at RNP Itabó. On 20 August 1993, a bird was calling repeatedly, but not tape-recorded (AMN). In 1995, up to two pairs were seen and heard in separate areas 20–22 October (MP *et al.*). All four individuals were tape-recorded and one photographed. The species has now been recorded in four distinct areas at RNP Itabó; it is probably a rare resident of forests in easternmost Paraguay.

RUSTY-BARRED OWL *Strix hylophila*

There are only three acceptable (and two very questionable) records in Paraguay, all from the Oriente (Hayes 1995). We found *S. hylophila* at two sites. At PN Caaguazú, Dpto. Caazapá, up to three birds were calling on six dates 15–23 July 1995, and a single bird was watched at close range on 16 July (JCL *et al.*). At PN San Rafael, Dptos. Itapúa/Caazapá, single birds were heard calling on 26 and 30 July 1995.

SICKLE-WINGED NIGHTJAR *Eleothreptus anomalus*

Near-threatened (Collar *et al.* 1994). Hayes (1995) lists two confirmed records for Paraguay and a further three unconfirmed reports. There is a previously unpublished record of a female collected at a now flooded area of Isla Yacyretá (MNHNP 000566) on 14 March 1992 (L. Amarilla *in litt.* 1996). We recorded the poorly known *Eleothreptus anomalus* at RNP Sombrero, Dpto. Cordillera. On 25 August 1995, a male was seen and photographed in the field, then trapped (JCL *et al.*); a photograph appears in Lowen *et al.* (1996a). It was found in tall, dry grassland within 500 m of an extensive seasonally inundated marsh, and within 2 km of dry, open woodland. Available evidence suggests that this species is a rare but regular inhabitant of marshy grasslands of eastern Paraguay. The paucity of reports presumably stems from a patchy distribution and the generally silent, inconspicuous nature of the species.

BLACK JACOBIN *Melanotrochilus fuscus*

Hayes (1995) lists two previous Paraguayan records in 1987 and 1994. The species has been recorded subsequently at the 1994 site (N. Pérez verbally 1995). At PN Caaguazú, Dpto. Caazapá, one bird was watched at close range on 16 July 1995 (RPC). There are no confusion species for this distinctive hummingbird.

RUFOUS-THROATED SAPPHIRE *Hylocharis sapphirina*

Brooks *et al.* (1993, 1995) detail two single observer sight records from the Oriente in 1992, but Hayes (1995) preferred to list it as "hypothetical" in Paraguay. He considered that the "species is almost certainly present . . . [but] further documentation is needed before it can be accepted". We observed it at three localities during 1995 fieldwork. At PN Caaguazú, Dpto. Canindeyú, a male was watched at close range on 16 July 1995 (R. Barnes). At RNP Sombrero, Dpto. Cordillera, a male and a probable female were seen well on 28 August 1995 (JCL). At PN Cerro Corá, Dpto. Amambay, a male gave close views on 10 October 1995 (JMB, BLL).

The following plumage characters were common to all males seen: bill predominantly dark, but with varying amount of red; throat and centre of breast iridescent pale greenish-blue, grading to iridescent green on remainder of underparts; upperparts slightly darker green; tail and upper tail coverts bronze, tinged rufous. The Sombrero and Caaguazú males appeared to have a darker blue throat and more iridescent chestnut tail. Female *Hylocharis* sp.—probably *H. sapphirina*—with a slightly forked bluish tail, obvious white tips to the rectrices and more extensive rufous chin, were seen at Sombrero (as above), in the RNBM at Jejui-mí on 7 November 1994 (AMN) and at RNP Itabó, Dpto. Canindeyú, on 7 December 1994 (RPC). *Hylocharis sapphirina* has now been recorded over a wide area of the Oriente, and it is unfortunate that no documentation has been obtained.

PYGMY KINGFISHER *Chloroceryle aenea*

Hayes (1995) lists only two records for Paraguay, both from the Chaco. There are three subsequent records from the Oriente: at the RNBM, Dpto. Canindeyú in 1994 and 1995 (Madroño & Esquivel 1997). We recorded it at Estancia Jiménez, Dpto. Canindeyú. Two birds were seen on 28 and 30 September 1995, with a female mist-netted on 29 September (JCL *et al.*). This site lies 20 km downstream of the RNBM. All reports of *C. aenea* in Paraguay come from the north, but given the two recent records of it in Misiones province, Argentina (Castelino 1990, MP), it may also occur further south in Paraguay.

CANEBRAKE GROUNDCREEPER *Clibanornis dendrocolaptoides*

Near-threatened (Collar *et al.* 1994). There are two records for Paraguay (Hayes 1995), including one in 1992 (Brooks *et al.* 1993, 1995). At PN Caaguazú, Dpto. Caazapá, a single bird was seen in streamside bamboo on 18 July 1995 (JCL). Despite mist-netting in suitable habitat at several sites, and extensive voice playback (especially at RNBM), there were no further records of this Atlantic Forest endemic. This suggests it is very rare and probably restricted to the Paraná basin of southeast Paraguay.

WHITE-BROWED FOLIAGE-GLEANER *Anabacerthia amaurotis*

Near-threatened (Collar *et al.* 1994). This Atlantic Forest endemic occurs in montane southeast Brazil (Parker *et al.* 1996, Stattersfield *et al.* 1997) and Misiones province, Argentina, where it is rare, but probably under-recorded (JMB). Hayes (1995) considered it "hypothetical" in Paraguay, listing eight sight records from three localities since 1992 (e.g. Brooks *et al.* 1993), but believing that "further documentation is needed". An additional sight record from the RNBM, Dpto. Canindeyú, in June 1995 (Madroño & Esquivel 1995) is best considered hypothetical (AMN).

At PN Caaguazú, Dpto. Caazapá, we had seven sight records in different areas. Single birds were seen on 16 (R. Barnes), 17 (JAT), 18 (RPC), 20 (JAT), 21 (JCL, DL) and 23 July 1995 (R. Johnson), and two on 22 July (R. Barnes). At PN San Rafael, Dptos. Itapúa/Caazapá, a single was seen on 26 July (JAT) and two on 30 July 1995 (RPC).

We consider that the likelihood of confusion with Buff-browed Foliage-gleaner *Syndactyla rufosuperciliata* (e.g. Hayes 1995) has been exaggerated. *Anabacerthia amaurotis* is considerably bulkier, with a far broader and whiter supercilium contrasting with thick dark eyestripe and crown. Its bright rufous tail contrasts with the brownish upperparts, while the straight bill is pale with a dark culmen. Additionally its vocalisations and behaviour differ from *S. rufosuperciliata*.

There is an evident pattern to the 1992/1995 records, all occurring in the Paraná basin forest of southeast Paraguay. This pattern is reflected in other species of montane southeast Brazil that are now being (re-)discovered in the lowland forests of southeast Paraguay (e.g. Large-tailed Antshrike, Bertoni's Antbird and Diademed Tanager: see also Whitney *et al.* 1995). We suggest that *A. amaurotis* is a rare resident of the remaining forests of southeast Paraguay.

BLACK-BILLED SCYTHEBILL *Campylorhamphus falcularius*

Hayes (1995) lists three records, all from the Oriente, in 1893 (two) and 1977. At PN San Rafael, Dptos. Itapúa/Caazapá, six individuals were seen on 26 July 1995, singles on 27, 29 and 30 July, and a bird mist-netted on 29 July (RPC *et al.*).

RUFOUS-CAPPED ANTSHRIKE *Thamnophilus ruficapillus*

Hayes (1995) lists only one reliable record (and three unconfirmed reports) from the Oriente. We recorded *Thamnophilus ruficapillus* at two sites. At Estancia Kaa'gua Rory, Dpto. Caaguazú, a pair (with the male singing) was seen in scrub on 29 August 1995 (JAT). A *Thamnophilus* sp. at Aguará Ñu, RNBM, Dpto. Canindeyú, on 16 and 18 September 1995 was initially identified as *T. ruficapillus* (see Lowen *et al.* 1996b). However, this individual is best left unidentified, now being thought to be closest to Rufous-winged Antshrike *T. torquatus*; further details will be published in due course. The paucity of Paraguayan records of *T. ruficapillus* is inexplicable. In northern Argentina, it is common in a variety of habitats including secondary growth (MP).

BERTONI'S ANTBIRD *Drymophila rubricollis*

Hayes (1995) lists just one record from Paraguay (in 1894: Bertoni 1901), but Ridgely (1991) has also observed it at RNP Itabó, Dpto. Canindeyú, in June 1991. At PN Caaguazú, Dpto. Caazapá, a bird was seen and heard on 19 July 1995, and two were heard on 20 July (JAT *et al.*). At PN San Rafael, Dptos. Itapúa/Caazapá, a bird was heard on 30 July 1995 (JAT). At RNP Itabó, a bird was heard on 3 August 1995 (JAT). All records were in dense scrub and forest islands on the forest edge. *Drymophila rubricollis* is common in northern Misiones province, Argentina, where it favours dense understorey growth, usually with *Chusquea* bamboo (JMB, MP). It was to be expected in eastern Paraguay, but is still only known from the extreme east. Although all recent records have been in the austral winter, this probably reflects the timing of fieldwork, rather than a genuine absence during the austral summer.

COLLARED CRESCENT-CHEST *Melanopareia torquata*

Hayes (1995) lists just one record for Paraguay, a 1938 specimen from Dpto. Amambay. Madroño & Esquivel (1997) provide the first recent record, with a bird seen in February 1995 at Aguará Ñu in the RNBM, Dpto. Canindeyú. We found it in dwarf palm (*Butia* sp.) *cerrado* at the same site 14–20 September 1995 (JAT *et al.*). At least six pairs were present, and observed daily. Four males were singing and at least one pair were holding territory in a small group of palms. The species was still present in 1996, with many birds singing on 15 September (AMN). *Melanopareia torquata* is presumably a breeding resident here, and is likely to be found in other areas of similar habitat further north in Paraguay. We noted much variation in the colour and extent of nape collars, with at least one bird apparently lacking any collar. Such variation has not been reported in the identification literature (e.g. Ridgely & Tudor 1989).

OCHRE-BREASTED PIPIT *Anthus nattereri*

Endangered (Collar *et al.* 1994). Hayes (1995) lists up to four records for Paraguay. There are two records from the Chaco, which Hayes considers to be considerably out of range. There are two records in the Oriente, the most recent in 1977 (Ridgely & Tudor 1989). We found *A. nattereri* common at RVS Yabebyry, Dpto. Misiones, with 14 singing birds in well-defined territories 27 October to 1 November 1995 (BLL *et al.*). At the nearby MN Bosque del Arary, Dpto. Itapúa, we found *A. nattereri* in two areas. At Base Aerea, it was common, with up to ten singing birds 1–3 November 1995 (MP *et al.*). At least four birds were still singing, and several other birds seen, on 20 December 1995 (RPC, BLL). At Puerto Turi, a singing bird was seen and heard on 5 November 1995 (BLL).

Different pairs were photographed in the field at RVS Yabebyry on 28 and 30 October, and an additional singing bird was trapped on 1 November. The songs of at least two different birds were tape-recorded at this site, and two singing birds were tape-recorded at Base Aerea, MN Bosque de Arary, on 20 December 1995. The large populations of this very rare pipit at both sites are of very high conservation significance. It is fortunate that both sites receive at least nominal protection, covering a combined, and near-contiguous protected grassland area of over 40,000 ha (Lowen *et al.* 1996b).

GREEN-CHINNED EUPHONIA *Euphonia chalybea*

Near-threatened (Collar *et al.* 1994). Hayes (1995) lists five certain and two possible records in the Oriente; one of these possible records (at the RNBM, Dpto. Canindeyú, in September 1992) should be considered certain (Brooks *et al.* 1993). There exists an additional specimen record (MNHNP 000323), previously labelled as a Palm Tanager *Thraupis palmarum*, taken at Puerto Triunfo, Dpto. Itapúa, on 6 November 1985 (RPC, JCL, JAT).

At PN Caaguazú, Dpto. Caazapá, we recorded a singing immature male or female on 18 July 1995 (RPC), an adult male on 20 July (JCL) and a presumed pair on 24 July (RPC). At PN San Rafael, Dptos. Itapúa/Caazapá, *E. chalybea* was fairly common, with 28 records 26–31 July 1995; up to eleven birds were recorded daily in seven distinct areas (JAT *et al.*). Most records were of pairs or singing males; one pair was photographed. At RNP Itabó, Dpto. Canindeyú, two female/immatures were seen on 2 August 1995 (RB). The species is evidently fairly widespread, but rare, in eastern Paraguay, appearing most frequent in the southeast.

DIADEMED TANAGER *Stephanophorus diadematus*

Hayes (1995) lists five records, the four known localities lying in extreme eastern Paraguay. The only recent record is from 1992 (Brooks *et al.* 1993). At PN Caaguazú, Dpto. Caazapá, up to eight individuals were seen daily 16–22 July 1995, mostly in mixed flocks on the forest edge (RPC *et al.*). At PN San Rafael, Dptos. Itapúa/Caazapá, we recorded one bird on 27 July 1995 (JAT), and four on 29 July (R. Barnes, TMB, JCL), one of which was photographed. All birds were in scrub on the forest edge. This appears to be another member of the group of species (including Large-tailed Antshrike and Bertoni's Antbird) that inhabit montane forest in southeast Brazil, but occur in scrubbier low-altitude habitat at the edge of their range in southeast Paraguay (see also Whitney *et al.* 1995).

TEMMINCK'S SEEDEATER *Sporophila falcirostris*

This bamboo specialist is considered Endangered by Collar *et al.* (1994). Hayes (1995) lists just one Paraguayan record, in 1977. Madroño & Esquivel (1995) found three males at the RNBM, Dpto. Canindeyú, in June 1995. We recorded it in bamboo (*Merostachys* sp.) at PN Caaguazú, Dpto. Caazapá, where males were seen on 18 July (RPC) and 19 July 1995 (JCL). Both observers had recent experience of *Sporophila falcirostris* in southeast Brazil. This rare species probably survives in low numbers in eastern Paraguay, perhaps being locally nomadic and moving between areas of bamboo. None of the 1995 birds was associated with bamboo flowerings, but it is possible that birds were lingering following such an episode in 1994 (RPC). Given the widespread deforestation of the adjacent Brazilian states, it would seem likely that any populations of *S. falcirostris* in eastern Paraguay and northeast Argentina are isolated from southeast Brazil (Lowen *et al.* 1996b).

SOOTY GRASSQUIT *Tiaris fuliginosa*

Hayes (1995) lists one record for Paraguay, a bird at the RNBM, Dpto. Canindeyú, in 1992 (Brooks *et al.* 1993). Madroño & Esquivel (1997) detail additional records for the RNBM in September and November 1994. At Estancia Kaa'gua Rory, Dpto. Caaguazú, a female was mist-netted on 31 August 1995 (DL *et al.*). We recorded *Tiaris fuliginosa* in two areas at the RNBM. At Jejui-mí, a male was seen on 8 September 1995 (JCL). At Lagunita, two males were found on 11 (RPC), one male on 12 (RJ, JR) and a pair on 13 September 1995 (BLL, JMB). Prior to 1992, the nearest known populations to Paraguay were in central Mato Grosso and in eastern São Paulo states, Brazil (Ridgely & Tudor 1989, Sibley & Monroe 1990). Subsequently, however, it has also been found in Misiones province, Argentina (Mazar Barnett & Herrera 1996). It would seem likely that *T. fuliginosa* occurs in low numbers throughout eastern Paraguay and northeast Argentina, but has—until recently—been overlooked.

First reliable records for the Oriente or Chaco regions

LEAST BITTERN *Ixobrychus exilis*

See above.

SPOT-FLANKED GALLINULE *Gallinula melanops*

There are many records from the Chaco, but it is considered "hypothetical" in the Oriente (Hayes 1995), with just one old unconfirmed report lacking site and date details (Podtiaguin 1945). We recorded *Gallinula melanops* on the main lagoon at Lagunita, RNBM, Dpto. Canindeyú, where one was seen and photographed 10–13 September 1995 (JMB *et al.*). This is the first documented record for the Oriente.

SPOT-WINGED PIGEON *Columba maculosa*

See above.

MARSH SEEDEATER *Sporophila palustris*

Endangered (Collar *et al.* 1994). Hayes (1995) only lists it for the Oriente. At RNP Golondrina, Dpto. Presidente Hayes, an adult male was present with a male Rufous-rumped Seedeater *S. hypochroma* on 7 November 1995 (JCL). This is the first record for the Chaco. The date is that of a migrant, and a Chaco record is not surprising. *Sporophila palustris* usually arrives on breeding grounds in Corrientes province, Argentina, in the first week of November (Pearman & Abadie in press).

CHESTNUT SEEDEATER *Sporophila cinnamomea*

Near-threatened (Collar *et al.* 1994). Hayes (1995) gives a total of five records for Paraguay; additionally, a bird was recorded at RNBM, Dpto. Canindeyú, in October 1994 (Madroño & Esquivel 1995). At RNP Golondrina, Dpto. Presidente Hayes, a single male was seen in a mixed *Sporophila* flock on 8 November 1995 (BLL). This is the first record for the Chaco, and presumably refers to a bird moving south to breed in northern Argentina.

LESSER GRASS-FINCH *Emberizoides ypiranganus*

Near-threatened (Collar *et al.* 1994). Hayes (1995) lists just six records for Paraguay, all from the Oriente. The species was fairly common at RNP Golondrina, Dpto. Presidente Hayes, with up to ten individuals daily 7–9 November 1995 in wet grassland. These are the first records for the Chaco. The species probably occurs in similar habitat at other sites in the area. With few previous records in Paraguay, *E. ypiranganus* has now been found over a wide area of the country (Lowen *et al.* 1996b).

Discussion

In this paper we discuss the occurrence of 43 bird species which previous evidence indicated to be exceptionally scarce in, or absent from, Paraguay.

Three species—*Anurolimnas viridis*, *Caprimulgus candicans*, *Caprimulgus maculicaudus*—were unexpected additions to the Paraguayan avifauna. Their nearest known populations lie several hundred kilometres from Paraguay. Our records probably represent previously overlooked populations rather than recent range extensions. Future fieldwork may help to clarify the situation.

Two other species new to Paraguay—*Tityra semifasciata*, *Sporophila nigricollis*—are relatively common throughout their extensive distribution. Our records may represent recent range extensions or indicate that the species occur in very low numbers at the edge of their range. Alternatively they may simply reflect the paucity of fieldwork in the country. Further surveys will doubtless find both species, and the resulting pattern of records may enable adjudication. Other species could be extending their ranges into Paraguay, but the available data are too few to justify firm conclusions. Such range extensions could represent open country birds extending into newly deforested zones or birds displaced by habitat destruction in adjacent areas (as suggested for the recent arrival of Curl-crested Jay *Cyanocorax cristatellus* at RNBM: see Madroño & Esquivel 1997).

Most other noteworthy records refer to species previously overlooked (due either to their secretive behaviour or perceived identification difficulties) or to species dependent on habitats with a limited distribution in Paraguay. Such habitats include *cerrados*, restricted to the extreme north of eastern Paraguay (with isolated patches, such as Aguará Ñu, RNBM, extending further south), and the grasslands of southern Paraguay. Until our 1994 and 1995 fieldwork, there had been very few comprehensive ornithological surveys of these areas, with most records attributable to occasional fortuitous observations. Our records of species such as *Micropygia schomburgkii*, *Elaenia chiriquensis*, *Melanopareia torquata*, *Anthus hellmayri*, *Anthus nattereri* and

Coryphaspiza melanotis, which occur in similar habitat in adjacent Brazil and Argentina, were thus not unexpected.

Similarly, although the humid forest originally covered 55% of the Oriente (Bozzano & Weik 1992), there is a subset of Atlantic Forest endemics whose distribution in Paraguay appears restricted to the southeast, adjacent to Misiones province, Argentina (Lowen *et al.* 1996b). Such species include *Mackenziaena leachii*, *Clibanornis dendrocolaptoides*, *Anabacerthia amaurotis*, *Campylorhamphus falcularius* and *Stephanophorus diadematus*. Since recent ornithological fieldwork in the Paraguayan Atlantic Forest has concentrated on forests further north and west (e.g. Brooks *et al.* 1993, Madroño & Esquivel 1997, Hayes & Scharf 1995), it is unsurprising that there have been few or no recent records of these species until renewed fieldwork at sites within their Paraguayan range.

A number of the species are secretive and unlikely to be recorded if their vocalizations are not known. These include crakes, owls, *Caprimulgus maculicaudus*, *Mackenziaena leachii*, *Drymophila rubricollis* and *Hylopezus nattereri*. Inadequate identification literature (e.g. for *Anthus* spp., *Euphonia chalybea* and *Emberizoides ypiranganus*) has a similar effect. Further fieldwork in appropriate habitat will probably reveal these species as more widespread than current records suggest.

Several migratory species may have been under-recorded due to a lack of fieldwork at the appropriate season. *Buteo swainsoni*, a North American breeder that spends the austral summer in Argentina, is likely to pass through Paraguay in reasonable numbers each year. Likewise, migrant *Sporophila* species such as *S. palustris* and *S. cinnamomea* probably pass through the Paraguayan Chaco each year en route between Brazil/Bolivia and Argentina. A few records may refer to vagrant individuals. This is perhaps the case for *Gallinula melanops* at RNBM, the single record of *Poospiza lateralis*, and both the 1992 (Brooks *et al.* 1995) and 1995 records of *Amazona pretrei*.

New distributional information was gathered for seven globally threatened species, including the Critically Endangered *Claravis godefrida* and *Caprimulgus candicans* (Collar *et al.* 1994). All are primarily threatened by habitat loss (Collar *et al.* 1992, 1994). They are—by definition—likely to be genuinely rare in Paraguay, although at sites which preserve pristine areas of their habitat they could be locally common (e.g. *Anthus nattereri* at two southern grassland sites and *Coryphaspiza melanotis* at Aguará Ñu, RNBM).

Most of our records reflect the paucity of knowledge about the distribution of birds in Paraguay rather than genuine rarity of the species concerned. However, given the continuing destruction and degradation of Paraguay's natural resources, it is likely that many are declining. Recent fieldwork (e.g. Brooks *et al.* 1993, 1995, Lowen *et al.* 1995, 1996a, 1996b, Madroño & Esquivel 1997) has highlighted the urgent need for more biological fieldwork. The rate at which Paraguay's ecosystems are being destroyed will otherwise result in the loss of the country's avifauna before much of it has even been documented.

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Appendix

A summary of the location of sites mentioned in the text

Region	Site	Department	Coordinates
Oriente	RVS Yabebyry	Misiones	27°10′S, 57°00′W
	MN Bosque de Arary	Itapúa	27°27′S, 56°48′W
	/Base Aerea		27°25′S, 57°11′W
	/Puerto Turi		27°24′S, 57°14′W
	RNP Ypetí	Caazapá	25°33′S, 55°30′W
	RNP Itabó	Canindeyú	24°20′S, 54°35′W
	PN Caaguazú	Caazapá	26°04′S, 55°45′W
	PN San Rafael	Itapúa	26°25′S, 55°40′W
	RNB Mbaracayú	Canindeyú	24°07′S, 55°23′W
	/Jejui-mí		24°08′S, 55°31′W
	/Lagunita		24°08′S, 55°25′W
	/Aguará Ñu		24°09′S, 55°16′W
	/Carapá waterfall		24°00′S, 55°20′W
	PN Ypacaraí	Central/Cordillera	25°15′S, 55°19′W
	RNP Sombrero	Cordillera	25°00′S, 56°38′W
	Estancia Kaa'gua Rory	Caaguazú	24°46′S, 55°26′W
	Bahia de Asunción	Central	25°18′S, 57°40′W
	Estancia Jiménez	Canindeyú	24°13′S, 55°38′W
	PN Cerro Corá	Amambay	22°39′S, 56°00′W
Chaco	RNP Golondrina	Presidente Hayes	24°59′S, 57°43′W
	Puerto Remanso	Presidente Hayes	25°12′S, 57°33′W

On the validity of the Half-collared Sparrow *Arremon semitorquatus* Swainson, 1837

by Marcos A. Raposo & Ricardo Parrini

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Many authors have stressed that it is necessary to review the many existing polytypic species because of the conceptual problems presented by the subspecific rank (Rosen 1978, 1979, Nelson & Platnick 1981, Wiley 1981, Cracraft 1983, 1992, McKitrick & Zink 1988).

The Pectoral Sparrow *Arremon taciturnus* (Hermann, 1783) is a classical example of a problematic taxon. It is a Neotropical undergrowth forest dweller generally treated as consisting of four subspecies: *A. t. nigrirostris* Sclater, 1886, from Peru, Bolivia, and probably northwestern Argentina (Meyer de Schauensee 1982); *A. t. axillaris* Sclater, 1854, from the eastern part of Colombia and adjacent Venezuela; *A. t. taciturnus* ranging from southern Venezuela, the Guyanas and the right bank of the rio Amazonas through the states of Mato Grosso, Goiás, Tocantins, Pará and southward to Minas Gerais and Espírito Santo; and *A. t. semitorquatus* Swainson, 1837 which is restricted to Brazil from Rio de Janeiro to Rio Grande do Sul (Hellmayr 1938, Pinto 1944).

In spite of the well marked differences between the last two taxa their conspecificity was defended by Hellmayr (*op. cit.*) and Pinto (*op. cit.*) on the basis of a supposed intergradation zone, particularly at Serra dos Órgãos, a mountain range in Rio de Janeiro. These authors distinguished *A. t. semitorquatus* from *A. t. taciturnus* by the colour of the lower mandible (yellow in the former and blackish-brown in the latter), the lesser upper wing coverts (nearly the same olive as the back in the former, bright yellow in the latter), and the black pectoral collar (interrupted at the centre of the neck in *A. t. semitorquatus*, complete in the nominate subspecies). The presence of an "intergradation zone" was based on the variation of the two last characters in some specimens from Serra dos Órgãos and in one skin from Ipanema (upland São Paulo).

The purpose of this work is to re-examine the evidence adduced by Hellmayr and Pinto, and to review the taxonomic status of Swainson's form.

Methods

We conducted an analysis of the specimens housed in the Museu Nacional of Rio de Janeiro and Museu de Zoologia da Universidade de São Paulo. A total of 243 skins were examined, 54 corresponding to the diagnosis of *A. t. semitorquatus* and 189 to that of the nominate form. The measurements taken were: bill length (calmen); wing length (chord); and tail length. Some field notes were made and specimens were collected in Bahia and Rio de Janeiro, mainly in Serra dos Órgãos, the alleged intergradation zone between *A. t. taciturnus* and *A. t. semitorquatus*. The Colombian and Peruvian/Bolivian subspecies were not included in the present comparison since they are widely separated from *A. t. semitorquatus*, our main subject. A good diagnosis of those forms can be found in Hellmayr (1938). The geographical co-ordinates of all the localities mentioned here may be found in Paynter & Traylor (1991) and Vanzolini (1992).

Results

Our analysis produced no evidence to corroborate the conspecificity of *semitorquatus* and *taciturnus*, nor the existence of the intergradation zone mentioned by Hellmayr and Pinto. No individual of *A. t. taciturnus* was found in Rio de Janeiro (the proposed hybridisation zone) where we only found typical *semitorquatus*, which was also recorded northward to northeastern Espírito Santo (Santa Teresa, 19°55′S, 40°36′W and Jatiboca, 20°05′S, 40°55′W) and eastern Minas Gerais (Mariana, 19°30′S, 41°00′W). It is noteworthy that this northward extension was not mentioned by those authors, and that it makes the intergradation zone at the interior of Rio de Janeiro state incomprehensible (see Fig. 1). The apparent allopatry of these two forms and the clear distinction between them, although their ranges abut, indicates that *semitorquatus* should be elevated to species rank.

Diagnosis of A. semitorquatus

The characters presented by Hellmayr and Pinto for the differentiation of *A. semitorquatus* and *A. taciturnus* were found to be constant. *A. semitorquatus* is characterised by the presence of an interrupted black collar, in contrast to the complete one found in adult males of nominate *A. taciturnus*. In *A. semitorquatus*, the bill had a yellow mandible contrasting with a blackish-brown maxilla, and the lesser upper wing coverts are nearly of the same colour as the rest of the dorsal plumage, while *A. taciturnus* has an uniform blackish bill and yolk-yellow lesser upper wing coverts. The sides of the belly in *semitorquatus* are invaded by dark grey, usually not present in *A. taciturnus*. The females of *semitorquatus* have an interrupted collar like that of the males, contrary to the accentuated dimorphism presented by *A. taciturnus*, the females of which do not have the black collar or have this feature reduced to a slight and inconspicuous grey jugular band. In both species, the females generally have a clear suffusion of buff on the ventral area, most pronounced on the throat.

The other species that could be mistaken for *A. semitorquatus* is *Arremon flavirostris* Swainson, 1837, notably the nominate subspecies which, like the former, has bright olive upper parts. The latter species has an orange bill with a black ridge, a white chin and a complete black pectoral band in both sexes. *A. semitorquatus* and *A. taciturnus* both have a black chin-spot and a white superciliary stripe reaching to the base of bill, while *A. flavirostris* and its sister-taxon *A. polionotus*

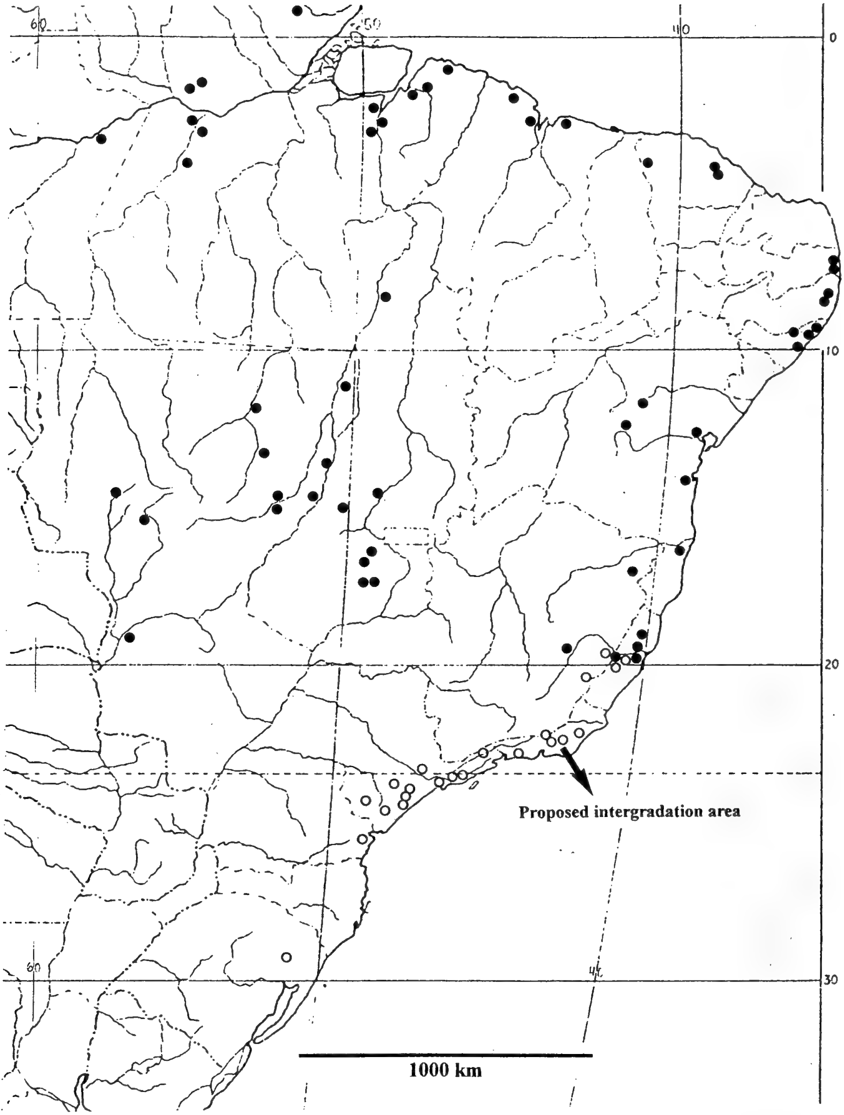

Figure 1. Map showing the distributions of *A. semitorquatus* (○) and *A. taciturnus* (●) in eastern South America after our studies, and the proposed intergradation area of Hellmayr (1938).

Bonaparte, 1851, both occurring in central Brazil, have the white superciliary stripe starting just above the eye (Silva 1991). *A. polionotus* has, moreover, dark grey upper parts. *A. flavirostris dorbignii* Sclater, 1856 (Bolivia to Argentina) resembles the nominate subspecies. The status of the Brazilian subspecies of the *A. flavirostris* complex was recently reviewed by Silva (*op. cit.*).

Individual variation

One male (MN 38305) from Serra dos Órgãos (Nova Friburgo) shows an ill-defined collar similar to that described by Hellmayr for an intermediate between the interrupted and the complete collar patterns of *semitorquatus* and *taciturnus*. In spite of it, this specimen retains all the other characters of *A. semitorquatus*. The fact that it comes from the centre of the range of *A. semitorquatus*, far from that of *A. taciturnus*, leads us to suppose that this plumage pattern may be of the ontogenetic origin or represent a rare individual variation. This feature alone is not enough to justify the suggestion of intergradation. Two specimens of *A. taciturnus* from Pará (rio Cururu, 07°12′S, 58°03′W) show a similar variation, having an incomplete pectoral band. We have come across other cases of isolated individual variation.

Measurements

The examination of skins of both sexes of *A. semitorquatus* and *A. taciturnus* revealed some notable differences in their measurements. The tail of *semitorquatus* (mean 66.51; s.d. 2.81) is noticeably longer (t=12.73, P<0.01) than that of *taciturnus* (mean 58.33; s.d. 3.67). The wing chord of *semitorquatus* (mean 69.8; s.d. 3.23), in contrast to the tail, is usually shorter (t=3.27, P<0.01) than that of *taciturnus* (mean 71.95; s.d. 3.49). The bill of *semitorquatus* (mean 12.32; s.d. 0.61) is in general shorter (t=6.36, P<0.01) than that of *taciturnus* (mean 13.06; s.d. 0.51).

Geographic distribution

Based on the examined material, *A. semitorquatus* occurs from Espírito Santo (Santa Teresa and Jatiboca) and Minas Gerais ("Fazenda Taveira" and Caparaó), southward through Rio de Janeiro (Três Rios, Cantagalo, Nova Friburgo, Teresópolis and Mangaratiba), São Paulo (Ribeirão Fundo, Serra da Cantareira, Mogi das Cruzes, Cabreuva, Piquete, Rio Grande, Barra do Ribeirão Onça Parda, Salesópolis and Itapetininga), Paraná (Morretes), probably Santa Catarina, to Rio Grande do Sul (Novo Hamburgo). Rio de Janeiro was suggested as the type locality by Berlepsch (in Hellmayr 1938).

In the states of Minas Gerais (Machacalis and Baixo Suassuí) and Espirito Santo (*e.g.* Soretama, Ibiraçu, Baixo Guandu and Rio São José) *A. taciturnus* occupies mainly lowlands, while *A. semitorquatus* seems to be confined to the mountains (*e.g.* Santa Teresa). This rule is not valid from Rio de Janeiro southward, where *A. taciturnus* is absent and *A. semitorquatus* also occurs in lowland areas (*e.g.* Mangaratiba and Morretes). The same phenomenon occurs with *A. taciturnus*, as in the northern portion of its range it is found in the mountains (Serra de Baturité, Serra da Neblina, etc.) as well as in the lowlands (*e.g.* Porto Seguro).

Final remarks

To conclude, *Arremon semitorquatus* is a good species, found to our knowledge only in Brazil. There is no geographic area where it has been found in sympatry with *A. taciturnus*. The intergradation zone proposed by Hellmayr and Pinto may have been based on misinterpretation of individual variation in the size of the pectoral band. Phylogenetic relationships within this genus are still unclear, and a revision is desirable. The presence of conspicuous sexual dimorphism in *A. taciturnus* (female without pectoral band) is an interesting feature that is not shared by any of its congeners. The taxonomic status of the subspecies of *A. taciturnus* should be scrutinised, especially *A. t. nigrirostris* which lacks good diagnostic characters.

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What is a desert bird?

by P. J. Cowan

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Desert is arid (low precipitation, high potential evaporation, rare and ephemeral liquid water accumulation on surface) and has a relatively small amount of vegetation. A bird in a desert might be resident, wintering, on migration or have some other temporal status. Spatially, some resident species appear characteristic of the desert whilst other avian desert residents have widespread distributions outside deserts. Some bird species occur in the desert proper whilst others are found in oases.

Many studies of "desert birds" have been reported in the scientific literature, including recent reviews by Webster (1991) and Maclean (1996) on ecophysiological aspects of avian survival in deserts. However, defining a desert bird is problematic (Cowan 1990, Wiens 1991) and the particular usage in a study is often not explicit. Lowe (1968) noted that animals referred to as desert species have often included species with a far wider distribution outside deserts. Lowe (1968) distinguished between non-desert species of animals, which occur in "permissive" desert environments and are more widespread outside deserts, and desert species which are either "desert-only" arid habitat species or "desert-included" species occurring in both desert arid habitats and semi-arid regions outside deserts. The present note is intended to further elucidate the question: what is a desert bird?

A desert bird could be a bird species that has evolutionary adaptations to the arid habitats of deserts (Maclean 1976), though any suggested adaptation needs to be proved. Bradshaw (1988) considered that desert reptiles survive due to general reptilian adaptations rather than the possession of unique adaptations to deserts. Birds may only need adaptive refinements to ensure survival in deserts due to favourable general avian adaptations (Miller 1963). Thomas (1984a,b) suggested that desert birds have a multiplicity of relatively minor evolutionary adaptations to deserts the cumulative effect of which is substantial. The discovery that cutaneous evaporative cooling constitutes a major heat defence mechanism in certain columbid birds contrary to previous expectations (Webster 1991), suggests that significant individual adaptations of birds to the arid habitats of deserts may remain to be discovered.

Adaptations to deserts need not be confined to species restricted in distribution to deserts, e.g. birds which migrate through desert regions might acquire desert adaptations (Miller 1963); but species restricted to the arid habitats of deserts presumably would be the most likely to possess significant desert adaptations. An ecogeographic definition of a desert bird therefore should aid in the selection of species for study in the hunt for avian adaptations to deserts.

What is a desert?

The question of what is a desert bird includes the perennial problem of precisely defining what is a desert. Differing systems of discrete major ecosystem types have been used to describe and map the Earth's terrestrial regions; tundra, desert, tropical rain forest and other major ecosystem types being variously defined using mainly climatic and vegetational criteria (e.g. Bailey 1983, 1989). Numerous other studies have concentrated on arid environments and these have used a wide variety of desert definitions involving, for example, vegetational criteria, the simple specification of isohyets and the use of aridity indices incorporating precipitation, temperature and other climatic variables (review by McGinnies *et al.* 1968). Some authors, e.g. Le Houérou (1977), have restricted their definition of a desert to include only the more extreme arid conditions. Schmidt (1979) presented 12 different delineations of the Chihuahuan desert of North America and a 13th, his version. The ecological zones of North Africa, from the central Sahara desert north to the 400 mm isohyet, presented by Le Houérou (1979) and based on climate, vegetation and land use, are, although he stated otherwise, arbitrary. Different, but equally valid, subdivisions of this region are possible (e.g. Ayyad & Ghabbour 1986). Only arbitrary criteria are available for the distinction between desert and the less arid major ecosystem types (e.g. Whittaker 1975, Beard 1980, Monod 1986, World Conservation Monitoring Centre 1992). The desert concept is subjective and, therefore, any definition of a desert bird is also subjective.

The UNESCO (1979) map of the world distribution of arid and semi-arid regions, based on aridity index values for meteorological stations but supplemented by taking soil, relief and vegetation data into account, is arguably the best general-purpose aridity map yet produced (Verstraete & Schwartz 1991). The aridity index of the UNESCO (1979) map is the ratio P/ETP, where P is the mean annual precipitation and ETP is the mean annual potential evapotranspiration calculated using the Penman formula. P/ETP less than 0.20 is arid. The arid (arid and hyper-arid) regions of this map, but not its semi-arid and sub-humid regions, can be considered to be deserts (Cowan 1987, 1990, 1996, Oberlander 1994).

The world's deserts, using the UNESCO (1979) map, lie between latitudes 50°N and 50°S. Major desert areas occur in North and South America, northern and southern Africa, Asia, and Australia. Polar "deserts" (Logan 1968) are excluded. The high altitude deserts of the Tibetan Plateau are included. The hyper-arid regions of the UNESCO (1979) map are mainly restricted to North Africa and Arabia and are absent from Australia. The arid (arid and extremely arid) areas of its predecessor map, produced by Peveril Meigs for UNESCO, were used by McGinnies *et al.* (1968) and Evenari (1985) for desert delimitation.

Within the perimeter of a desert a distinction exists between desert and oasis. Oases include traditional oases, irrigated agricultural projects, cities and habitats associated with perennial rivers. Lakes or pools in the desert, with associated vegetation, can attract a considerable avifauna of wetland species (e.g. Cowan 1985). Non-arid highlands can also occur within the desert perimeter (e.g. Schmidt 1989). The arid habitats of deserts include the normally-dry valleys, which experience stream flow only after sufficiently heavy rain. Some areas in oases, away from irrigation and water, appear effectively to be arid habitats. Also, previously irrigated agricultural areas return to desert-like conditions.

Desert birds

The ideal ecogeographic definition of a desert bird would be a species completely restricted in its breeding and non-breeding range to the arid habitats of deserts. Unfortunately, comparison of the distributions of avian species with the boundaries of the world's deserts, the arid and hyper-arid regions of the UNESCO (1979) map, soon reveals a problem. Desert Lark *Ammomanes deserti*, Desert Wheatear *Oenanthe deserti*, Trumpeter Finch *Bucanetes githagineus* and many others of those avian species which appear good candidates for meeting the requirements of the ideal definition (e.g. Casselton 1984), are not completely restricted to the arid habitats of deserts; they can also occur and breed in semi-arid regions outside the desert such as steppe, drier savanna or semi-arid mountains. Apparent desert birds are sometimes found in oasis situations; e.g. Spotted, Crowned and Lichtenstein's Sandgrouse *Pterocles senegallus*, *P. coronatus*, *P. lichtensteinii* drink at permanent pools and village irrigation channels (Thomas & Robin 1977), Black-crowned Finch Larks *Eremopterix nigriceps* are abundant in late summer at a lush desert golf course (Richardson 1990), and in central Saudi Arabia, in late summer, local concentrations of Brown-necked Ravens *Corvus ruficollis* occur near water, including up to 500 at a reservoir on the outskirts of Riyadh (Jennings 1980). Some likely desert birds have occurred as vagrants in countries a considerable distance from deserts, e.g. 33 Cream-coloured Coursers *Cursorius cursor* have been recorded in the British Isles, nine Desert Warblers *Sylvia nana* in Sweden (Lewington *et al.* 1991). Ignoring vagrancy, the Bar-tailed Desert Lark *Ammomanes cincturus* is probably the closest to meeting the ideal definition of the 25 species listed by Casselton (1984) as the desert-associated members of the Sahara desert avifauna.

More realistically, desert birds can be considered as those species which occur primarily within the arid habitats of deserts, any occurrence elsewhere being considerably less important. This definition includes species which are completely restricted to the arid habitats of deserts but excludes, for example, species which occur equally in deserts and semi-arid regions. A desert bird could breed in one desert, migrate with stop-overs in less-arid regions, then overwinter in another desert. The imprecision of the terms "primarily" and "considerably" in the definition adds further subjectivity to any list of desert birds produced. Selection of species for a list of the desert birds of a desert involves assessing from the literature the world distribution of each of the avian species recorded there. I listed 23 (later reduced to 20) desert bird species for the deserts of Pakistan and India (Cowan 1987, 1996), 26 for the rift valley desert of the Gulf of Aden and southern Red Sea region (Cowan 1990) and 14 for the Caspio-Central Asian desert (Cowan 1996), involving 39 different species. Each of the species referred to by name in the previous paragraph would be a desert bird.

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Range extensions and unusual sightings from Western Province, Papua New Guinea

by Phil Gregory

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The birds of the Tabubil area of the Western Province of Papua New Guinea have now been documented by the papers written by Bell (1969), Coates & Lindgren (1978), Murray (1988a) and Gregory (1995d). The latter added over 75 species to the previous total recorded. The status of some species is altering as habitats change due to settlement, and a number of species such as Pied Chat *Saxicola caprata* and Black-headed Whistler *Pachycephala monacha* have colonised new areas of secondary growth. Losses have been few, with only the Brown Quail *Coturnix australis* and Tawny Grassbird *Megalurus timoriensis* seemingly gone, the former due to the loss of its grassland habitat at what is now the mine site.

The additions since Gregory (1995d) are summarised below and now bring the Ok Tedi area total up to some 329 species, a very high total given the primarily forest habitats and absence of extensive wetlands or coastline. In addition, distributional information from the remote Kiunga and Obo (Middle Fly river region) areas of Western Province is given in separate sections.

For the present purpose, the Ok Tedi area may be defined as follows: the valley of the Ok Tedi extending south to km 90 on the Kiunga road and northwest as far as Mt. Binnie inside the mine site itself. The Hindenburg Walls (actually some three such structures, spectacular knife-edge limestone escarpments forming part of the foothills of the Hindenburg Range) form a natural boundary to the north, and the survey area extends west as far as the Lukwi valley beyond the village of Ok Ma. The total area is approximately 500 km^2.

Additions and corrections for the Ok Tedi area

PEACEFUL DOVE *Geopelia striata*

Singles in Tabubil town in February and March 1996 represent a large northward range extension from the southern Trans-Fly. Suitable habitat appears available for colonization as the area is opened up.

THREE-TOED SWIFTLET *Collocalia papuensis*

A single specimen captured at Luplupwintem Cave just outside the Ok Tedi survey area in April 1993 was the first such for PNG (Rowland 1994). Conceivably much overlooked. There were some *Collocalia* swiftlets flying about in front of thunderheads at km 9 on the Ok Ma road in October 1995 with several birds looking like something different. They were quite large, with an extremely fast flight more like an *Apus* than the usual *Collocalia* 'dithering', spiky winged and with a slightly forked tail, brownish plumage with a prominent silvery chin and throat which contrasted sharply with the dull underparts. I think these are likely to be Three-toed Swiftlet *Collocalia papuensis*, but a specimen would be necessary for certainty.

GREATER MELAMPITTA *Melampitta lugens*

Discovered on Mt. Robinson in forest with no obvious karst formations at 1000 m on 31 October 1992, with at least 2 birds calling in one area (R. Rowland and P. Gregory). Also heard at two other sites on Mt. Robinson at about 1100 m, from Dablin Creek at 750 m and from km 7 and 9 on the Ok Ma road at 750 m where it occurs in the more usual limestone karst country.

GRAY'S GRASSHOPPER WARBLER *Locustella grayi*

A single *L. grayi* was found in undergrowth at km 9 on the Ok Ma road in October 1995. A probable in March 1992 in similar secondary scrub habitat in the town is suggestive of a passage migrant.

LEMON-BELLIED FLYCATCHER *Microeca flavigaster*

Uncommon. A single bird at 700 m at Dablin Creek in early 1993 was unexpected but the species is now regularly found there, with a maximum of 5 birds (probably a family party). Originally thought to be Olive Flycatchers *M. flavovirescens* and listed as such in Gregory (1995d) but subsequent views have permitted a re-identification. The form here is bright yellow beneath with dark legs and a short tail.

GREY SHRIKE-THRUSH *Colluricincla harmonica*

A single in Tabubil in March 1996 was an unexpected addition, maybe a wanderer from the Trans-Fly.

GREY-STREAKED FLYCATCHER *Muscicapa griseisticta*

Vagrant, but may be more regular than supposed. The third and fourth records for Papua New Guinea came from forest clearing edge at Ok Menga on 3 November 1991 and 22 November 1992. A spring bird was in Tabubil on 15 March 1996, suggesting that the species may be regular in the area as it is quite frequent in Irian Jaya during the northern winter.

PAPUAN FLOWERPECKER *Dicaeum pectorale*

A common canopy-dwelling species up to about 1500 m locally, often seen in pairs. Omitted in error from Gregory (1995d) but previously recorded by Murray (1988) and Coates & Lindgren (1978).

A note on two Ok Tedi mysteries

Melanocharis sp.

A female *Melanocharis* recorded as Obscure Berrypecker *M. arfakiana* by Coates & Lindgren (1978) was seen in hill forest at 640 m on 8 February 1978. The yellow pectoral tufts and some orange on the gape or bill base suggested an immature bird. Murray (1988a) reported a similar yellow tufted bird at the plateau edge on 17 April 1987.

At Dablin Creek on 1 October 1992, C. Eastwood and I found two small canopy-haunting *Melanocharis*-type berrypeckers with yellow pectoral tufts and orange bills, but also with faint dark streaks underneath (Gregory 1993a). In July 1993 orange-billed yellow-tufted birds without streaks were common in the same area, haunting the canopy and having a high pitched buzzy song identical to unidentified berrypeckers discovered at Boana on the southern Huon by a Field Guides Inc. tour group in 1991. These Boana birds have yellow pectoral tufts, but also an eye ring, which is lacking in the Tabubil form (B. Whitney and J. Pierson pers. comm.).

Clearly much work needs to be done to reveal the identity of these forms, which may be referable to *M. arfakiana*, or represent an undescribed taxon. Two individuals were collected under permit in July 1994 by Whitney and are being studied in the U.S.A. The form is quite frequent at heights of *c.* 750–1000 m in the area, now being known from the Ok Ma road and Mt. Robinson as well.

It is also worth recalling that Coates & Lindgren (1978) reported a drab olive *Melanocharis* of the *striativentris/longicauda* type at 2220 m on Mt. Binnie in moss forest, but with strong black streaking down the sides of the abdomen and white pectoral tufts. There have been no further sightings as yet and its identity remains unknown.

RED-BREASTED PIGMY-PARROT *Micropsitta bruijnii*

A form resembling Red-breasted Pigmy-parrot, but with a distinctive yellowish cap, is common in the area. This form was first recorded by Murray (Murray 1988b) on Mt. Binnie on 20 September 1987 and was rediscovered by G. Johnston and myself at Dablin Creek on 29 November 1991 (Gregory 1994). There have been frequent sightings since with 40 flying N at Ok Menga at 750 m on 4 October 1992; also 220 flying N there on 25 October 1992; 45 on 8 November 1992, and an unprecedented total of 650 heading NE on 22 November 1992 between 16.00 and 16.45 hrs, in flocks of 50–60 birds with one flock of over 100. Flocks of 20–30 are common at Dablin Creek. A pair were excavating a chamber in a stump at Townsville at 1650 m in September 1992 (photograph of the male in Gregory 1995d).

Reference to museum specimens in Port Moresby, Sydney and Hawaii by G. Johnston suggests some variation in the colouration of males of this species, and the local birds are likely to be within this continuum rather than being a new subspecies.

The Yellow-capped Pigmy-parrot *M. keiensis* is unrecorded from the area (or confused with the other form) but is possible lower down the valley.

Further notes on the plumage phases of the Grey-headed Goshawk

I recorded a previously undescribed melanistic morph of the Grey-headed Goshawk *Accipiter poliocephalus* in the Ok Ma area in 1992 (Gregory 1995c). A normal phase adult, and an adult of a hitherto undescribed greyish morph, were found at Ok Menga, Western Province, on 21 September 1996. The latter was twice seen well, perched in trees, and watched through a × 30 telescope on my second view. It showed whitish underwing coverts in flight, like the normal phase adult seen earlier. Its plumage was otherwise entirely mid-grey, including the head and underparts, with no streaks or bars, quite unlike the usual pale headed appearance. The legs were the normal bright pink, and the cere was also bright pink, extending back to the dark eye which had a reddish ring around it joined to the pink loral patch. In its head pattern the bird was curiously reminiscent of a Gabar Goshawk *Micronisus gabar*. These New Guinea accipiters remain poorly known, particularly their immature plumages, and the Grey-headed Goshawk is clearly polymorphic in this area.

Distribution data from the Kiunga area

The Kiunga area, along the upper Fly River some 140 km south of Tabubil, is well-known for a number of rare New Guinea species, and some recent records are given below. New road and forestry developments look set to cause significant changes in the near future.

NEW GUINEA FLIGHTLESS RAIL *Megacrex inepta*

Local informants report this species as being not rare in dense sago swamps. A captive individual with a single leg was in Kiunga in August 1994.

SOUTHERN CROWNED PIGEON *Goura scheepmakeri*

Still to be found in small parties in the monsoon forest up-river, though extirpated from the immediate vicinity of the town. Birds are quite frequently traded in local markets.

VULTURINE PARROT *Psittrichas fulgidus*

This highly-prized species, classified as Vulnerable by BirdLife International, is occasionally seen flying over the river, or along Magazine Road north of the town.

LARGE FIG-PARROT *Psittaculirostris desmarestii*

This spectacular and uncommon species is sometimes seen from the river, usually in pairs.

LESSER PARADISE-KINGFISHER *Tanysiptera hydrocharis*

Reported in October 1992 from beyond Magazine Road (A. Richards and R. Rowland *in litt.*) and April 1994 about 20 minutes up-river (I. Richardson *in litt.*); sympatric with the Common Paradise-Kingfisher *T. galatea* which is frequent here. A single bird was also found in August 1996, in slightly drier forest than the Common Paradise-Kingfisher (B. Whitney pers. comm.).

LONG-BILLED CUCKOO *Rhamphomantis megarhynchus*

Recorded on the Field Guide Inc tours in July and August during the early years of the decade, and again in 1996, about 15 km north of the town on the Drimgas road. This is a significant extension of the known range of this rare and cryptic species from its previous sites in the Middle Sepik district and around the Port Moresby/Central Province area.

WHITE-BELLIED PITOHUI *Pitohui incerta*

This rare and enigmatic species occurs up-river from the town in the monsoon forest, with brown and black bird parties. It may easily be mistaken for a Little Shrike-thrush *Colluricincla megarhyncha* but is stouter, shorter tailed, and pale creamy beneath with fairly obvious diffuse darker mottling on the chest. Prominent dark eye with pale lores, being almost encircled by pale like an eye-ring. Bill pinkish-horn with a darker lower mandible. Legs brownish-pink. One distinctive call was a repeated *tuc*, almost like clicking the tongue, as well as some typical 'pitohui type' musical calls. The birds kept to the mid-stratum, feeding in vine tangles and perching on tree trunks in a manner reminiscent of *Phyllastrephus* bulbuls.

BROAD-BILLED FAIRY-WREN *Malurus grayi campbelli*

Discovered by Palliser (1988) in swamp forest between the Kiunga airstrip and the river. There are no subsequent Kiunga records, but it was found in a peculiarly difficult and inaccessible habitat. This may be the only field observation of this form, the Mount Bosavi (extreme southwest of Southern Highlands Province) birds all being trapped and then described as a new species *M. campbelli* (Schodde & Weatherly 1982). Following further research and specimens, it was subsequently shown by LeCroy & Diamond (1995) to be a subspecies of the Broad-billed Fairy-wren *M. grayi*.

BANDED YELLOW ROBIN *Poecilodryas placens*

Reported from monsoon forest a short way up-river in April 1994 (I. Richardson *in litt.*). Confirmation is desirable; this would be a significant but not unlikely range extension, as the species is previously known from Mount Bosavi.

WHITE-SPOTTED MUNIA *Lonchura leucosticta*

Reported by Palliser (1988) from the airstrip vicinity, and found in April 1994 at Rumgenai some 27 km north of the town. A Trans-Fly species that is on the edge of its range here, Trans-Fly being the lower and middle sections of the Fly river catchment.

CRIMSON FINCH *Neochmia phaeton*

Two birds with a White-spotted Munia in kunai grass at Rumgenai in April 1994 were a long way from the known range in the middle Fly River.

YELLOW-EYED STARLING *Aplonis mystacea*

Occurs in small numbers with flocks of Metallic Starlings *A. metallica* along the river. The nasal tuft is a useful field character in flight.

FLAME BOWERBIRD *Sericulus (aureus) ardens*

The southern form *S. (aureus) ardens* is still to be found along Magazine road north of the town, where the birds fly over at canopy height of an early morning; also quite often seen flying over the Boystown Road. Skins of males are occasionally seen dangling from the driving mirrors of vehicles, where they are a local version of fuzzy dice and clearly an object of status!

GREATER and RAGGIANA BIRDS-OF-PARADISE *Paradisaea apoda* and *P. raggiana*

The Raggiana seems to be the species usually seen along the Fly River itself in this district, whilst the Greater occupies the areas further away. Hybrids would be extremely difficult to detect, and whether the two species do hybridize here is still unknown. One lek of Greater Birds has been in use for over two decades.

Observations from Obo

Obo is a small airstrip and distribution station sited on the Fly River just north of the Strickland confluence, lying in the middle-Fly wetlands about 200 river miles inland. Ok Tedi Mining Ltd sponsored some surveys in 1994–95 for the Asian Wetland Bureau, and the records here were made whilst a member of that team, unless otherwise stated. Very little has been published about the area.

LITTLE BITTERN *Ixobrychus minutus*

Jaensch (1995) recorded four calling birds in June 1994, flushing a probable pair—which strongly suggested that breeding occurs in these vast wetlands. Various other individuals were seen in December 1994 and April 1995. It can be assumed that a resident breeding population is present, which may perhaps be seasonally augmented by Australian migrants.

GLOSSY IBIS *Plegadis falcinellus*

Counts of 973 at dusk at Lake Daviumbu on 2 December, and 400+ at Lake Ambuve on 4 December show the significance of the area for this species during the austral summer. None were seen in April 1995.

MAGPIE GOOSE *Anseranas semipalmatus*

The area holds good numbers during the austral summer, with 250 at Lake Pangua on 2 December and 150 at Lake Owa on 3 December 1994. Much smaller numbers were present in April 1995, and nests were found.

GARGANEY *Anas querquedula*

4 at Lake Pangua 2 December, 12 at Lake Owa 3 December, 38 Lake Ambuve 4 December 1994. The species is sparse in Papua New Guinea and this may be a significant wintering area.

YELLOW WAGTAIL *Motacilla flava*

The marshy edges of ox-bows supported good numbers of birds, with 10 at Lake Pangua on 2 December, 45 at Lake Owa on 3 December and 10 at Lake Ambuve on 4 December. The area is likely to be a significant wintering ground, for a species thought to be very scarce in Papua New Guinea.

RESTLESS FLYCATCHER *Myiagra inquieta*

The species was previously only known from the southern Bensbach River area in Papua New Guinea, so singles near Komavai village, Lake Pangua on 26 April and at Obo station on 27 April 1995, and a pair found nesting on the roof beam of an abandoned hut at Lake Ambuve in April 1995, are noteworthy range extensions, several hundred kilometres further inland. The nest was a neat cup of dried grass and fine woody material containing a single whitish egg with dark spots. Apparently the first instance of nesting proven for New Guinea.

GREAT REED WARBLER *Acrocephalus arundinaceus*

Usually considered to be a vagrant to the Australasian region. One was singing in reeds along the channel to the main river at Lake Ambuve on 4 December, readily recognised by the distinctive harsh song, large size and streaked breast. May be a far more regular visitor than previously realised.

FLY RIVER GRASSBIRD *Megalurus albolimbatus*

Two at Lake Daviumbu on 2 December, the type locality for the species; one at Lake Owa on 3 December. Recorded in April from Lake Pangua, Lake Owa and Lake Daviumbu, in floating *Echinochloa* and *Leersia* sp. grass mats, not *Cyperus* sedge beds as is the habitat at Bensbach. The species has a distinctive whistled call, a quiet, rising *zeeee*, and may be distinguished from Tawny Grassbird *M. timoriensis* by the prominent white edges to the black tertials, a gently rounded rather than ragged tail, orangish rump, whitish supercilium and underparts and an unstreaked orangish crown.

Lake Owa and Lake Pangua are new localities for the species which is a Papua New Guinea endemic previously known from Lake Daviumbu and the middle Bensbach river. The abundance of suitable habitat in the middle Fly suggests that this easily overlooked species may be more widely distributed than currently recognised and may occur across the border in West Irian.

BLACK MANNIKIN *Lonchura stygia*

Not recorded during December 1994, and only found at Lake Owa in April 1995, despite extensive searches at other apparently similar sites during both expeditions. We saw a total of over 30 individuals in small flocks, most with flocks of Grey-crowned Mannikin *Lonchura nevermanni*, which was widespread in the area in both December and April. *Lonchura stygia* was invariably seen at rest in floating or emergent grass, especially *Oryza* and *Echinochloa* spp. in full seed head, feeding on *Echinochloa* seeds like its congener.

Birds were in a variety of plumages (Gregory 1995b), and are clearly very scarce in the Obo area where the species is presumably nomadic, dependent on supplies of seeds. The species is only otherwise known in Papua New Guinea from Lake Daviumbu, being endemic to the western Trans-Fly. We did not find it at this site during our visits and our observations suggest it is rather rare.

Acknowledgements

I would like to thank Chris Eastwood and Dr Ian Burrows for their records, and K. David Bishop, Roger Jaensch and Bret Whitney for access to trip reports and verbal observations. Dr J. M. Diamond provided valuable comments and data about the Greater Melampitta. Ok Tedi Mining Ltd. must be thanked for access to mine and drill sites and logistic support, specifically the Environment Department and Ian Wood, Dr Murray Eagle and Dr Andrew Storey. I also thank the various local landowners, particularly Borok Pitalok of Wangbin, for allowing me access to their customary land.

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IN BRIEF

A NEW BREEDING AREA FOR THE SONG THRUSH *TURDUS PHILOMELOS* IN NORTH PORTUGAL

The Song Thrush is a partially migratory Palaearctic species which breeds over a vast area from Western Europe to Central Asia. The Iberian Peninsula constitutes an important wintering area for this species. The movements of the partially migratory populations may be affected by poor weather (Santos 1982, 1985).

The historical evidence concerning the possible breeding of this species in Portugal is mainly restricted to the Portuguese national breeding Atlas, which refers to possible nesting in the Coroa Hills (northeast Portugal) (Rufino 1989). Earlier, Tait (1924) mentioned nesting of this species in the Cabrera Hills (Puebla de Sanábria), on the Spanish side of the boundary of the Montesinho Natural Park (northeast Portugal). More recently, its breeding was confirmed in Portugal for the first time. In 1991, a nest was discovered in Peneda-Gerês National Park (northwest Portugal) (Santarém 1991, Pimenta & Santarém 1996).

In field surveys for the breeding Atlas of the Montesinho Natural Park (north Bragança) (1992–1995) and the breeding Atlas of Nogueira Hills (southwest Bragança) (1995–1996) the Song Thrush was

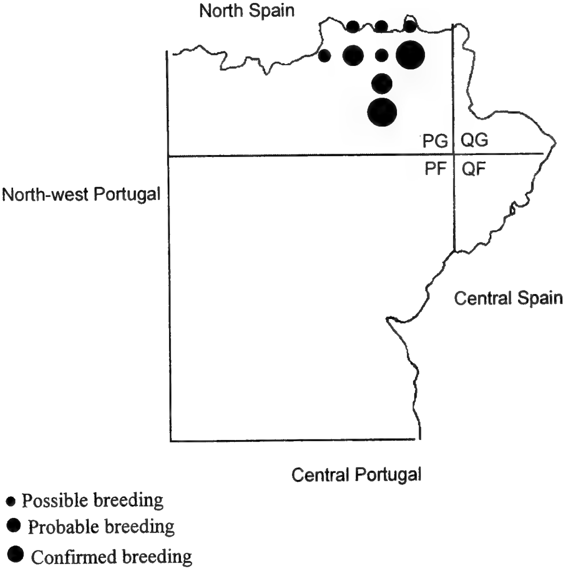

Figure 1. Distribution map of the Song Thrush *Turdus philomelos* breeding area in northeast Portugal, based on 10 × 10 UTM squares.

TABLE 1
Location of confirmed, probable, or possible breeding records of Song Thrushes in northeast Portugal

Place	Year	10 × 10 UTM squares	Habitat	Breeding status
Montesinho Hills (Montesinho)	1992	PG 84	Oak woodland	Possible
Montesinho Hills (Vilarinho)	1994	PG 74	Riparian vegetation	Possible
Rabal	1992	PG 83	Riparian vegetation	Confirmed
Soeira	1993	PG 73	Riparian vegetation	Probable
Vinhais	1993	PG 63	Riparian vegetation	Probable
Cobelas	1994	PG 53	Riparian vegetation	Possible
Moimenta	1995	PG 64	Agro-forestry	Possible
Gestosa	1994	PG 63	Agro-forestry	Possible
Nogueira Hills	1995	PG 82	Riparian vegetation	Probable
Nogueira Hills	1996	PG 81	Riparian vegetation	Confirmed

detectedin nine 10 × 10 km UTM squares. These data represent the first breeding evidence of this species in the northeast of the country, indicating the existence of a second and larger nucleus in northern Portugal.

It occurs mostly in riparian vegetation consisting of Common Alder *Alnus glutinosa*, Narrow-leaved Ash *Fraxinus angustifolia* and poplars, or White Poplar *Populus alba* and Black Poplar *P. nigra* associated with moors and highland pastures. It also occurs in oak woods and mixed deciduous woods formed mainly by Pyrenean Oak *Quercus pyrenaica* and Birch *Betula* sp. (see Table 1).

The apparent absence of this species in northern Portugal in the past was mainly due to an insufficient coverage of the more remote areas and did not necessarily reflect its real distribution. Nevertheless, it is believed that in recent years this species' breeding distribution has expanded southwards to certain areas in the north of Portugal, resulting in the distribution presented here for the northeast (Fig. 1). To support this idea some local hunters report that this thrush has only bred in Nogueira Hills for the last five years. It should be noted that the distribution presented may still be somewhat incomplete due to difficulties in detecting Song Thrushes breeding at low densities.

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FIRST DESCRIPTION OF THE NEST OF THE SLENDER-BILLED FINCH

The Slender-billed Finch *Xenospingus concolor* is a poorly known bird that inhabits some coastal valleys from central Peru to northern Chile (Koepcke 1970, Ridgely & Tudor 1989). It is shy and inconspicuous, occurring in natural riparian shrubbery, and its nest has not been described (Collar *et al.* 1992). Here I present observations on two nests in southwestern Peru.

On 18 December 1995, I found an individual building a nest in the riparian thickets of La Real (16°07′S, 72°29′W), in the Majes valley at an elevation of 550 m. Slender-billed Finches occur in the riparian thickets (mainly of *Tessaria integrifolia* and *Baccharis* sp.) all along this valley (González & Málaga 1997). The site of the nest was about 50 m from the river, and on the other side about the same distance from extensive rice plantations. A pair of birds was present in the vicinity of the site but only one bird, presumably the female, was nest-building. During three hours of observations, it twice brought twigs to the nest, and twice went to the nest without material, apparently to shape the interior. The nest was placed among ramificating dead branches of *Tessaria* with a tangle of many dead stems and leaves of *Baccharis*. It was about 80% complete, 2 m above ground and well hidden; globular in shape, about 11 cm in diameter, and entirely woven of fine twigs.

The second nest was found on 2 June 1996, in riparian shrubbery between Ocucaje and Callango (14°27′S, 75°38′W), in the Ica valley at an elevation of 300 m. It was first located by students taking part in a field course on regional wildlife, and shown to me. The riparian shrubbery of Ocucaje is drier than that of the Majes valley, and interspersed with *Baccharis* (fruiting at that time), "Huarango" trees (*Acacia macracantha*; with fruit in pods) and introduced shrubs of *Tamarix*. The nest was empty and apparently recently built, as a pair of Slender-billed Finches were calling persistently around it, uttering high-pitched cheeping calls which at first led us to suppose that there were nestlings in the nest. This nest was woven with dry leaves of "caña brava" (*Gynerium sagittatum*, a large grass) and was oval-shaped, with the entrance high up on one side; height 12–13 cm, depth 8 cm, width of nest walls 2.2 cm, entrance diameter 4 cm. It was 1.5 m above ground, in a tangle of small twigs between the branches of a small *Acacia*, with an impenetrable tangle of "caña brava" behind. It was collected and is now in the collection of the Departamento de Ornitología, Museo de Historia Natural of the Universidad Nacional Mayor de San Marcos, Lima.

This discovery was one of the objectives in a research project on the ecology of the Slender-billed Finch, sponsored by the American Bird Conservancy. I wish to thank Biol. Victor Velásquez for inviting me to Ocucaje and the students that helped me to discover the nest: Emilio Ayquipa, Jessica Caballero, Erika Carnero, Jorge Espinoza, Alipio Baldeón, all from the Facultad de Ciencias Biológicas y Químicas of the Universidad Nacional de Ica. Irma Franke (Museo de Historia Natural, UNMSM, Lima) and Manuel Plenge helped with the MS.

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A SPECIMEN OF *HIRUNDO ABYSSINICA* FROM MADAGASCAR

In the course of a revision of the bird collection in the Museum of Natural History of Geneva, Switzerland, I came across a specimen of *Hirundo abyssinica* which appears to be the first record for Madagascar. The specimen (MHNG 835.83) was purchased in September 1925 from a certain Mr Chauvin, along with six other Malagasy species. The shipment was dispatched in part from the Académie Malgache. The specimen was collected in January 1925 near Lake Alaotra, northeast of Antananarivo. In eastern Africa, the species breeds from Ethiopia to the Cape and is partly migratory, so its occurrence in Madagascar as an occasional, if not regular, visitor is not surprising. Dr François Baud, Curator, kindly provided further details on the origin of the specimen.

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FIRST RECORD OF SWAINSON'S HAWK *BUTEO SWAINSONI* FOR THE WEST INDIES

On the afternoon of 22 April 1996, *c.* 3 km south of Monte Christi, in the northwest Dominican Republic, the authors were driving through an area of dry scrub when a medium-sized Buteo was noticed soaring near the road. We stopped and watched the bird for approximately five minutes at ranges down to *c.* 100 metres before it flew west and out of sight. We identified it as a Swainson's Hawk *Buteo swainsoni*, a species both GMK and CGB had seen previously in the U.S.A. and Canada.

The bird was identified as a light morph adult and the following details were recorded. Approximately the same size as Red-tailed Hawk *Buteo jamaicensis*, but with marginally longer, more pointed wings and narrower hand than that species. The head was dark brown with whitish throat that contrasted with the dark brown upper breast. The lower breast, belly and ventral area were white. The tail was dark. The underwings had whitish underwing coverts contrasting with darker remiges recalling Booted Eagle *Hieraaetus pennatus*, although the remiges were not as uniformly dark as that species. The upperparts appeared uniformly dark brown.

This is the first documented sighting of Swainson's Hawk in the Dominican Republic. Stockton de Dod (1981) and Wetmore & Swales (1931) list no records for the island of Hispaniola and there are no records from elsewhere in the West Indies. The species breeds in prairie and open areas of western North America from southern Canada south to Texas and central California. It migrates south to winter in South America and thus its appearance in the West Indies is not unexpected.

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NOTES ON THE BLACK-BACKED TANAGER *TANGARA PERUVIANA* (DESMAREST, 1806)

Tangara peruviana has a limited range in southeast Brazil, from Espirito Santo to Rio Grande do Sul (Meyer de Schauensee 1970, Argel de Oliveira *et al.* 1993). It has been considered conspecific with, and a colour morph of, the more widespread *T. preciosa* (Sick 1988), but is now recognised, though somewhat tentatively, as a separate species (Sibley & Monroe 1990). Collar *et al.* (1992) consider it threatened, as most recent records are from habitats in São Paulo and Rio de Janeiro states that are rapidly being destroyed. Gonzaga (1987) comments on the lack of information about this bird.

We present here data collected at Pontal do Sul (25°32'S, 49°27'W) and Ilha do Mel (25°30'S, 48°21'W), Paranagua, Paraná. During field work from April 1989 to October 1991 we obtained some records of Black-backed Tanagers, and in the course of a bird-banding programme from November 1991 to July 1994 we captured a number of individuals. These we marked with CEMAVE/IBAMA numbered rings, noting their weight and wing, tail and bill measurements, and details of moult. Faeces deposited in the bags in which they were brought back to the camp were preserved in 70% alcohol and later examined in the laboratory.

T. peruviana is one of the commonest tanagers at the two above localities; single individuals or groups may often be seen foraging in the middle and upper strata of the vegetation. Ilha do Mel and Pontal do Sul are covered by the so-called *restinga* formation, defined by Silva *et al.* (1994) as a mosaic of sandy beaches, dunes, forests, mangroves, herbaceous and arboraceous marshes. There are also areas with human disturbance. From July 1989 to September 1991 we had 13 records at Ilha do Mel, of which 8 were from disturbed areas. From 1992 to 1994 we caught 24 individuals, 16 at Ilha do Mel (6 in disturbed, 10 in undisturbed areas) and 8 at Pontal do Sul in areas with human disturbance in contact with mangroves.

The occurrence of Black-backed Tanagers in areas modified by man can be related to the presence of suitable fruit-bearing plants. Species of Melastomataceae, favourite food plants for tanagers, are very common, and there are also *Cecropia* sp. (Moraceae), *Salacia* sp. (Celastraceae), *Gaylussacia brasiliensis* (Ericaceae), *Psidium* sp. (Myrtaceae) and other cultivated plants. The faecal analysis showed a predominance of fruits (66.6% by frequency) in their diet, with some insects (Hymenoptera 16.6%, Coleoptera 16.6%) and spiders (16.6%).

Weights and measurements of 15 mist-netted birds were as follows: weight, mean 22.16, range 18.5–25.5 g, *n*=15; wing, mean 75.45, range 70–80 mm, *n*=24; tail, mean 48.66, range 44–59 mm, *n*=21; tarsus, mean 19.55, range 16.6–22 mm, *n*=24; bill length, mean 11.05, range 8.5–13.6 mm, *n*=24. Twelve of the birds caught showed some moult of body feathers; 3 (2 adults in March, 1 juvenile in February) were moulting flight-feathers.

Black-backed Tanagers were present at Ilha do Mel and Pontal do Sul in all seasons. They may be totally sedentary, or perhaps partially migratory. Little is known about their possible movements. Ihering (1885, in Sick 1981) assumed that they travelled short distances in connection with the ripening of fruits; other authors, such as Sick (1981), have considered the possibility of large-scale migrations. Data from the literature show their presence at different localities in Rio Grande do Sul at all seasons (Pinto 1944, Camargo 1962, Sick 1988), and in São Paulo state in winter and summer (Pinto 1944). Krul & Moraes (1993) recorded the species at Curitiba, Parana, in all seasons.

We provisionally conclude that some populations may opportunistically travel for short distances and that others are essentially sedentary. Their tolerance of human disturbance and exploitation of fruit sources provided by man justify some optimism for their future survival.

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23 November 1995

BOOKS RECEIVED

Olsen, K. M. & Larsson, H. 1997. *Skuas and Jaegers: a guide to the skuas and jaegers of the world*. Pp. 190, 13 plates (12 in colour). 156 text-figures (21 in colour). Pica Press. ISBN 1-873403-16-1. £24. 25 × 17 cm.

The main purpose of this richly illustrated book, dealing with only seven species, is to provide as complete as possible a guide to their identification—often, under field conditions, a notoriously difficult problem. The first 16 pages of text give a general overview of the subfamily Stercorariinae; this is followed by the species accounts, which go in meticulous detail into plumage and other characters, each account ending with a full-page distribution map. The 13 plates by Larsson, each illustrating up to 9 birds (mostly in flight, some standing), are excellent, and are supplemented by a large number of photographs, many in colour. Its size, though rather large for a field-guide, should be no hindrance to the ship-borne seabird-watchers who are most likely to find it useful, or even essential.

Lefranc, N. & Worfolk, T. 1997. *Shrikes: a guide to the shrikes of the world*. Pp. 192, 16 colour plates, maps, text-figures. Pica Press. ISBN 1-873403-47-X. £25. 25 × 17 cm.

With an authoritative text (by Norbert Lefranc) and a superb set of colour plates (by Tim Worfolk), this is an attractive addition to the Pica Press family guides. Although it is stated that the book is "primarily an identification guide", the 30-page introductory section is of a very high standard, dealing not only with taxonomy and relationships but also very thoroughly with feeding habits and many other aspects of behaviour and ecology.

Inskipp, T., Lindsey, N. & Duckworth, W. 1996. *An Annotated Checklist for the Birds of the Oriental Region*. Pp. 224. Oriental Bird Club (c/o The Lodge, Sandy, Bedfordshire SG19 2DL, U.K.). ISBN 0-9529545-0-8. £9.95. 24 × 17 cm.

A very useful list of the 2586 species of birds recorded in the area covered by the Oriental Bird Club. It is stressed in the introduction that its aim is to summarise published data concerning their systematics and taxonomy (distribution is not dealt with), and that it is "only as complete as are the available data". It has clearly been thoroughly researched and carefully prepared, with annotations mentioning all unresolved points of taxonomy backed up by an impressive list of 814 references. The adoption of standard English names is a problem for any work covering such a wide area, many parts of which have been dealt with in a variety of past handbooks. In each case a preferred name has been adopted, others that have been used being cited in the annotations.

Gillham, E. & B. 1996. *Hybrid Ducks: a contribution towards an inventory*. Pp. 88, 53 colour and 3 black-and-white photographs. Published by the authors (P.O. Box 563, Wallington, Surrey SM6 9DX). ISBN 0-9511556-0-2. £14, plus packing and postage £1 (Europe), £2 (other continents). 21 × 15 cm.

The outcome of a long-standing interest in hybrid ducks by the senior author, summarising data on 161 hybrid combinations, many of which are in the authors' growing collection of live hybrid ducks. For each hybrid the plumage and other characters are described in detail, many being illustrated. There is a selective list of 225 references.

BOC Publications

The following books are now available, on application to:
The Publications Officer, Mr S. John Farnsworth, Hammerkop, Frogmill, Hurley, Maidenhead, Berks SL6 5NL, U.K. Tel: +44 (0)1628 824214, Fax: +44 (0)1491 579835.

Avian Systematics and Taxonomy (1992), edited by Dr J. F. Monk, with a preface by Professor **Ernst Mayr**, and published as centenary Volume 112a of the *Bulletin*. This volume, in hardback, contains a specially solicited and prestigious collection of papers from 26 authorities in systematics and taxonomy worldwide. ISSN 0007 1595.
Now available at the reduced price:
£15.00 (US$34.00) only + p & p £2.00 ($4.00) = **Total £17.00 ($38.00)**

Birds, Discovery and Conservation (1992), edited by David Snow, published by Helm Information Ltd. A well chosen and interesting anthology of articles from the *Bulletins* of the last 100 years. It includes some of the notable controversies and personalities associated with the Club. 208 pp. ISBN 1 873403 15 1
Basic Price £15.00 (US$34.00) + p & p £2.00 ($4.00) = **Total £17.00 ($38.00)**

BOC Occasional Publications No.1. ***Extinct and Endangered Birds in the Collections of the Natural History Museum***, by Dr A. G. Knox & M. P. Walters (1994). This is an important detailed list of over 3000 specimens (skins, skeletons, spirit specimens and eggs) of bird species which are extinct or highly endangered, held in the collections of the Natural History Museum at Tring – the most comprehensive of its kind to be published. 292 pp., laminated cover. ISBN 0 9522886 0 5
Basic Price £28.00 (US$56.00) + p & p £2.00 ($4.00) = **Total £30.00 ($60.00)**

BOC Occasional Publications No. 2. ***Manuscripts and Drawings in the Ornithology and Rothschild Libraries of the Natural History Museum at Tring***, by Frances E. Warr (1996). The Ornithology and Rothschild Libraries of the Natural History Museum at Tring hold a unique collection of manuscripts and drawings, dating from the late 17th Century to the present day. The collection includes manuscripts of published and unpublished books and papers, field notes of travel in many parts of the world, notes on egg collections, drawings, watercolours and photographs. Published in association with the Natural History Museum, the catalogue will be of value to ornithologists, historians of natural history and all those interested in the collections held at Tring. 140 pp., laminated cover. ISBN 0 9522886 1 3
Basic Price £13.50 (US$31.00) + p & p £1.50 ($3.00) = **Total £15.00 ($34.00)**

BOC Occasional Publications No. 3. ***Avian Egg-shells: An Atlas of Scanning Electron Micrographs*** by Dr Konstantin Mikhailov (1997). The author is an ornithologist of the Paleontological Institute of the Russian Academy of Sciences in Moscow, and has been investigating avian taxonomy and phylogeny based on the micro-structure of eggshells. Here he presents the results of research on 220 species from 165 genera of non-passeriform birds and 8 genera of fossil birds, forming a representative sample of all modern and five extinct orders. After a description of basic eggshell structure, both micro- and ultra-structure, there follows a photographic atlas of scanning electron micrographs of eggshells, accompanied by explanations of their taxonomic significance. This is the first compilation of its kind and it sheds new light on the relationships between different non-passeriform groups which do not always follow current phylogenies based on DNA or other characters. 96 pp. + index. 16 b/w plates comprising 101 SE micrographs + line drawings and graphs. Hard cover. ISBN 0 9522886 2 1
Basic Price £35.00 (US$67.00) + p & p £4.00 ($8.00) = **Total £39.00 ($75.00)**

NOTICE TO CONTRIBUTORS

Papers are invited from Club Members or non-members, especially on taxonomic and distributional topics; descriptions of new species are especially welcome and may be accompanied by colour photographs. **Two copies** of manuscripts, typed on one side of the paper, **double spaced and with wide margins**, should be sent to the Editor, Prof. Chris Feare, 2 North View Cottages, Grayswood Common, Haslemere, Surrey GU27 2DN, UK. All contributions, **including *In Brief* articles**, should follow the style of main papers in this issue of the *Bulletin*.

A contributor is entitled to 10 free offprints (16 if 2 or more authors) of the pages of the *Bulletin* in which his contribution, if one page or more in length, appears. Additional offprints or offprints of contributions of less than one page may be ordered when the manuscript is submitted and will be charged for. Authors may be charged for proof corrections for which they are responsible.

MEMBERSHIP

Only Members of the British Ornithologists' Union are eligible to join the Club, and to receive (postage free) four quarterly issues of the *Bulletin*, and the annual index, for an annual subscription of £12 (or U.S. $26). Applications, enclosing the annual subscription, should be made to the Hon. Secretary (address as below).

NON-MEMBER SUBSCRIBERS & APPLICATIONS FOR BACK NUMBERS OR OTHER PUBLICATIONS

The *Bulletin* (for 1998 onwards), together with annual index, may be purchased (postage free) by Non-member Subscibers on payment of an annual subscription of £22 (or U.S. $45) on application to The Publications Officer, S. J. Farnsworth, Hammerkop, Frogmill, Hurley, Maidenhead, Berks SL6 5NL, U.K. Single issues, and runs of back numbers of the *Bulletin*, and also other BOC Publications may similarly be obtained, on request to him.

PAYMENTS

All amounts quoted are net and should be paid in £ sterling, if possible. Payments in other currencies must include a further £4 for UK bank charges (except for annual rates in U.S. dollars, which are inclusive). All cheques or drafts should be made payable to the British Ornithologists' Club. If preferred, remittances may be made by bank transfer direct to the Club's bank account—Barclays Prime Account, Dale House, Wavertree Boulevard, Liverpool L7 9PQ, U.K. (Sort Code 20-00-87 Account No. 10211540), with confirmation to the Hon. Treasurer, D. J. Montier, Eyebrook, Oldfield Road, Bickley, Bromley, Kent BR1 2LF.

CORRESPONDENCE

Correspondence on membership, changes of address and all other matters should be addressed to the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants GU31 5PA, U.K. For details of Club Meetings see inside front cover.

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BULLETIN
of the
BRITISH ORNITHOLOGISTS' CLUB

EDITED BY

Prof Chris Feare

Volume 118
1998

LIST OF AUTHORS AND CONTENTS

INDEX TO SCIENTIFIC NAMES

(Compiled by Mary N. Muller)

All generic and specific names (of birds only) are indexed. Names of new taxa are indexed in bold print under generic, specific and, where appropriate, subspecific names.

CORRECTIONS TO TEXT

Page 2	Line 15	*May 1998* not *May 1988*
Page 28	Line 31	*xanthogaster* not *xanthogastra*
Page 33	Line 41	*Oryzoborus funereus = Oryzoborus angolensis funereus*
Page 43	Line 6	*Serpophaga* not *Serophaga*
Page 43	Line 28	*inornata* not *ornata*
Page 47	Line 28	*Passeriformes* not *Passiformes*
Page 65	Line 50	*Tanysiptera* not *Tanysiptra*
Page 65	Line 50	*Ptilorrhoa* not *Ptillorrhoa*
Page 66	Line 23	*albertisi* not *albertsi*
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Page 169	Line 18	*pugnax* not *stagnatilis*
Page 172	Line 4	*Pytilia* not *Pytelia*
Page 179	Line 27	*cayanensis* not *cayenensis*
Page 181	Line 12	*luciae* not *lucia*
Page 232	Line 28	*1898a* not *1989a*
Page 221	Line 14	*haliaetus* not *haliacetus*
Page 221	Line 17	*freycinet* not *freycinete*
Page 222	Line 23	*Eudynamys* not *Eudynamis*

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Bulletin of the

British Ornithologists' Club

Edited by
Prof C. J. FEARE and Dr D. W. SNOW

Volume 118 No. 1 March 1998

FORTHCOMING MEETINGS

Tuesday 21 April 1998. Dr W. R. P. (Bill) Bourne will speak on **"Birds and Islands"**. At the age of ten, Bill was evacuated to Bermuda, in the central western North Atlantic, for three years during World War II, where he sailed and fished and chased the local birds. Since then, in the course of a complicated career ending with an Honorary Research Fellowship at Aberdeen University, he has periodically managed to spend shorter periods watching both the land and seabirds of a variety of other islands, ranging from Bear Island and Cyprus, via the Cape Verde Islands and Ascension, to South Georgia and Juan Fernández. He will summarise these experiences and draw some conclusions.

Applications to the Hon. Secretary by ***7 April****, please.*

Tuesday 19 May 1998. ANNUAL GENERAL MEETING at 6 p.m., followed by a **Club Social Evening**. There will be no speaker, but Members are invited to bring along one or two slides (or a specimen!) of a bird of topical interest, and to speak **for not more than 5–10 minutes** about it. The aim will be to generate discussion, and to facilitate the exchange of information between Members.

Applications to the Hon. Secretary by ***5 May****, please, including subjects to be raised and any special facilities required.*

Tuesday 14 July 1998. R. E. (Bob) Scott will speak on **"Bird reminiscences (in a lighter vein)"**. Bob started an interest in birds when he was introduced to a tame Jackdaw during war-time evacuation from London. As a school-boy in the early 1950s, egg-collecting first introduced him to the subject in detail, and he became closely involved with the London Natural History Society, serving for periods as junior committee member for their ornithological branch, and subsequently as recorder for south of the Thames. After a few years in the Zoology Department of the British Museum (Natural History), he took a post as warden at the RSPB Dungeness reserve. He has recently retired after serving 37 years with the RSPB, ending his career as Head of Reserves Management. During his time at Dungeness he served on the BTO's Ringing and Migration Committee, and still retains an interest in the area, as a Trustee of the Dungeness Bird Observatory. He is currently Vice-President of the BOU. Since retirement, Bob has increased his foreign travel, now leading parties of bird-watchers to many different localities. Together with his wife Ann, he has a full lecturing programme throughout the country.

Applications to the Hon. Secretary by ***30 June****, please.*

Future dates for 1998. Further meetings have been arranged for the following **Tuesdays: 15 September**—Dr Nigel Collar on *"Two Indian Enigmas"*, **13 October**—Dr Ben Hatchwell on *"The cooperative behaviour of Long-tailed Tits"*, and **17 November**—Dr Bill Porteous on *"Birds of the Humboldt Current"*.

Meetings are held in the Sherfield Building of Imperial College, South Kensington, London SW7. The nearest Tube station is at South Kensington, and car parking facilities are available; a map of the area will be sent to members, on request. The cash bar is open from 6.15 p.m., and a buffet supper, of two courses followed by coffee, is served at 7.00 p.m. (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion, at about 8.00 p.m.

Overseas Members visiting Britain are particularly welcome at meetings. For details in advance, please contact the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants GU31 5PA.

Tel/Fax: 01730-825280 for late bookings and cancellations.

Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

Vol. 118 No. 1 Published: 27 March 1998

REPORT OF THE COMMITTEE FOR 1997

Meetings. Eight evening meetings were held in 1997, in the Sherfield Building at Imperial College, London. A total of 297 (218 members and 79 guests) attended these meetings, which represented an average attendance of 37. The programme of speakers during the year again covered a wide variety of ornithological subjects, and was presented by speakers both from Britain and from overseas. The May meeting following the AGM was in the form of a social evening, during which informal short talks and brief discussions were contributed by twelve participants, on a wide range of topical subjects.

Committee. The Committee met six times during the year, and the attendance was 73%. The chief topic for discussions concerned the progress of Club publications, and the activities of the Publications Sub-Committee (see below). Following the announcement by Imperial College of a steep increase in charges for room hire and catering, alternative meeting arrangements were actively considered, but an acceptable agreement was negotiated to continue at Imperial College, at least for 1998. Dinner charges were, however, increased accordingly. Following the resignation of Mr S. J. Farnsworth as Hon. Treasurer, the administration of Membership records and subscription payments was transferred to the Hon. Secretary, with the assistance of Miss H. Baker, as membership secretary. Mr D. J. Montier was elected Hon. Treasurer, at the AGM, and assumed responsibility for all accounting matters. Mr N. H. F. Stone has given valuable advice and help as Club archivist.

Mr Peter Oliver, representing the Trustees of the Herbert Stevens Trust Fund met with the Committee to give advice on the performance of the Fund. The Committee is most grateful to Mr Nigel Crocker, Mr Richard Price and Mr Peter Oliver for their time and expertise in this matter.

It is with great regret that the Committee reports the deaths in the past year of H. P. H. Johnson (1957–97) and G. R. Cunningham-van-Someren (1946—Hon. Life Member), also of J. G. Williams (1951–97), in January 1998.

Publications Sub-committee. Two titles were published in 1997. Occasional Publications No. 2 *Manuscripts and Drawings in the Ornithology and Rothschild Libraries of the Natural History Museum*, completed in 1996, appeared early in January; and Occasional Publications No. 3 *Avian Egg-shells: an Atlas of Scanning Electron Micrographs* was published in mid-November.

Sales of both titles, and of Occasional Publications No. 1 *Extinct and Endangered Birds in the Collections of the Natural History Museum*, *Avian Systematics and Taxonomy*, and *Avian Taxonomy from Linnaeus to DNA* (papers presented at the joint B.O.C. and Linnean Society of London meeting in March 1996, published as Volume 117(2) *Bull. B.O.C.*) have continued steadily throughout the year.

Work continues on the possible *Bird Atlas of Uganda*, and a number of other publications are being actively explored.

The Sub-committee was strengthened by the agreement of Professor Chris Feare and Nigel Redman to join it in September, and by the appointment of a Publications Officer, John Farnsworth, who has assumed responsibility for the non-Member Subscribers, sales of publications and *Bulletin* back-numbers, and other sales items.

Because of other commitments, Dr David Snow resigned from the Sub-committee, when he relinquished the Editorship of the *Bulletin*. Dr Robert Prys-Jones agreed to take over the chairmanship from Amberley Moore, as from May 1988.

Membership. There were 569 paid-up Members at 31 December 1997—320 with addresses in the U.K., and 249 overseas (45 countries). Active recruitment from the newly-elected Members of the Union, and others attending dinner meetings as guests, resulted in 29 new Members joining, or re-joining the Club.

The Committee decided that, in the interests of economy, the annual publication of Members' Address Lists would be discontinued. The Hon. Secretary would prepare this list annually, and duplicated copies would be available for any Member requesting a copy, on payment of £1, to cover the costs of preparation and postage, but the complete list would be published, at four yearly intervals, with the *Bulletin*.

The *Bulletin*. The 320 pages of Volume 117 contained 39 main papers and 13 "In Brief" articles. The June issue was devoted to a series of papers presented at a joint meeting of the Club and the Linnean Society, under the heading *Avian taxonomy from Linnaeus to DNA*, and contained major reviews of taxonomies, species concepts, and their implications for conservation. One new species, a vanga from Madagascar, was described and illustrated in colour, and details of a subspecies of *Phylloscopus* warbler, now elevated to full specific status on the basis of song, and responses to playback of songs of near relatives. While two new subspecies were described, the validity of others was questioned. Of 17 papers presenting new distributional data, 12 were from the neotropics. New information on the biology and behaviour of eight species was described, four of these were from the neotropics, including the first description of the nest of the Slender-billed Finch. An encouraging discovery of the apparently thriving population of Jerdon's Bushchats on islands in the Mekong Delta was reported, and another paper refined our definition of "desert birds". The subjects of papers again reflected the global cover of Club interests, and the authorship of papers extended to 25 countries, from five continents.

We are again grateful to Mary Muller who continues to compile the index, and to Michael Casement for preparing the Club Notes and Notices that preface each issue.

***Bulletin* Sales.** Sales to Non-member Subscribers totalled 142, with 18 in the U.K. and 124 overseas (31 countries). Of the latter, 51 were to the United States of America, and 14 to Germany.

Finance. The increase in subscription rates for both Members and non-Member Subscribers, which took effect on 1 January 1997, appears to have caused very little fall-out in overall membership, and will provide a valuable boost to the Club's income. Production costs of the *Bulletin* continue to increase, especially with the introduction of colour plates from time to time

Completion of two new publications in the same year inevitably had a significant impact on cash flow. Occasional Publications No. 2, published in January, and No. 3 in December required a combined outlay of almost £8,000, already partially offset by sales achieved at the year's end.

Accounts for 1997 are not yet available, but will be tabled at the AGM and published in the *Bulletin*.

ANNUAL GENERAL MEETING

The Annual General Meeting of the British Ornithologist's Club will be held in the Ante-room of the Sherfield Building, Imperial College, London SW7 at 6 pm on Tuesday 19 May 1988.

AGENDA

1. Minutes of the 1997 Annual General Meeting (see *Bull. Brit. Orn. Cl.* 117(3): 153–156).
2. Chairman's report.
3. Report of the Committee and Accounts for 1997.
4. The *Bulletin*.
5. The election of Officers. The Committee proposes that:
    (i) Mr D. J. Montier be re-elected as Honorary Treasurer,
    (ii) Commander M. B. Casement, OBE, RN, be re-elected Hon. Secretary.
    (iii) Mr R. E. Scott be elected a member of the Committee vice Miss Helen Baker who retires by rotation, and is ineligible for re-election.
6. Any other business of which notice shall have been given in accordance with Rule (12).

By Order of the Committee
MICHAEL CASEMENT, *Honorary Secretary*

The eight hundred and seventy second meeting of the Club was held on Tuesday, 4 November 1997 at 6.15 pm. 30 Members and 9 guests attended.

Members present were: The Rev. T. W. GLADWIN (*Chairman*), Miss H. BAKER, Sir David BANNERMAN Bt., Captain Sir Thomas BARLOW Br. R.N., J. W. BARRINGTON, Captain M. K. BARRITT R.N., P. J. BELMAN, I. R. BISHOP, D. M. BRADLEY, Cdr M. B. CASEMENT R.N., Professor R. J. CHANDLER, S. J. FARNSWORTH, J. E. Francis, C. A. R. HELM, G. P. JACKSON, J. A. JOBLING, I. T. LEWIS, B. A. E. MARR (*Speaker*), D. J. MONTIER, Mrs A. M. MOORE, R. G. MORGAN, P. J. OLIVER, C. M. C. PATRICK, Dr W. G.

PORTEOUS, Dr R. P. PRYS-JONES, P. S. REDMAN, R. C. SELF, P. J. SELLAR, N. H. F. STONE and S. J. R. RUMSEY.

Guests attending were: Mrs G. BONHAM, Mrs C. R. CASEMENT, Mrs J. M. GLADWIN, Lady BANNERMAN, Ms C. HOFF, Mrs S. LEWIS, A. M. MARTIN, Mrs M. MONTIER and P. J. MOORE.

BOC Meeting—4 November 1997

After dinner, Tony Marr gave a presentation, illustrated with colour slides, entitled *Atlantic Seabird Odyssey*. He gave his talk the sub-title *The Agony and the Ecstasy* to suggest the difficulties of getting out to sea to study seabirds, and the pleasure derived from actually locating and watching them.

Seabirds face many threats—pollution, fishing, predation, and habitat destruction and degradation. He illustrated particular examples of problems caused by pollution and fishing. There is still much to learn about seabird migration and lifestyles and excellent identification books are available, particularly Harrison's two major works.

There are two basic requirements for a successful pelagic trip—a suitable boat, and suitable bait. After much trial and error, he had found that game-fishing boats offered speed and manoeuvrability, while yachts had the advantage of silence. The best bait (or 'chum', as it was inexplicably named) consisted of an evil-smelling mixture of fish oil and fish pieces, mashed into a pulp, and hung in a net over the back of the boat to trail in the water. The smell quickly attracts seabirds from miles around.

The main part of the talk then showed the seabirds that he had found in different parts of the Atlantic. Around Madeira and the Canaries he had watched Fea's (Soft-plumaged) Petrels, Bulwer's Petrels, White-faced and Madeiran Storm Petrels, and Cory's and Little Shearwaters, concentrating on the Salvage and Desertas Islands where landings in the dark had been undertaken. Off Dakar in Senegal, the westernmost point of Africa, recent autumn studies had revealed a large southwards passage of seabirds, which included thousands of Pomarine Skuas, hundreds of Long-tailed Skuas and Sabine's Gulls, Cory's and Cape Verde Shearwaters, Wilson's and Bulwer's Petrels and South Polar Skuas.

His talk concluded with evocative slides of Antarctica and some of its wildlife. The journey between South America and the Falklands offered great opportunities to see albatrosses, including Wandering, Black-browed, Grey-headed and Light-mantled Sooty. On the Antarctic peninsula were breeding Wilson's Petrels, Giant Petrels, South Polar Skuas and innumerable penguins. He ended with close-up pictures of Hump-backed Whales amidst the dramatic Antarctic scenery; a sight he described as both moving and humbling. Man was an alien in this unforgiving habitat.

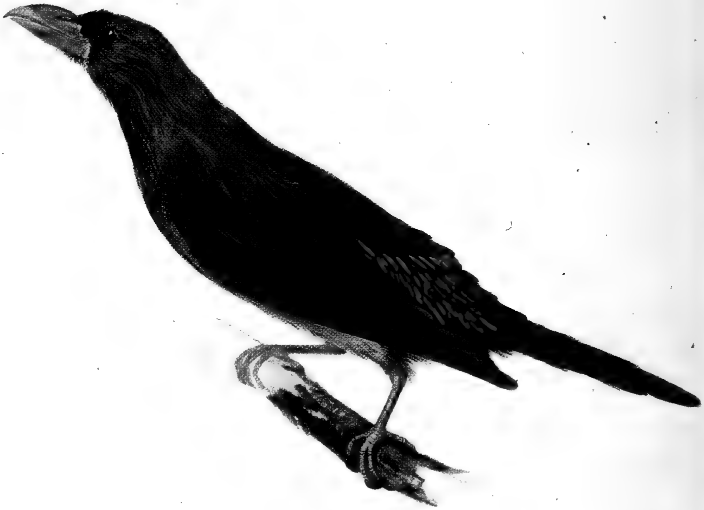

Figure 1. Watercolour illustration of *Scissirostrum dubium* by George Gibsone, labelled: "Non-descript from the collection of M. Collone". The original was burnt at Thompson the bird stuffers.

'Gibsone's nondescript' and the lost type of *Scissirostrum dubium* (Latham)

by *L. Jessop*

Received 12 December 1996

Trivial marginalia sometimes provide information that is interesting to the historian in a way that was never intended by the original author. Such is the case of 'Gibsone's nondescript' and *Scissirostrum dubium*. A marginal comment beside an unpublished watercolour painting, by an obscure provincial English artist, provided clues that led to the unravelling of at least part of the history of the holotype of a species.

George Gibsone (*c*. 1762–1846) was an amateur, Tyneside-based artist who is best known for his many watercolours of mollusc shells (Jessop 1996), but he also produced a single volume of watercolours of birds that is owned by the Natural History Society of Northumbria, and held in their library at The Hancock Museum. The paintings are undated, but some are on paper that is watermarked with the date 1794. The front flyleaf contains some information in manuscript about the history of the volume, "C.M. Adamson from his father, June 1849. Drawings of birds by Mr George Gibsone late of Newcastle", and "Pres. by Miss C. Adamson 1937": i.e. the volume was owned by members of the Adamson family until it was presented to the Natural History Society in 1937.

One of the birds is labelled in manuscript "Non-descript from the collection of M. Collone. The original was burnt at Thompson the bird stuffers", and this bird may be called 'Gibsone's nondescript'.

M. Collone is undoubtedly Charles Alexandre de Calonne (1743–1802), who fled to England from France in 1797. George Humphrey catalogued his collection in London (Anon [Humphrey] 1797) before it was dispersed, the most valuable items being sold privately in 1801 and the remainder by auction in May, June and July of that year (Whitehead 1969, Chalmers-Hunt 1976).

Among the many birds listed in Humphrey's catalogue, there is one that may be the bird figured by Gibsone as a nondescript. It is: "40. A bird probably of a new genus—Oiseau probablement d'une genre neuf".

'Gibsone's nondescript' was referred to the Bird Group at the Natural History Museum at Tring for identification, and following a suggestion by Mr David Gibbs it was confidently identified as *Scissirostrum dubium* (Latham, 1802), a species of Sturnidae from the island of Sulawesi.

Scissirostrum dubium was first described by Latham in his *General Synopsis* (Latham 1801) as the Dubious Shrike, from a specimen seen at "Mr Thompson's in Little Saint Martin's Lane, London but without any history of its manner or country annexed". In the same year, Latham bestowed the latin binomen *Lanius dubius* upon the Dubious Shrike in the supplement to his *Index Ornithologus* (Latham 1802). The subsequent history of its taxonomy can be traced *via* Sharpe (1890).

There is a strong and obvious coincidence between *Thompson the bird stuffer* mentioned by Gibsone and *Mr Thompson's in Little Saint Martin's Lane, London* where Latham saw the bird on which he based his new species. The suspicion that the two Thompsons are in fact identical is strengthened by reference to *Holden's Triennial Directory* for 1805–07, where John Thompson a 'Natural History Preserver' is listed at 5 Little Saint Martin's Lane. There was, incidentally, also an auctioneer called Thompson next door at number 3, who may or may not have been the same John Thompson.

Setting aside the extremely remote possibility that Thompson had two specimens of *Scissirostrum dubium*, one described by Latham and another figured by Gibsone, it is reasonable to conclude that both men saw the same bird.

The manuscript annotation to Gibsone's painting is important because there is no information from the published literature about the prior history of the holotype of *Scissirostrum dubium* or of its fate. We know from Gibsone that the bird originated in the collection of de Calonne and that it was destroyed while at Thompson's.

Although the holotype of *Lanius dubius* Latham, 1802 is now known to be no longer in existence, it is a distinctive species, and there is no taxonomic confusion surrounding its identity: designation of a neotype is, therefore, unnecessary. There appears to be no discrepancy between the current interpretation of *Scissirostrum dubium* and Gibsone's painting of the holotype, and no taxonomic changes arise from the discovery of the painting.

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Hybridization between Macgregor's Bowerbird *Amblyornis macgregoriae* and the Streaked Bowerbird *A. subalaris* (Ptilonorhynchidae) of New Guinea

by Clifford B. Frith & Dawn W. Frith

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The four species of 'gardener' bowerbirds of the genus *Amblyornis* (Ptilonorhynchidae) are confined to upland areas of New Guinea. All are known or assumed to be polygynous species in which males build elaborate 'maypole' type bowers and females alone construct and attend the nest and raise their offspring (Gilliard 1969, Diamond 1986).

In all species individuals of both sexes are predominantly uniformly plumaged in buff, olive or rufous brown; and immature (crestless) males are like adult females. Adult males of three species are, however, adorned with a brilliant yellow (Golden-fronted Bowerbird *A. flavifrons*) to deep orange (Macgregor's *A. macgregoriae*, Streaked Bowerbird *A. subalaris*) crest. That adult males of the fourth species (Vogelkop Bowerbird *A. inornatus*) lack a crest and are thus identical to their females yet build the most elaborate of all bowers led to the 'transferral effect' theory of Gilliard (1969). This assumed that the forces of sexual selection (by females) have been transferred (or externalized) from morphological characters (the crest of adult males) to external objects (bowers) and that this 'transferral' has resulted in increasingly complex bower structures and their decoration. Thus as males of the various species have developed bower-building they have then simultaneously lost their crests to an extent correlated with the increasing complexity of their bower (Gilliard 1956, 1963, 1969). For full descriptions and illustrations of the birds and their bowers see Gilliard (1969), Cooper & Forshaw (1977) and Coates (1990).

Crown colouration among the three monogamous non-bower-building bowerbirds or catbirds (*Ailuroedus* spp.), and in the nine or ten members of the polygynous 'avenue'-building genera *Chlamydera* and *Sericulus*, conspicuously reflects speciation in these groups (Gilliard 1969, Frith & Frith 1995, 1997a, 1997b). Similarly, both adult male crest colouration and, more particularly, crest length differ between taxa and reflect speciation within *Amblyornis* (Gilliard 1969, Diamond 1972, Schodde & McKean 1973, Pratt 1982, Frith & Frith 1997b).

Macgregor's Bowerbird and the Streaked Bowerbird occur over predominantly different altitudinal ranges in eastern New Guinea. The higher range of 1600–3300 m) (occasionally down to 1200 m) asl of the former species is bordered for much of its southern and a third of its northern range by that of the latter species at 1000–1400 m (occasionally 700–1400 m) asl (Beehler *et al.* 1986)—see Figure 1. Collecting localities and altitudes of museum specimens of

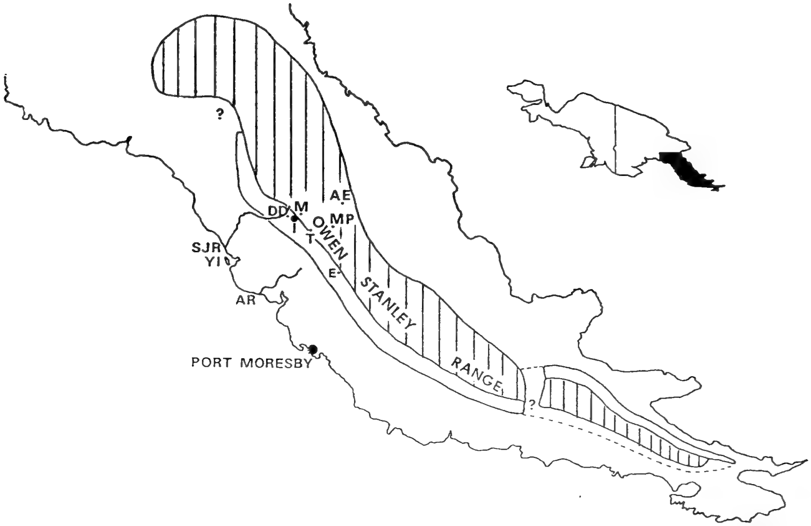

Figure 1. Map showing approximate distributions of Macgregor's Bowerbird *Amblyornis macgregoriae* (vertical hatched areas) and Streaked Bowerbird *A. subalaris* (adjacent unhatched narrow strips) on the south-eastern Papua New Guinea peninsula. Inset map shows the New Guinea mainland with the vertical border line between Irian Jaya to its left and Papua New Guinea to its right with the area of the larger map solid black. Locations mentioned in the text are indicated by: AE=Mt. Albert Edward, AR=Aroa River, DD=Deva Deva, E=Efogi, I=Iola, M=Mafulu, MP=Murray Pass, SJR=Angabunga or St. Joseph River, T=Mt. Tafa, YI=Yule Island. Areas indicated by a question mark are those gardener bowerbirds remain to be recorded in. After Schodde & McKean (1973).

Macgregor's and Streaked Bowerbirds indicated the possibility of sympatry between the two in the northeastern part of the range of the latter species (Frith 1970). It was subsequently noted that collecting methods and data for the specimens concerned were not necessarily accurate (LeCroy 1971, Bell 1972). The latter author reported, however, that both species had been observed at Efogi at *c.* 1800 asl (Fig. 1), where Macgregor's Bowerbird was in moss forest and the Streaked Bowerbird slightly below it. He wrote that "the species apparently need quite different habitats and their ranges apparently overlap merely because the moss-forest occurs at different altitudes in different areas with different climates".

In a review of the taxonomy of the *Amblyornis* bowerbirds an Australian Museum specimen (AM O. 26264) was noted to possibly represent a hybrid individual between Macgregor's and Streaked Bowerbirds (Schodde & McKean 1973). This specimen lacks a locality and has a 51 mm long crest measured from its posterior base. Compared with Streaked Bowerbirds, it has a "rather heavy pale bill, rather pale-brown sides to the head, a rather dense crest, streaked throat and the following measurements (mm): wing 126; tail 82; tarsus

36; bill (tip to nostril) 12.7. In these characters, it falls between *A. subalaris* and *A. macgregoriae*, and raises the possibility of occasional hybridization between the two species" (Schodde & McKean 1973).

This apparent hybrid was of interest as none had been authenticated within the bowerbird family notwithstanding a supposed unique intergeneric hybrid adult male specimen between the Satin Bowerbird *Ptilonorhynchus violaceus* and Regent Bowerbird *Sericulus chrysocephalus* of eastern Australia (Marshall 1954, Gilliard 1969). While the authenticity of this supposed intergeneric hybrid combination is now seriously doubted, the unique specimen having long ago disappeared, an undoubted interspecific hybrid between the Great and Spotted Bowerbirds *Chlamydera nuchalis* × *C. maculata* of Australia has been described (Frith & Frith 1995).

Methods

While studying bird specimens at the American Museum of Natural History, New York (AMNH), we took the opportunity to examine skins of gardener bowerbirds for another study of this group (Frith & Frith 1997b). The collection contained an adult-plumaged specimen of Macgregor's Bowerbird taken at Iola on 28 May 1929 and four adult-plumaged male Streaked Bowerbirds from the same locality during 1–5 June 1929, collected by Hannibal Hamlin of the Whitney South Sea Expedition. A Streaked Bowerbird specimen (AMNH 831497) was recorded by Lee Crandall as taken at the adjacent village of Deva Deva at "4–5000'" (*c.* 1375 m) asl on 20 October 1928. Iola is a village, immediately east of Deva Deva and west and below Mafulu, on the mountain range just to the south of the Angabunga (or St Joseph) River, inland of Yule Island (Fig. 1).

Iola and Deva Deva were also visited by the 1933–34 Archbold Expedition en route to Mt. Albert Edward via Mt. Tafa and the Murray Pass, but were stated to be only 700 m asl (Archbold & Rand 1935). These two gardener bowerbird species were also both collected by Hamlin and/or his collectors at Deva Deva. While acknowledging that Hamlin's Macgregor's Bowerbird locations are at approximately 700 m asl, Mayr & Rand (1937) noted they encountered the species only at 2000–2800 m asl. As 770 m is well below even the extreme lowest altitude normally frequented by Macgregor's Bowerbird it seems likely Hamlin and his collectors climbed to procure the two specimens of that species or obtained them from Papuans that did so for him.

We examined and measured all gardener bowerbird specimens from Iola and immediately adjacent localities (Table 1). All wing and tail measurements were made with the same rulers, all others with the same electrical digital callipers, and all by CBF. Wing length measured was the flattened and straightened, thus maximised, chord using a stopped steel rule. Tail length was measured from the point of entry of the central pair into the bird's skin to the tip of the longest feather with a small steel rule. Bill length was measured from the bill tip to the cranio-facial hinge. Tarsus length was that of the tarsometatarsal bone. One or two crest length measurements were taken of adult males, the

TABLE 1
Details and measurements (mm) of six Macgregor's and seven Streaked Bowerbirds, and a hybrid individual, all males

Specimen no.	Age	Locality	Date	Wing	Tail	Exposed crest	Crest length	Tarsus	Bill
A. macgregoriae									
421006	Ad	Mt. Tafa, west slope, 2700 m	23.8.33	133	87	85	—	37.4	27.9
330484	Ad	Iola, *c.* 1375 m	28.5.29	139	92	92	66	35.9	27.9
421005	Imm	Murray Pass, 2840 m	2.8.33	135	87	—	—	37.6	29.0
421004	Imm	Mt. Tafa, east slope, 2070 m	31.5.33	133	88	—	—	37.0	28.1
816488	Imm	Mt. Albert Edward, 2320 m	15.8.69	139	84	—	—	39.7	28.9
330485	Imm	Deva Deva, *c.* 1375 m	30.5.29	131	92	—	—	37.4	27.1
Means				135	88	89	66	37.5	28.2
Hybrid	Ad	Yule I., *c.* 1375 m	1.6.29	130	—	72	50	34.2	26.2
A. subalaris									
831497	Ad	Deva Deva, *c.* 1375 m	20.10.28	121	85	56	—	34.1	24.8
330486	Ad	Deva Deva, *c.* 1375 m	31.5.29	127	92	55	—	33.5	25.0
330492	Ad	Deva Deva, *c.* 1375 m	15.6.29	124	92	63	—	32.3	24.0
330488	Ad	Iola, *c.* 1375 m	4.6.29	124	88	50	36	35.3	25.7
330491	Ad	Iola, *c.* 1375 m	5.6.29	127	93	55	38	36.0	25.8
330490	Ad	Iola, *c.* 1375 m	5.6.29	128	90	55	36	33.6	26.1
280845	Ad	Iola, *c.* 1375 m	4.6.29	126	86	65	—	35.1	25.3
Means				125	89	57	37	34.3	25.2

Notes: All specimens from American Museum of Natural History, except the last which is from the Field Museum of Natural History, Chicago.
Crest length is measured from the posterior base.
The altitude of specimen no. 330492 is less reliable (M. LeCroy *in litt.*)

length from posterior base (*cf.* Schodde & McKean 1973) and that of the exposed or visible length of the orange crest (Table 1).

Results and discussion

Of the four AMNH Iola specimens identified as Streaked Bowerbirds, three had fully developed orange crest plumes marked with small amounts of deep brown, from fine short flecking (AMNH 330488) to numerous larger streakings (330491). While the identity of these four specimens has never been questioned, it was noted by Mayr & Rand (1937) that one of them had the usually pronounced throat and breast streaking much reduced. The other three AMNH Iola males have a crest bordered at the outer edges with a contrastingly dark, almost a reddish-black, brown—a feature characteristic of Streaked Bowerbirds, present in the three adult males from nearby Deva Deva. Adult male Macgregor's do have brown feathering at the outer border of their crest but it is far less dark and discrete than in Streaked Bowerbirds, being much the same olive-brown as the rest of their head and nape.

The fourth adult male supposed Streaked Bowerbird (AMNH 330487) from Iola does not exhibit the dark crest border typical of the species but has a crest intermediate in colour and tone between that species and the Iola Macgregor's Bowerbird. The sides of its face are not lighter than in Streaked Bowerbirds from Iola. It differs conspicuously from adult male Streaked Bowerbirds from there and elsewhere in having only the slightest trace of throat and chest streaking, notwithstanding known variation of ventral markings in the Streaked Bowerbird (*cf.* Schodde & McKean 1973). We view this 'masking' of typical Streaked ventral streaking as an expression of the influence of ventrally plain Macgregor's Bowerbird genes. The base of the lower mandible of the apparent hybrid individual is paler than that of most Streaked Bowerbird specimens, only that of specimen AMNH 330490 being similarly pale. The hybrid specimen (AMNH 330487) unfortunately lacks its tail.

All three Iola adult male Streaked Bowerbirds of normal appearance have a crest shorter than 40 mm in length, measured from the posterior base. Crest length in 12 AMNH adult male Owen Stanley Mountains Streaked Bowerbirds, additional to those detailed in Table 1, average 35 (range 24–40) mm. That of eight other adult male Streaked Bowerbirds, in Australian collections, average 39 (range 37–42) mm (Schodde & McKean 1973). The latter authors also cite crest lengths from posterior base of three adult male Macgregor's Bowerbirds from the western Owen Stanley Range of 52, 57 and 59 mm. Thus the 72 mm exposed crest length of the Iola hybrid specimen AMNH 330487 is intermediate between the mutually exclusive crest lengths of Streaked and Macgregor's Bowerbirds.

The hybrid specimen was recorded as collected at Iola on 1 June, the three Streaked Bowerbirds on 4–5 June and the Macgregor's Bowerbird on 28 May. We therefore see the former's larger wing length, conspicuously longer crest and lack of ventral streaking, compared with these features of Streaked Bowerbirds from the same

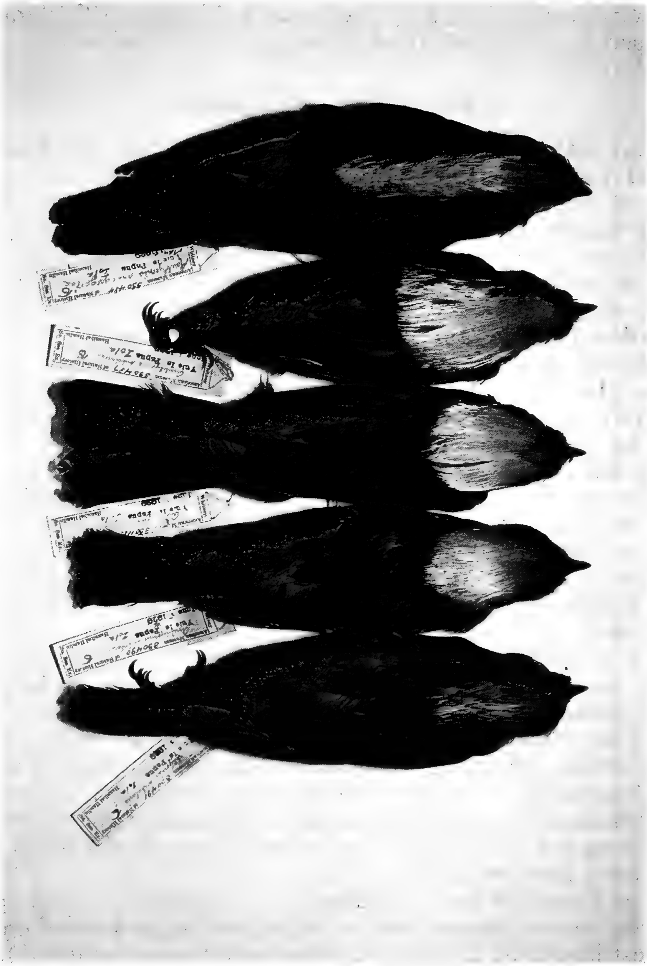

Figure 2. Dorsal appearance of AMNH specimens of adult males of: *Amblyornis macgregoriae* (33048), A hybrid *A. macgregoriae* × *A. subalaris* (330487, lacking tail) and three *A. subalaris* (330488, 330490, 330491) seen from top to bottom respectively. Note intermediate crest length and dorsal markings of the hybrid.

area (Table 1), as too great a coincidence to be indicative of intraspecific variation. Hence we consider it an *A. macgregoriae* × *A. subalaris* hybrid individual exhibiting stronger evidence of the genes of both putative parents than the specimen (AM O. 26264) of unknown locality thought also to represent this hybrid combination (Schodde & McKean 1973). Our measurements of both crest from posterior base and exposed crest support this conclusion and are consistent with measurements of both putative parent species presented by Diamond

(1972) and Schodde & McKean (1973). We suppose it was this AMNH hybrid specimen that Mayr & Rand (1937) noted as being less typical of Streaked Bowerbirds (see above).

Male gardener bowerbirds probably require at least five or six years to acquire adult plumage, as other sexually dimorphic bowerbird species are known to do (Disney 1970, Disney & Lane 1971, Vellenga 1980, Frith & Frith unpubl. data). Adult-plumaged male gardener bowerbirds would therefore represent but a small proportion of their species populations. It can therefore be appreciated that hybrid individuals in female (and immature male) plumage would be difficult to identify from their appearance in museum specimens. Genetic 'fingerprinting' studies in areas where the two species may meet clearly have the potential to prove rewarding as it would seem that hybridization may be more common in the family than has been previously conceded (Frith & Frith 1995).

Macgregor's and Streaked Bowerbirds are for the most part separated by mutually exclusive altitudinal ranges and associated differences in habitat. While specimens demonstrate that the two species occasionally hybridize in the wild, providing clear evidence that they are at some places sympatric (*sensu stricto* cf. Amadon & Short 1992), they are better described as parapatric (Mayr 1963: 672, Wilson 1975, Kemp 1995). Specimens in the AMNH show this is clearly the case in the Iola and Deva Deva area, and it may well be the case elsewhere, potentially including the upper Aroa River (Frith 1970). It remains to be assessed whether parapatry occurs within natural altitudinal ranges/habitats, or if it may only result from habitat modification caused by agriculture (Gilliard in Mayr & Gilliard 1952, Gilliard 1959) or more severe (geological) habitat destruction.

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Range extensions and new records for forest birds in southern Rio Grande do Sul, Brazil

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The southernmost distributional limits of forest birds in southern Brazil are particularly evident in the State of Rio Grande do Sul, where the Atlantic Forest has its last domains. Distributional patterns of

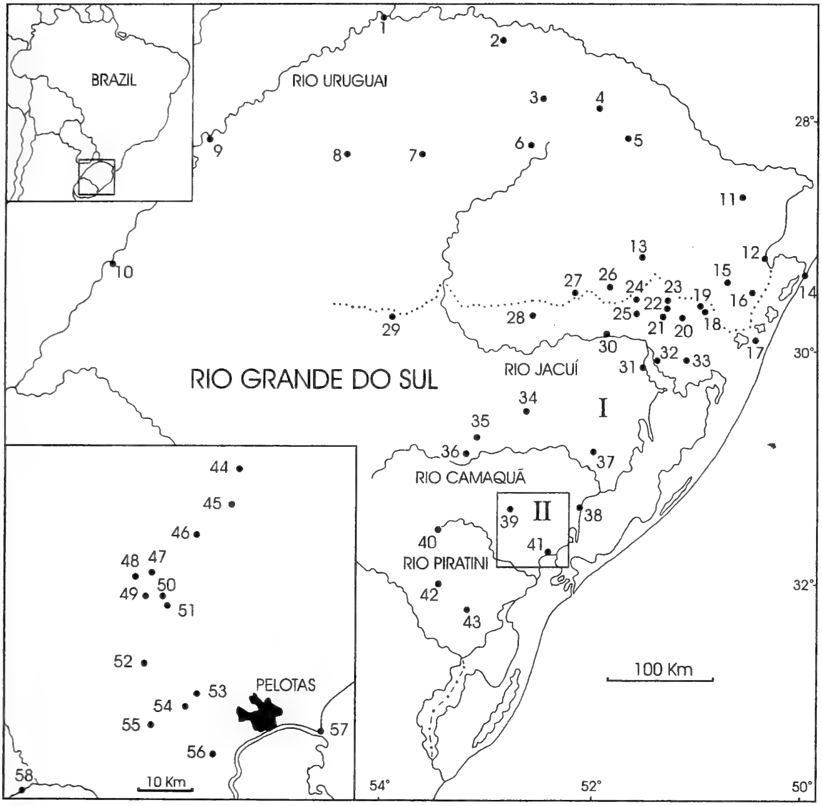

Figure 1. Map showing localities mentioned in text. 1, Turvo state reserve; 2, Nonoai; 3, Erebango; 4, Sananduva; 5, Lagoa Vermelha; 6, Passo Fundo; 7, Panambi (Nova Wurtemburg); 8, Santo Ângelo; 9, Garruchos; 10, Itaqui; 11, Bom Jesus; 12, Aparados da Serra national park; 13, Farroupilha; 14, Torres; 15, São Francisco de Paula; 16, Barra do Ouro; 17, Osório; 18, Arroio Grande; 19, Taquara; 20, Campo Bom; 21, Sapucaia do Sul; 22, Novo Hamburgo (Hamburgo Velho); 23, Sapiranga; 24, São Sebastião do Caí; 25, Montenegro (Monte Negro); 26, Poço das Antas; 27, Cruzeiro do Sul; 28, Santa Cruz do Sul; 29, Santa Maria; 30, Triunfo; 31, Guaíba (Pedras Brancas); 32, Porto Alegre; 33, Viamão; 34, Encruzilhada do Sul; 35, Rincão dos Pereira; 36, Santana da Boa Vista; 37, Camaquã; 38, São Lourenço (do Sul); 39, Canguçu; 40, Pinheiro Machado; 41, Pelotas; 42, Herval; 43, Arroio Grande; 44, Taquaral; 45, Arroio do Padre; 46, Arroio Andrade; 47, Parque Farroupilha; 48, Rincão da Caneleira; 49, Arroio Cadeia; 50, Arroio dos Porcos; 51, Santa Eulália; 52, Santo Amor; 53, Arroio Moreira; 54, Arroio Padre Doutor; 55, Cerro das Almas; 56, UFPEL botanical garden; 57, Pontal da Barra (on Laguna dos Patos littoral); 58, Rio Piratini. I, Serra do Herval; II, Serra dos Tapes. The dotted line represents the Serra Geral escarpment.

forest birds in Rio Grande do Sul identified by Belton (1984, 1985) indicate distinct forested areas as limits for some groups of species. In this way, the northeastern littoral coastal forests are considered the southern limit for some lowland species (e.g. *Formicarius colma*, *Myrmotherula unicolor*, *Platyrinchus leucoryphus*), whereas the northern forests, along the Rio Uruguai, constitute limits for other ones (e.g. *Pteroglossus castanotis*, *Drymophila rubricollis*, *Colonia colonus*) which apparently reach the state from inland Brazil. The forests of the escarpment of the Serra Geral highlands, marking the transition between the forested northern half of Rio Grande do Sul and the more open south, although seemingly being the southern limit for predominantly montane species (e.g. *Chamaeza ruficauda*, *Hylopezus nattereri*, *Piprites pileatus*) do not show a precise effect on bird distribution, as Belton (1984: 391) states: "Most species with ranges to the south and the west are limited by this barrier, but many from the north are not affected by it, either not reaching it in significant numbers or, if they do, passing beyond it into the central trough or southeastern hills". The presence of forest birds south of the escarpment is mostly related to the occurrence of a formerly continuous forest block on the eastern slopes of Rio Grande do Sul's southeastern hills (Serra dos Tapes and Serra do Herval). This forest unit, poorly studied and virtually unknown to ornithology, is a semideciduous forest of humid climate (Floresta Estacional Semi-Decidual; Brasil 1986). Therefore, although the southern half of Rio Grande do Sul is typically grassland, an appendix of the Atlantic Forest (*sensu lato*) extends south of the escarpment and the adjacent central trough (i.e. south of 30°S to approximately 31°40′S), covering the humid slopes of the eastern watershed of Rio Grande do Sul's Crystalline Shield (southeastern hills), a deeply eroded (medium height 300 m) prolongation of southeastern Brazil's Serra do Mar mountains.

Ihering (1899) was the first author to mention the few forest birds known from this region, citing specimens obtained in the municipalities of São Lourenço (31°22′S, 51°58′W, now São Lourenço do Sul) in the 1880s and Pedras Brancas, the former name of Guaíba (30°07′S, 51°20′W), a town on the northeastern limit of this forest. This author also contested the origin Pelotas (31°45′S, 52°20′W; a city on this forest's southern limit) of specimens from the British Museum's Joyner collection, with which Belton (1984, 1985) agreed. Pinto (1938) reported specimens collected in São Lourenço around 1900, probably obtained within the limits of the semideciduous forest. E. Kaempfer did not collect in São Lourenço, only along the Laguna dos Patos littoral, as stated by Naumburg (1935), but also in the higher part of the municipality (see text on the Hooded Berry-eater *Carpornis cucullatus*). More recently Belton (1984, 1985, 1994) mentions additional forest birds from the southeastern hills, as well as records of other birds from localities already cited above, without however relating their presence to the occurrence of a previously forested area, nowadays extremely fragmented.

Between October 1993 and July 1996, we conducted an ornithological survey in several forest remnants located in the southernmost domains of this former forest region, documenting with tape recordings new records of forest birds that represent substantial southward range extensions (some of these are sight records). In the municipality of Pelotas, 6 forest remnants were studied: Arroio Andrade (31°27′S, 52°28′W; alt. 300 m, 150 ha of primary forest); Arroio do Padre (31°24′S, 52°23′W; alt. 160–180 m, 10 ha of primary forest); Rincão da Caneleira (31°31′S, 52°35′W; alt. 200 m, 10 ha of primary forest); Parque Farroupilha (31°30′S, 52°34′W; alt. 160 m, 10 ha of primary forest); Arroio dos Porcos (31°33′S, 52°32′W; alt. 60 m, 15 ha of primary forest) and Santa Eulália (31°34′S, 52°32′W; alt. 100 m, 20 ha of primary forest). On the border of the municipalities of Pelotas and Morro Redondo we visited Arroio Cadeia (31°33′S, 52°34′W; alt. 100–120 m, 50 ha of primary forest) and Santo Amor (31°40′S, 52°35′W; alt. 100 m, small fragments of mixed primary and secondary growths). In the municipality of São Lourenço the only remnant visited was Taquaral (31°20′S, 52°23′W; alt. 100–200 m, 200 ha of primary forest). All these forest remnants were sporadically visited during the years, with the exception of Arroio Andrade, visited 8 times (covering 22 days) between February 1995 and May 1996. Additional work was done outside the borders of the original forest (*sensu* Brasil 1986), on gallery forests and on an isolated 500 ha forest block at Cerro das Almas (31°46′S, 52°35′W), a small chain of granitic hills with altitudes varying from 100 to 250 m located in the municipality of Capão do Leão.

SHORT-TAILED HAWK *Buteo brachyurus*

Ihering (1899) and Gliesch (1930) recorded this hawk in Rio Grande do Sul at Taquara and Porto Alegre, respectively. More recently, E. Willis observed this species in three different locations along the southern escarpment, while W. Voss and L. R. C. da Silva recorded it twice at Sapucaia do Sul and W. Voss saw a pair in apparent courtship behaviour at Barra do Ouro (Belton 1984). Additionally, W. Voss and others observed this species at Triunfo and São Sebastião do Caí, and G. Bencke found a dead individual at Cruzeiro do Sul (Belton 1994). We found *B. brachyurus* as resident at Arroio Andrade, with up to three individuals recorded in a day, including immatures (observed on 17 February 1996) and black morphs. An immature was seen at Rincão da Caneleira in late January and early February 1995. Two immatures and a black adult were observed at Arroio Cadeia on several days in February 1995. Also recorded at Cerro das Almas and an individual was seen flying over nearby Arroio Moreira gallery forest (31°43′S, 52°28′W) on 16 June 1996. These records represent a southward distributional extension of *c.* 200 km from the southern range limit (i.e. 30°S) marked by Belton (1994).

BARRED FOREST-FALCON *Micrastur ruficollis*

Ihering (1899), Gliesch (1930), Pinto (1938) and Camargo (1962) mentioned specimens from Taquara, Porto Alegre, São Lourenço and Santa Maria, respectively. Besides these, Belton (1984) cites records from scattered localities in the northern highlands and one from the southeastern hills. We found this species throughout the year at Arroio Andrade and also at Santa Eulália on 23 November 1996 and at Taquaral on 5 November 1995. The nearest record (from São Lourenço, just north of the study area) is given by Pinto (1938), based on a specimen collected in 1900.

RUDDY QUAIL-DOVE *Geotrygon montana*

Known in Rio Grande do Sul from scattered points in the state's northern and northeastern sectors and from the central portion of the southeastern hills, north of the Rio Camaquã (Belton 1984). Mentioned from Taquara by Ihering (1899) and Farroupilha and Osório by Camargo (1962). On 1 February 1995 we observed a female sitting on a nest with two chicks at Rincão da Caneleira, and on 21 February 1995 we saw a male at Arroio Andrade. These records extend the known distribution of this species *c.* 100 km to the south.

RUSTY-BARRED OWL *Strix hylophila*

We observed and tape-recorded up to three individuals of this owl on numerous occasions throughout the year in three small forest remnants (Parque Farroupilha, Rincão da Canaleira and Arroio dos Porcos). It is more numerous at Arroio Andrade, with up to six individuals detected. Found by Belton (1984) in northeastern Rio Grande do Sul, primarily above the escarpment and once in the southeastern hills, near Santana da Boa Vista. Ihering (1899) cited this species from Taquara and Pinto (1938) mentioned a specimen from São Lourenço.

SEMI-COLLARED NIGHTHAWK *Lurocalis semitorquatus*

Mentioned for Taquara by Ihering (1899) and Poço das Antas by Gliesch (1930). Belton (1984) reported it as common near the escarpment and in the extreme north, along the Rio Uruguai, with an isolated record for the central highlands and another for the southeastern hills, north of the Rio Camaquã. This species was recorded in November, December and February at Rincão da Canaleira, Arroio Cadeia and Arroio Andrade, which extends the known distribution of this species 100 km southwards.

ASHY-TAILED SWIFT *Chaetura andrei*

First mentioned for Rio Grande do Sul by Camargo (1962), based on a specimen collected in Farroupilha. Belton (1984) recorded this species from the state's northeastern quarter (except the highest areas) and along the escarpment. At Arroio Andrade we observed this swift regularly between October and late March, disappearing from the area in the fall and winter. Some individuals were additionally seen at Taquaral on 5 November 1996. These records represent a southward extension of the known distribution of this species by *c.* 200 km.

RED-BREASTED TOUCAN *Ramphastos dicolorus*

Reported from Taquara by Ihering (1899) and Poço das Antas by Gliesch (1930). Pinto (1938) and Camargo (1962) mentioned specimens collected respectively at Itaqui (on the Rio Uruguai) and Passo Fundo. According to Belton (1984), the distribution of *R. dicolorus* in Rio Grande do Sul follows the escarpment, from Santa Maria to Aparados da Serra national park and also in the extreme and central north, disregarding the specimen exhibited at Camaquã's Museu de Aves Empalhadas, collected at Encruzilhada do Sul, a town in the northern sector of the southeastern hills. Later, Belton (1994) admits the bird's casual occurrence in the southeastern hills, based on G. Bencke's communication of an individual killed at Encruzilhada do Sul. Haffer (1974), in addition to the localities mentioned above in the northern half of Rio Grande do Sul, marks an additional point south of 32°S (in the municipality of Arroio Grande; 32°15′S, 53°05′W) in his distribution map of *R. dicolorus*. Haffer (*in litt.* 1996) informs us that this point refers to Berlepsch & Ihering's (1885) citation of Arroio Grande (29°45′S, 50°45′W), a locality near Taquara, and not to the southern village of the same name mistakenly shown on the map. In our study area, this species is resident and particularly numerous at Arroio Andrade (groups of up to 20 individuals), where a pair was also seen feeding two young in a cavity 8 m up in an *Alchornea triplinervea* tree, on 22 February 1995. Pairs were also observed at Rincão da Caneleira and Parque Farroupilha. Additionally, there is a specimen at Universidade Católica de Pelotas found dead on a highway near Rincão da Caneleira on 14 June 1994.

WHITE-BROWED WOODPECKER *Piculus aurulentus*

Cited for Taquara by Ihering (1899) and Poço das Antas and Porto Alegre by Gliesch (1930). Specimens are mentioned from Itaqui by Pinto (1938) and Bom Jesus and Passo Fundo by Camargo (1962). Belton (1984) found this woodpecker in the state's northeastern quarter and mentioned two isolated records from the extreme north and the southeastern hills (one north and another south of the Rio Camaquã). We recorded this species in Santo Amor, Rincão da Caneleira and Arroio Andrade, on 25 May 1994, 19 March 1995 and 10 October 1995, respectively.

LINEATED WOODPECKER *Dryocopus lineatus*

Ihering (1899) mentioned this species from Taquara and Gliesch (1930) from Poço das Antas and Santo Ângelo. Subsequently recorded from Bom Jesus (Camargo 1962). Belton (1984) found it in the north, northeast and northwestern sectors of the state and reported it from the southeastern hills, with records from Rincão dos Pereira and São Lourenço, the latter based on a specimen cited by Pinto (1938). A pair were attending a nest with two young, 3 m up in a dead tree at Parque Farroupilha on 2 November 1993 and later, in the same locality, a female was recorded on 25 June 1994. An individual was observed at Arroio Andrade on 27 March 1995.

ROBUST WOODPECKER *Campephilus robustus*

We found this species only at Arroio Andrade, where a small family party (adult pair and young female) was initially observed on 21 February 1995. Isolated individuals were later seen during the year and the female's voice was recorded on two occasions. The nearest previous records are for the foot of the escarpment, at Taquara (Ihering 1899) and Poço das Antas (Gliesch 1930), *c.* 250 km to the north. Additionally mentioned for Santo Ângelo by Gliesch (1930) and Bom Jesus by Camargo (1962). Belton (1984) cited scattered records from the high northeast, extreme north and Garruchos, considering this species rare.

WHITE-THROATED WOODCREEPER *Xiphocolaptes albicollis*

Common resident at Arroio Andrade, the only forest remnant where it was found. Belton (1994) marked its distribution north of 30°S, doubting the origin Camaquã of the specimen at Museu de Aves Empalhadas of Camaquã and, despite G. Bencke's voice-based winter record from Santa Cruz do Sul, in August 1990, considers that this species is possibly a summer resident in Rio Grande do Sul, which is not confirmed by our records. Previously mentioned from sparse localities in the northern half of Rio Grande do Sul: Taquara (Ihering 1899), Itaqui (Pinto 1938), Bom Jesus and Osório (Camargo 1962).

PLANALTO WOODCREEPER *Dendrocolaptes platyrostris*

We found this species in 7 forest remnants (Rincão da Caneleira, Parque Farroupilha, Arroio Andrade, Arroio dos Porcos, Arroio Cadeia and Santa Eulália), both in primary and in old and recent secondary growths. Also recorded further south, outside the limits of the originally forested region, in gallery forests along the Rio Piratini (31°51′S, 52°50′W). According to Belton (1984), the distribution of this species in Rio Grande do Sul covers primarily the northern half of the state, with only one record from the southeastern hills, just south of the Rio Camaquã. Mentioned from Taquara (Ihering 1899), Itaqui (Pinto 1938), Santo Ângelo and Porto Alegre (Gliesch 1930).

RUFOUS-CAPPED SPINETAIL *Synallaxis ruficapilla*

Known in Rio Grande do Sul north from 30°S as far as Santa Maria to the west and west across the state north of 28°30′S (Belton 1984). Besides citing it from Taquara, Ihering (1899) mentioned a record south of 30°S, from Pedras Brancas, overlooked by modern authors. Pinto (1938) recorded this spinetail from Nova Wurtemburg (now Panambi) and Camargo (1962) from Farroupilha. Recorded regularly at Arroio Andrade, primarily along a clearing with dense undergrowth, where we tape-recorded it twice, and also in a bamboo thicket. Additionally found at Cerro das Almas. Our records represent a southward range extension of *c.* 150 km from the historical record of Pedras Brancas.

SHORT-TAILED ANTTHRUSH *Chamaeza campanisona*

Recorded by Belton (1985) in forests along the escarpment, central trough (east of Santa Maria) and in the northern sector above 28°30′S. Previously known from Taquara, Pedras Brancas (Ihering 1899), Porto Alegre (Gliesch 1930), Novo Hamburgo (Pinto 1938), Erebango, Sananduva, Sapiranga (Naumburg 1939) and Santa Maria (Camargo 1962). A recent record from gallery forests of the Rio Camaquã in the municipality of Canguçu in the southeastern hills is given by G. Bencke (Belton 1994). This species was recorded only in the larger forest fragments (Arroio Andrade and Taquaral), being usually heard throughout the year.

RUFOUS GNATEATER *Conopophaga lineata*

This species was recorded in 6 forest remnants of our study area in the southeastern hills (Rincão da Caneleira, Parque Farroupilha, Arroio

Andrade, Arroio dos Porcos, Arroio Cadeia and Santo Amor), being an uncommon resident. Also found at sea level in swampy forests of Pontal da Barra marsh (31°47'S, 52°14'W) and nearby sites along Laguna dos Patos in the municipality of Pelotas, where this gnateater is a scarce resident. Previously recorded in Rio Grande do Sul from localities in the state's northern half. Ihering (1899) mentioned it from Taquara and Gliesch (1930) from Porto Alegre. Naumburg (1937) reported specimens collected by E. Kaempfer at Hamburgo Velho (nowadays Novo Hamburgo), Sananduva, Nonoai, Sapiranga and Santa Cruz. Pinto (1938) cited it from Novo Hamburgo and Camargo (1962) from Farroupilha, Porto Alegre and Viamão. According to Belton (1985), the distribution of *C. lineata* in the state is restricted to the area north of the central trough, east of 54°W, with sparse records to the west. Our records represent a southward extension of the known distribution of this species by *c.* 200 km.

MOUSE-COLOURED TAPACULO *Scytalopus speluncae*

This species was recorded in all studied forest remnants; it is particularly abundant at Cerro das Almas, with up to twelve individuals recorded in a forest patch of less than 5 ha. Occurs at altitudes of about 10 m above sea level near Cerro das Almas and in Arroio Padre Doutor gallery forest (31°44'S, 52°29'W). First mentioned from Rio Grande do Sul by Camargo (1962), based on specimens collected in Bom Jesus and Farroupilha. Belton (1985) recorded *S. speluncae* only in the state's extreme north and along the eastern portion of the top of the escarpment, and also found an individual near Pinheiro Machado, *c.* 100 km westward of our study site.

PLANALTO TYRANNULET *Phyllomyias fasciatus*

This summer resident is mentioned from the vicinity of the northeastern escarpment and the central part of the state, from the Santa Catarina border to the central trough, north of 30°S, also with a record from the southeastern hills near Santana da Boa Vista, where it was found by E. Willis (Belton 1985). Previously known in Rio Grande do Sul only from Taquara (Ihering 1899). We found this species most frequently at Arroio Andrade and also at Rincão da Caneleira, Arroio do Padre and Taquaral remnants, always in spring and summer. These records represent a southward extension of *c.* 100 km from the site of E. Willis's record.

ROUGH-LEGGED TYRANNULET *Phyllomyias burmeisteri*

An unseen bird calling in the canopy of Arroio Cadeia forest was tape-recorded on 3 September 1995 and later identified by José Fernando Pacheco and Bret Whitney as this species. Later heard and tape-recorded at Arroio Andrade on 9 October 1995 and 12 May 1996. Belton (1985) recorded this species seven times in scattered localities of Rio Grande do Sul, north of 29°S (extreme north, northeast and northwest). Our records represent a southward extension of *c.* 300 km in the known distribution of *P. burmeisteri*.

GREENISH TYRANNULET *Phyllomyias virescens*

We usually found only one pair of this species in the smaller forest remnants studied (Rincão da Caneleira, Arroio Cadeia, Arroio dos Porcos and Santo Amor) and up to four pairs in the larger ones (Arroio Andrade and Taquaral), regularly tape-recording its voice. Belton (1985) cited only four records from Rio Grande do Sul, three from the top of the escarpment in the northeast and one from Garruchos, in the extreme west, and stated that Kaempfer collected 13 specimens from the north-central sector in 1928–1929. The nearest previous record is located *c.* 300 km to the north of our study area.

YELLOW-OLIVE FLYCATCHER *Tolmomyias sulphurescens*

We regularly recorded this flycatcher in all forest fragments studied, including Cerro das Almas. Also found in gallery forests of Rio Piratini and Arroio Moreira and occasionally in forest patches on the coastal plain, at the botanical garden of Universidade Federal de Pelotas (31°48′S, 52°25′W). Previously known in Rio Grande do Sul north of the central trough (Belton 1985), including Porto Alegre (Gliesch 1930, Camargo 1962), São Francisco de Paula, Campo Bom, Sananduva, Sapiranga, Lagoa Vermelha and Nova Wurtemburg (Pinto 1944).

WHITE-THROATED SPADEBILL *Platyrinchus mystaceus*

Mentioned for Taquara (Ihering 1899), Farroupilha (Camargo 1962), Novo Hamburgo and Monte Negro (Pinto 1944). Besides these localities, Belton (1985) included in his proposed distribution of *P. mystaceus* in Rio Grande do Sul the state's extreme north and northeastern sectors, with one record for Garruchos. Common in the larger forest fragments studied (Arroio Andrade and Taquaral), less so in the smaller ones (Rincão da Caneleira, Arroio Cadeia, Santa Eulália and Santo Amor). These records extend the known distribution of this species by *c.* 200 km southwards.

GREENISH SCHIFFORNIS *Schiffornis virescens*

According to Belton (1985), in Rio Grande do Sul this species is a common resident in forests of the extreme north close to the Rio Pelotas and Rio Uruguai downstream to Garruchos, and uncommon in the vicinity of the escarpment from Torres to 52°30′W. Mentioned for Taquara by Ihering (1899). We found and tape-recorded isolated individuals of this species on two occasions (22 March and 10 October 1995) at Arroio Andrade. More common at Taquaral forest, where we recorded more than six territorial individuals in 5 November 1995. Our records extend this species' known distribution by *c.* 200 km to the south.

HOODED BERRYEATER *Carpornis cucullatus*

We found this endemic cotingid of the Brazilian Atlantic Forest in six forest remnants southwards to 31°34′S. In the smaller fragments (Rincão da Caneleira, Parque Farroupilha, Arroio do Padre and Santa Eulália) only two individuals were recorded, whereas at Arroio Cadeia four and at Arroio Andrade up to eight singing males were detected.

Previously mentioned in Rio Grande do Sul from Taquara and Pedras Brancas by Ihering (1899), Osório and Viamão by Camargo (1962) and Poço das Antas and Porto Alegre by Gliesch (1930). Belton (1985) limited the distribution of *C. cucullatus* between the northern littoral and the eastern end of the central trough (an area that covers the above mentioned localities) and additionally cited that Kaempfer found it in the southeastern hills, marking on his species map (Belton 1985: 89) two points south of 31°S without precise localities. Belton (*in litt.* 1995) informs us that one of the points (north of Pelotas) represents a site west of São Lourenço, at 122 m altitude, not mentioned by Naumburg (1935), where two specimens (nos. 321984 and 321985 housed in the American Museum of Natural History) were collected by Kaempfer on 14–15 October 1931, and that the other one (southwest of Pelotas) represents Ihering's (1899) citation for Serra do Herval. However, the Serra do Herval where Ihering heard this species is located north of 31°S, being the eastern watershed of the southeastern hills between the Rio Camaquã and Rio Jacuí, as indicated in his former works on Rio Grande do Sul's natural history (Ihering 1891, 1892). Therefore, Belton's interpretation of Ihering's citations is erroneous and clearly refers to the grassy hills around Herval (32°02′S, 53°24′W), a town located in the savanna domain (*sensu* Brasil 1986). Probably the distribution of *C. cucullatus* does not extend south of 31°40′S, coinciding with the limits of the originally forested region.

RED-RUFFED FRUITCROW *Pyroderus scutatus*

On 3 and 29 February 1995 we recorded two individuals at Arroio Cadeia and later found it regularly throughout the year at Arroio Andrade in numbers varying from one to five birds. Local residents informed us that in September and October groups of four or five individuals are seen in display, vocalizing intensely from the canopy. The nearest previous records and accepted southern limit for the species are Taquara (Ihering 1899) and Poço das Antas (Gliesch 1930), both located more than 250 km to the north of our study site. Besides these, Belton (1985) mentioned only two additional localities in Rio Grande do Sul with records of *P. scutatus*: Turvo state reserve and Garruchos.

CHESTNUT-HEADED TANAGER *Pyrrhocoma ruficeps*

We found this tanager only in four forest remnants: Arroio Andrade (up to three pairs), Arroio Cadeia (one pair), Arroio dos Porcos (three individuals) and Parque Farroupilha (male seen on 2 November 1993). Previously known in Rio Grande do Sul from Ihering's (1899) record for Taquara, Gliesch's (1930) for Santo Ângelo and Camargo's (1962) for Farroupilha. According to Belton (1985), the distribution of *P. ruficeps* covers forests north of 30°S and east of 54°W, and across the state north of 28°30′S (being absent from the highest areas of the extreme northeast), with a record from the southeastern hills near Santana da Boa Vista. Our records extend the known distribution of this tanager *c.* 100 km to the south.

RUBY-CROWNED TANAGER *Tachyphonus coronatus*

Recorded in all forest fragments studied, including Cerro das Almas. We also recorded it on two occasions at sea level, in swampy forests at Pontal da Barra marsh. These records extend the species' known distribution by *c.* 250 km to the south, since it was previously known only from localities north of the central trough: Taquara (Ihering 1899), Nova Wurtemburg (Pinto 1944), Osório (Camargo 1962) and along the escarpment from Torres to the upper Rio Jacuí, thence north to the Rio Uruguai and downstream to Garruchos (Belton 1985).

VIOLACEOUS EUPHONIA *Euphonia violacea*

On 28 February 1995 a male was seen in a mixed-species flock with *Heliobletus contaminatus* and *Tangara preciosa* at mid-level in the Arroio Cadeia forest. Previously known in Rio Grande do Sul from Taquara (Ihering 1899), Porto Alegre (Gliesch 1930, Camargo 1962) and Novo Hamburgo (Pinto 1944). Belton (1985) recorded it from the foot of the escarpment in the northeast and once near Garruchos. The nearest previous record is located *c.* 180 km to the north of our study site.

GREEN-THROATED EUPHONIA *Euphonia chalybea*

We first recorded a pair of this euphonia at Arroio dos Porcos on 12 December 1994 and later saw three individuals (a male and two females) at Arroio Andrade on 28 May 1995. Mentioned from Taquara by Ihering (1899), Poço das Antas by Gliesch (1930) and Novo Hamburgo and Nova Wurtenburg by Pinto (1944). According to Belton (1985) this species is uncommon near the southern escarpment and in scattered localities of the north-central region. Our records extend the known distribution of *E. chalybea c.* 200 km southwards.

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Notes on the biology of two threatened species of *Bangsia* tanagers in northwestern Colombia

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The genus *Bangsia* includes five species of chunky, thick-billed, rather short-tailed and strong-legged, medium-sized (body mass 35–45 g) tanagers. All of the species occur in very wet primary to lightly disturbed forests in upper tropical and subtropical life zones and all have restricted geographic distributions, making them potentially vulnerable to deforestation (Hilty 1985, Collar *et al.* 1992). The most threatened and least known species of the genus are undoubtedly the Black-and-Gold Tanager *B. melanochlamys*, and the Gold-ringed Tanager *B. aureocincta* (Isler & Isler 1987, Ridgely & Tudor 1989, Collar *et al.* 1992), both endemic to northwestern Colombia.

B. melanochlamys had been recorded previously from two small areas some 150 km apart, on opposite sides of the Cauca valley: the northwestern tip of the Central Andes between 1500 and 2385 m in the Department of Antioquia, and the southern and western slopes of

Cerro Tatamá on the Pacific slope of the Western Andes between 1000 and 2150 m, near the junction of the Departments of Valle del Cauca, Chocó and Risaralda. In the former area, at least 25 specimens were collected between 1914 and 1948, but the region has since been severely deforested and there are no recent records; this population is feared to be extinct (Hilty 1985, Collar *et al.* 1992). There are a number of specimens and two recent (1987) records from the area of Cerro Tatamá: a specimen taken at 1000 m, and a sighting of one individual (in several days of field work) at *c.* 1500 m (Collar *et al.* 1992, Pearman 1993), the latter providing the only information on the species in life. Available information on *B. aureocincta* was even more scanty: the species was known from just four specimens taken between 1909 and 1946 at three localities between 2040 and 2195 m in the same area of Cerro Tatamá as the previous species; aside from the habitat notation of "wet mossy forest" on a specimen label, nothing was known of its natural history.

This paper presents field observations on the behaviour and ecology, measurements and weights of both species that greatly augment previous information. These data were obtained in the course of a biological inventory of northwestern Risaralda Department carried out between 1991 and 1993 by personnel of the Instituto de Ciencias Naturales through a contract with the Corporación Autónoma Regional de Risaralda (CARDER); further data on the avifauna are given by Stiles (1992). Observations were made with 10 × 25 binoculars; birds captured in mist nets were measured with dial calipers or (wing chord, tail length) a millimeter rule (precision 0.1 or 0.5 mm, respectively; see Baldwin *et al.* 1931 for techniques) and weighed to the nearest 0.1 g with "Pesola" spring balances.

Observations were made at the following sites: (1) Finca El Empalado, 9 km N Mistrató: a large (>100 ha) patch of forest just northwest of the divide between the Pacific and Cauca Valley slopes of the Western Andes between *c.* 1600 and 1800 m, headwaters of the Quebrada Sutú; lightly high-graded forest on steeply sloping terrain, with abundant epiphytes and moss, frequent mist and high rainfall: 28 March–3 April 1992. (2) Finca La Argentina, *c.* 4 km SSW San Antonio del Chamí and 3 km NW of El Empalado at a lower elevation (1250 m) in the drainage of the Quebrada Sutú; a smaller patch (*c.* 5 ha) of more heavily disturbed forest, connected to the previous site by a narrow strip of forest along the stream; observations by Sandra Arango, 1–4 April 1992. (3) Alto de Pisones, a mountain ridge 16 km E San Antonio del Chamí and 9 km by trail NW Geguadas, a small village overlooking the Río San Juan; observations were made in nearly pristine cloud forest between 1400 and *c.* 1850 m, 28 May–7 June 1992 and 12–17 April 1993. A more detailed description of the vegetation is given by Salaman & Stiles (1996); the avifauna is treated in more detail by Stiles (1992 and in prep.).

Bangsia melanochlamys

At El Empalado, this species was fairly common (5–10 sightings daily) in forest canopy and along the forest edge on steep slopes. Individuals or presumed pairs frequently accompanied mixed flocks of tanagers (*Tangara* spp., *Anisognathus* spp., *Chlorospingus semifuscus*, *Chlorochrysa phoenicotis*) and other species in the canopy and subcanopy, although I more often saw individuals or pairs by themselves, especially at fruiting *Miconia* trees. On one occasion, my attention was drawn to a bird hopping and calling excitedly with sharp *tsip* notes in a high, exposed treetop; it suddenly dived into cover an instant before a small hawk (*Accipiter collaris*) arrived at the same perch. On 30 March 1992, I observed an individual, evidently a female, repeatedly carrying moss, fibres and leaf petioles into a mass of bromeliads in the fork of a tree trunk 8 m above ground at the edge of a natural treefall clearing, at *c*. 1750 m. The presumed nest was hidden in the mass of epiphytes. A male was singing from an adjacent treetop while this individual worked. I captured three males with large cloacal protuberances (two collected, both with very enlarged testes) and a female with a well-developed brood patch at this site. At La Argentina, this species was observed twice, and one female with a brood patch was trapped and released.

At Alto de Pisones, I observed *B. melanochlamys* frequently between 1400 and 1650 m and occasionally to 1750 m in May–June 1992, nearly always in tall forest on steep slopes; a male sang regularly from a treetop at 1600 m. Most birds seen occupied the middle levels to the lower canopy of the forest; about half of my observations were of birds accompanying mixed flocks (typically dominated by several species of tanagers, but containing a wider variety of other species than at El Empalado), the others of birds resting or foraging alone or in pairs. I also noted two family groups (a pair with one or two full-grown, begging juveniles) in the upper understorey. In a net set along the ridge crest at 1730 m, I captured and collected a young male (testes very small, skull 10% ossified), probably recently independent, and measured and released an adult male and female.

In April 1993, this species was common up to *c*. 1550 m, and relatively scarce up to 1650–1680 m. Four males were noted singing from treetops along the mule trail between 1400 and 1550 m, one at 1575 m, and one at 1650 m. Most individuals seen were in pairs, two of which were feeding more recently-fledged, stub-tailed juveniles (at 1450 and 1550 m). At most a third of the individuals seen were with mixed flocks, which on the whole were less evident than during the 1992 study period.

Birds with flocks mostly foraged for insects, gleaning in moss tufts, epiphytes, and along small to medium-sized branches, sometimes leaning far forward to scan the undersides of branches and occasionally hanging upside-down to reach an insect, fruit, or flower. Birds foraging for fruit hopped heavily and rapidly along branches, plucking fruits while perched and usually crushing them in the bill, discarding husks and larger seeds in situ. Fruits taken included those of *Cavendishia* and *Psammisia* spp. (Ericaceae), *Marcgravia* sp. (Marcgraviaceae), *Miconia* and *Topobaea* (Melastomataceae), and those of an unidentified mistletoe, as well as the arillate seeds of *Clusia*. Flowers of *Cavendishia* were sometimes plucked, crushed at the base to extract the nectar, and discarded (see also Pearman 1993). Stomachs of collected birds contained 75–100% fruit, the remainder insects; at least one of the fledglings seen in 1993 was being fed fruit (probably *Marcgravia*).

The song of *B.melanochlamys* consists of 3–5 phrases that sound like *pit-psEEyee* or *tst-tzEEeee*, delivered rapidly and followed by a pause of several seconds before the next group. The *tst* note is staccato, the *tzEEyee* very high and penetrating, the first part with an explosive quality. The usual contact note is a sharp, staccato *tst* or *pit*; lone birds occasionally give a longer *pseee* or *pseeyee*, evidently the note described by Pearman (1993).

Bangsia aureocincta

I observed this species only at Alto de Pisones, where it was common to abundant above 1700 m, progressively less common down to *c.* 1600 m (1993) or 1530 m (1992). Most birds were seen along the main ridge (Cuchilla de Gebanía) running roughly E–W and separating the Río Agüita and Río Mistrató watersheds. On 28 May 1992, along roughly 500 m of this ridge between *c.* 1730 and 1850 m, I counted at least 16 individuals including two family groups of a pair with one or two juveniles; at two points some 300 m apart, males were singing from the lower canopy. In April 1993, I noted four singing males near or along this ridge between 1700 and 1800 m, separated by distances of *c.* 100–250 m. A female was seen carrying moss into a mass of epiphytes on a thick horizontal limb some 15 m above the ground and *c.* 50 m below the ridge crest, but the nest was completely hidden. No family groups or fledglings were seen. In general, this species seemed less numerous in the area than during the previous year, possibly because its centre of distribution had shifted to higher elevations for breeding.

Especially during the 1992 observations, this species was often associated with mixed flocks that included *Tangara* spp., *Chlorothraupis stolzmannii*, *Chlorospingus flavigularis* and/or *semifuscus*, *Chlorochrysa phoenicotis*, *Euphonia xanthogastra* as well as furnariids, woodcreepers, antwrens, barbets and other species; however, it rarely occurred in the same flocks as *B. melanochlamys*, and even at fruiting *Miconia* trees (common along the trail to Puerto de Oro above *c.* 1650 m) the two species seldom coincided in their visits (and were not observed to interact when they did so). *B. aureocincta* occurred on average slightly lower in the vegetation than *melanochlamys*, typically from the upper understorey through the midcanopy. With flocks, its foraging was mainly for insects and similar to that of *melanochlamys*: searching deliberately in moss and epiphytes, mostly along rather thick, horizontal branches. Individuals or pairs were also recorded taking fruits of *Cavendishia*, *Marcgravia*, *Guettarda* (Rubiaceae), an unidentified mistletoe and *Anthurium* (Araceae), and arillate seeds of *Clusia* and ?*Tovomita* (Guttiferae).

Between 29 May and 2 June 1992 I captured 7 individuals in mist nets set along the ridge at 1730–1750 m. An adult male and female and a subadult male were collected; two males and two females were measured and released. All individuals except one female were commencing the annual moult; the males collected had enlarged testes

TABLE 1

Measurements (mean, standard deviation, range) of *Bangsia* tanagers captured in NW Risaralda Department, Colombia, 1992–1993

	B. aureocincta		*B. melanochlamys*	
	Males (*n*=4)	Females (*n*=3)	Males (*n*=5)	Females (*n*=3)
Exposed culmen	14.03, 0.46 (13.6–14.6)	13.70, 0.26 (13.5–14.0)	13.47, 0.48 (12.9–14.0)	13.07, 0.16 (12.9–13.2)
Total culmen	18.10, 0.60 (17.2–18.4)	17.97, 0.90 (17.3–19.0)	17.55, 0.42 (17.4–18.0)	17.23, 0.25 (17.0–17.5)
Commissure width	13.80, 0.91 (12.6–14.6)	13.83, 0.42 (13.5–14.3)	11.96, 0.39 (11.6–12.6)	11.96, 0.25 (11.7–12.2)
Bill depth at nostril	8.15, 0.19 (7.9–8.3)	8.10, 0.26 (7.9–8.4)	7.75, 0.13 (7.5–8.0)	7.87, 0.15 (7.7–8.0)
Tarsus length	26.08, 0.91 (24.8–26.5)	25.87, 1.39 (24.7–27.4)	24.72, 0.94 (23.8–25.8)	24.60, 0.36 (24.3–25.0)
Wing chord	89.40, 1.04 (88.0–90.5)	84.19, 1.05 (83.0–85.0)	85.56, 1.11 (84.0–86.5)	82.30, 1.71 (80.5–83.5)
Tail length	52.42, 0.68 (51.5–53.5)	52.23, 0.75 (51.5–53.0)	45.06, 0.88 (44.0–47.0)	44.96, 1.50 (43.5–46.5)
Body mass (g)	42.05, 3.40 (39.4–46.6)	41.37, 3.15 (38.3–44.6)	38.80, 0.81 (37.7–39.4)	35.65, 0.92 (35.0–36.3)

(9 × 8 mm and 6 × 4 mm for the adult and subadult, respectively), while the females had old brood patches and the collected female had a postreproductive ovary. Stomachs of collected birds contained 70–90% fruit, mainly *Miconia*, *Cavendishia* and *Marcgravia*, the remainder insects.

The song of *B. aureocincta* consists of sharp, penetrating, high-pitched whistles or thin, watery trills *tseeuurr* delivered in groups of 3–6. The individual whistles start explosively and slur downwards; usually the first one or two are shorter than the rest. A frequently given note in situations of alarm or excitement is a short, twittering trill on a lower pitch; when moving together, individuals may maintain contact with sharp *chip* or *chit* notes, heavier than the corresponding notes of *B. melanochlamys*.

Measurements, weights and plumages

B. aureocincta is slightly larger in all measurements, but apart from this the two species are quite similar in overall proportions. In both species males have significantly longer wings than females (Mann–Whitney U-tests), but the sexes do not differ in any other measurement (save that males of *B. melanochlamys* weighed more than females, which may be an artefact of the small sample size; see Table 1).

Sexual differences in plumage in *B. melanochlamys* are too slight to be evident in the field: the head and back of the female are a slightly duller, less glossy black and the orange of the breast is loss glossy and intense. The sexes differ much more in *B. aureocincta* and, given the uncertainty regarding the adult female plumage (Isler & Isler 1987) due to the scanty data of the few available specimens, I here describe the plumages of my specimens in some detail. ADULT MALE: head, throat, sides of breast glossy black; chin whitish, scaled with dull black; postocular and malar stripes and postauricular bar bright yellow, forming a ring around the cheeks and auriculars; centre of breast bright orange-yellow, remaining underparts bright olive-green, washed with yellow medially and on crissum. Back dark moss-green, rump and upper tail-coverts paler, brighter green. Central rectrices duller, darker olive; remaining rectrices dusky, edged with olive, faintly tinged with dull blue; wings blackish, the wing-coverts and secondaries broadly edged with rather dull, dark blue. Iris dark red; maxilla black, mandible yellowish horn colour; tarsi and feet light greyish-brown. ADULT FEMALE: crown and nape dull blackish smudged with dull dark blue; auriculars and cheeks dark moss green, the yellow ring surrounding them narrower and more greenish-yellow; chin yellowish-white smudged with dusky, throat dusky-olive shading to olive-green on the sides of the breast; yellow of breast duller, less orange; posterior underparts olive green with less yellow wash medially; green of dorsum duller, more olive; blue of wings duller. Mandible mostly chrome yellow, tip brownish; soft parts otherwise like male. SUBADULT MALE (probably one year old, as skull completely ossified): black of head dull, not glossy, slightly smudged with dull, dark blue on crown and nape; auriculars and sides of breast dull, dark greenish-black; pale area of chin tinged yellowish and more extensive than in adult; yellow of breast duller, smudged with dusky; back slightly paler and duller; iris dark chestnut; blue of remiges slightly greyer; otherwise like adult male.

Discussion

Breeding of both species appeared to be at its height during March and April, with many well-grown young in late May–early June. There appeared to be a fairly well-marked separation in elevation during breeding at Pisones, with *melanochlamys* mostly below 1600–1650 m and *aureocincta* mostly 1700 m and higher; more overlap evidently occurred following breeding. At El Empalado, where *aureocincta* was not observed, *melanochlamys* nested up to at least 1750 m. A difference in preferred habitat may also occur, with *melanochlamys* occupying steeply sloping terrain, *aureocincta* the ridge crests.

In plumage pattern including the relative lack of sexual dimorphism, vocalizations and behaviour, *melanochlamys* seemed quite similar to *B. arcae* of Central America (*cf.* Isler & Isler 1987, Stiles & Skutch 1989, Ridgely & Gwynne 1989); the two are doubtless closely related, and probably comprise a superspecies. The closest relative of *B. aureocincta* is probably *B. edwardsi* to the south of the Río San Juan drainage (Hilty & Brown 1986, Ridgely & Tudor 1989); only from this species have I heard a similar, trilling alarm note. However, the two differ much more in plumage pattern, and *aureocincta* shows much greater sexual dimorphism.

The Alto de Pisones region of western Risaralda would appear to be a critical conservation area for both species, especially for *B. aureocincta* which at present is known to exist nowhere else. CARDER is preparing to execute a management plan for this area, which may also be included in the proposed Caramanta National Park. However, because the area is also part of an Embera Indian reservation and recently has been invaded by guerrilla groups, the situation is complicated to say the least. Potential threats to the area resulting from the construction of the Geguadas–Santa Cecilia road were outlined by Salaman & Stiles (1996). It is hoped that funds deriving from the Species Sponsorship Program of BirdLife International (Alto de Pisones is the type locality of the recently described *Vireo masteri*; Salaman & Stiles 1996) will help CARDER to act in spite of the difficult situation. It will also be important to survey other mountain ridges around the massif of Cerro Caramanta to determine whether other populations of *B. aureocincta* exist in this region.

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New distributional information on the birds of southern Quintana Roo, México

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The avifauna of the Mexican state of Quintana Roo, located in the eastern half of the Yucatan Peninsula, has received much attention recently, partly because of its importance as a wintering ground for many Neotropical migrants (Scott *et al.* 1985, Gatz *et al.* 1985, Chávez-Léon 1988, López-Ornat 1989). Since the pioneering monograph of Paynter (1955), the Yucatan Peninsula has been recognised as an important area of avian diversity and endemism, particularly the arid northern section. However, knowledge of the avifauna of Quintana Roo has been concentrated in the northern part and on Cozumel Island, and much of the south remains poorly known (Paynter 1955, MacKinnon 1992, Vásquez *et al.* 1992, Figueroa 1994).

The Museo de Zoología of the Colegio de la Frontera Sur, Chetumal (ECOSUR, formerly Centro de Investigaciones de Quintana Roo, CIQRO) surveyed the vertebrate fauna in the poorly known southern section of the state between August 1992 and August 1993. Field work was conducted in seven localities within the Municipio of Othón Pompeyo Blanco in southernmost Quintan Roo (17°53′–18°13′N, 88°46′–89°15′W). The elevational range of the area is from 0 to 200 m. Dominant vegetation throughout is tropical semideciduous forest (*sensu* Rzedowski 1988), with dominant trees including *Bursera simaruba, Manilkara zapota, Brosimum alicastrum, Metopium brownei*, and *Chrysophila argentea* (Torres, 1991). Large tracts of original vegetation have been modified due to human disturbance, mainly for cattle grazing, agriculture, and exploitation of fine hardwoods. General coordinates and elevation of localities mentioned in the species accounts are as follows: 4·7 km N, 13 km W of Calderón (18°07′N, 88°55′W; 200 m); Estero Franco (17°56′N, 88°52′W; 30 m); La Unión (17°56′N, 88°51′W; 0 m); Los Tornillos (18°05′N, 89°03′W; 130 m); Dos Aguadas (18°07′N, 89°08′W; 180 m); 2.3 km S of Nuevo Veracruz (18°02′N, 89°10′W; 140 m); El Naranjal (18°13′N, 89°02′W; 140 m).

During 65 days of field work, mist-netting and sight or auditory records were used to inventory the species present in the area. We collected selected specimens of as many species as possible; voucher specimens are at the Museo de Zoología, ECOSUR (MZECOSUR) and at the Museo de Zoología, Facultad de Ciencias, Universidad Nacional Autónoma de México (MZFC). We report here seven species apparently new or noteworthy for the state.

MISSISSIPPI KITE *Ictinia mississippiensis*

On 20 October 1992, an individual was observed at Los Tornillos. This species is a transient along the east coast and southeastern Mexico to South America. No previous records exist from the Yucatan Peninsula, except for one in Yucatan (no locality given, Howell & Webb 1995). Possibly overlooked, and more widespread, this record is the first from Quintana Roo.

SWALLOW-TAILED KITE *Elanoides forficatus*

Six individuals were observed on 12 May, 1993, at Los Tornillos. In June 1994, a nest was discovered on a dead tree on the edge of a cornfield at Isidro Fabela, central Quintana Roo (De Alba 1997); in June 1995, an individual was observed 5 km S Dos Lagunas, in southeastern Campeche (Figueroa & Salgado in prep.). This species is considered a common winter transient throughout the Yucatan Peninsula, and a local breeder in eastern Mexico (eastern Chiapas) and Central America (Rappole *et al.* 1993, Howell & Webb 1995). The nest record extends the Mexican breeding range significantly northwards.

WHITE-NECKED JACOBIN *Florisuga mellivora*

On 23 March 1993, an adult male (heavy fat deposits, no moult) was collected 4·7 km N, 13 km W of Calderón (MZECOSUR A-512) in cultivated grassland approximately 1 m high. The next day, two additional individuals were observed at the same locality, foraging at several species of flowers. On 14 May 1993, another was observed near Los Tornillos, in a patch of well preserved forest. This species is known from rain forests in Tabasco, Veracruz, northern Oaxaca and Chiapas (Miller *et al.* 1957, AOU 1983, Binford 1989, Howell & Webb 1995) and adjacent northern Guatemala in the Petén (Land 1970) and Tikal (Smithe 1966), where it is considered uncommon. Records from Belize (Russell 1964) are from southernmost localities. No previous records exist from the Yucatan Peninsula in Mexico except for an observation from Calakmul Biosphere Reserve, in southeastern Campeche (PRONATURA 1993).

BUFF-THROATED FOLIAGE-GLEANER *Automolus ochrolaemus*

In April 1992, an adult male was collected 7 km N of La Unión (MZFC 10551). On 24 and 25 February 1993, a male and a female (MZECOSUR A-380, A-387) were collected 2.3 km S of Nuevo Veracruz, in a well preserved patch of forest. The male showed no evidence of fat or gonadal enlargement; the female, however, had an enlarged ovary and light fat. These records are the first for the State; previous Mexican records near the study area are from Oaxaca, Tabasco and Chiapas in Mexico (AOU 1983). The species is considered uncommon in northern Guatemala (Land 1970), and rare in northern Belize (Russell 1964).

THICK-BILLED SEEDFINCH *Oryzoborus funereus*

Six specimens of this species (MZECOSUR A-157, A-538, A-610, A-612, A-613, A-641) were collected on 29 August 1992, and 25 March and 2, 3 and 24 June 1993. These are the first records for the state; previous peninsular records are those of Robbins, who sighted one individual at Rancho Santa Anita, Campeche (MacKinnon 1992). The species has been recorded from Guatemala and Belize (Land 1970, Russell 1964), but seems to be very local in occurrence, as in Mexico (Howell & Webb 1995).

FUERTES' ORIOLE *Icterus (spurius) fuertesi*

One adult in male plumage was observed on 25 February 1993, 2.3 km S of Nuevo Veracruz among a flock of Orchard Orioles *Icterus (spurius) spurius*. It was not possible to determine if females or immatures of this species were also present. The specific status of the two forms is still in debate, but winter sympatry has been documented elsewhere (e.g. AOU 1983). This record is the first for Quintana Roo.

EASTERN MEADOWLARK *Sturnella magna*

One individual was sighted on 4 June 1993, in a patch of grass at the margins of Rio Hondo. No previous records exists from Quintana Roo, and its seasonal status is uncertain; the data suggests a resident population (Russell 1964). This species is uncommon in Belize (Russell 1964) and northern Guatemala (Land 1970). In the Yucatan Peninsula it has been recorded only along the northern coast of the state of Yucatan.

Discussion

Due to the lack of thorough surveys in many regions, knowledge of the Mexican avifauna is still fragmentary. Although organized surveys have been developed for several states and regions (e.g. Binford 1989, Navarro *et al.* 1993), many areas remain little known. The avifauna of southern Quintana Roo is very rich, and an analysis of general distribution patterns of bird species will be published elsewhere (Figueroa in prep.). Undoubtedly, most of the species still to be recorded have been overlooked due to lack of thorough field work, but some crop-associated species may well be recently established, as a result of the extensive transformation of forest to agriculture and pasture lands. Examples may include the seedfinch and meadowlark recorded here.

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Distributional records of and identification notes on birds of the Beni Biological Station, Beni, Bolivia

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Distributional data on the Bolivian avifauna have accumulated rapidly in recent years, which has facilitated greatly the identification of localities crucial for conserving species at risk from extinction. Wege & Long (1995) identified 27 'Key Areas', of which nine were ranked as being of top priority with regard to the numbers of threatened species occurring. One of these locations is the Beni Biological Station (BBS) (Estación Biológica del Beni) (IUCN category I; IUCN 1992), which was the first ever UNESCO 'Man and Biosphere' site. This 160 000 ha tropical lowland reserve is characterized by a complex habitat mosaic, spanning rainforest, savanna and wetland; consequently it has a rich avifauna. A recent inventory has been provided by Brace *et al.* (1997), who list 478 species, and treat in detail the status of the four threatened and 15 near-threatened species (Collar *et al.* 1994) which had been recorded as of 1995. However, information on either range extensions or new observations relating to the identification of non-threatened species was not provided in that paper, an omission which is rectified here.

The great majority of the data presented are derived from observations made during three annual (1994–96), 6-week visits to the BBS over the July–September period (dry season), accompanied by EarthCorps (Earthwatch) teams and Bolivian students, to undertake ecological research on the faunas of savanna-based forest islands (R. C. Brace *et al.*, unpubl. data). However, commentaries on three of the 22 species discussed are based solely on sightings made by White *et al.* (1993) in 1992. Earlier endeavours at the BBS by Cabot *et al.* (1986), Flores (1988), S. L. Hilty (unpubl. data), Rocha (1988, 1990) and other workers led to the production of a preliminary species catalogue by Miranda *et al.* (1991), which tabulated more than 400 species. Although that inventory acted as a valuable template for our expanded listing (Brace *et al., loc cit.*), it was necessary nevertheless to evaluate critically a number of records, which resulted in the exclusion of no less than 10 species.

Although we now have a good working knowledge of the avifauna of some parts of the BBS—notably those within easy reach of the El Porvenir field station located on the southern flank of the reserve—there is a paucity of information concerning centrally located tracts which are difficult to access. It is our hope that this paper will catalyse investigations of hitherto relatively unexplored areas of the BBS, and will encourage further study during the austral summer (wet season), a period over which there is little information, for example, on the influx of northern migrants.

Figure 1. Location of the Beni Biological Station (BBS). The administrative departments of Bolivia, and some cities and towns, are indicated, as are adjacent countries.

Study location and areas

The BBS is located in the Llanos de Mojos (Fig. 1), a lowland (*c.* 200 m altitude) plain characterized by savannas and forested areas. The savannas are either hyperseasonal (subject to alternating soil saturation and drought/fires) or seasonal (subject to an extended dry period) (Sarmiento 1983). The reserve itself extends over an area roughly 80 by 30 km in extent, 70% of which is covered by a variety of forest types, though humid seasonal categories dominate (Miranda *et al.* 1991). The northern and southern limits of the reserve are demarcated, respectively, by the Ríos Manique and Curiraba (Fig. 2a); inundation of the former, a 'white-water' river, is responsible for the presence of much swamp forest within the reserve core. The El Porvenir (PVR) field station (14°52′S, 66°20′W), where we were based, is located 180 km west of Trinidad and 50 km east of San Borja. Planned expansion (Miranda pers. comm.) of the BBS will engulf the 2500 ha PVR estancia (Fig. 2b), which extends northwards to the Río Curiraba.

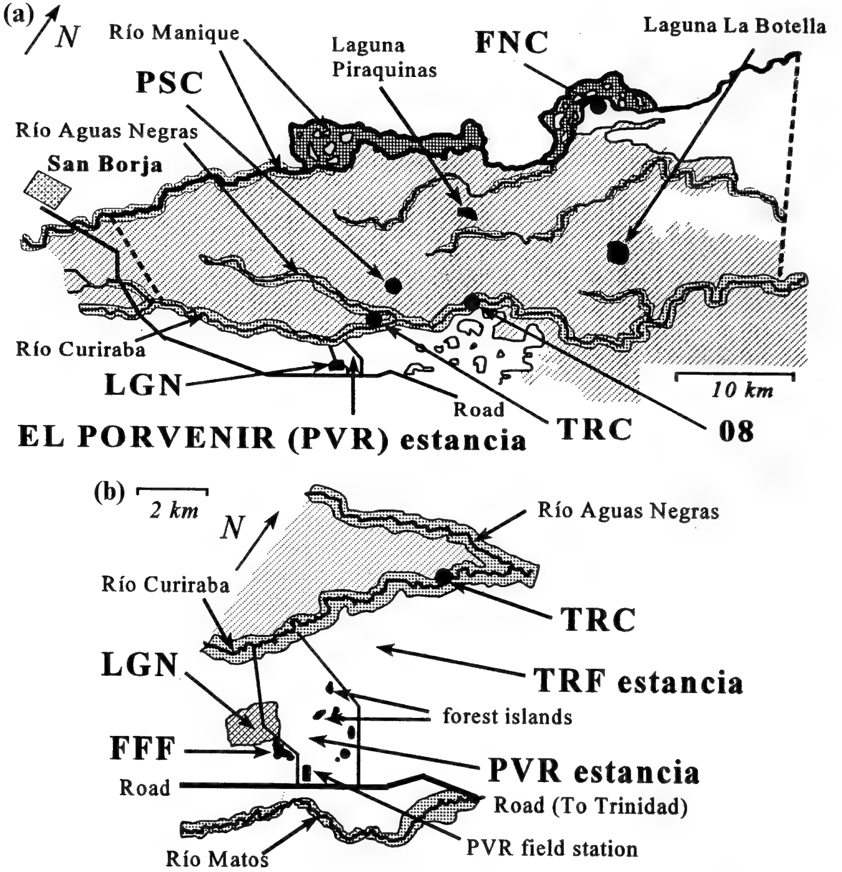

Figure 2. (a) Map of the Beni Biological Station to show study locations and areas (see text): based on maps given in Miranda *et al.* (1991). To the southwest and northeast, the limits of the reserve (as of 1996) are indicated by dashed lines. The northern and southern limits are demarcated by the Ríos Manique and Curiraba (with accompanying riverine forest shown) respectively. South of the latter lies the El Porvenir (PVR) estancia. Stippled areas represent forest; unmarked tracts, in the east and adjacent to the San Borja–Trinidad road, designate savanna. To the east of PRV a representative selection of savanna-based forest islands/fragments is depicted. (b) Map showing the El Porvenir estancia and affiliated field station, in more detail; some forest islands are depicted. Also denoted are the TRF estancia, the FFF, and some features south of the road.

Consequently, this ornithologically well-worked estancia is, and has been considered (Brace *et al.* 1997), an integral part of the reserve. The same is true of the Triunfo (TRF) estancia, through which it is necessary to pass in order to reach forest camps from PVR. It should be noted that the reserve forest block is virtually isolated now from all adjacent forested areas by intervening savanna, giving concern in the context of putative future avifaunal impoverishment. However, negating this isolation to some degree is the presence of well-vegetated, former river beds (*curiches*) meandering across the PVR savanna, and of forest islands (*islas des bosques*), which appear to act, collectively, as habitat corridors (Saunders & Hobbs 1991). They are utilized by a wide selection of forest birds, though by no means all such species (R. C. Brace & J. H. Pearce-Higgins unpubl. data).

The following areas are distinguished in the text; their locations are indicated in Figure 2.

PVR estancia—savanna. This fairly open terrain is dominated by *Andropogon bicornis* (Graminaceae) (up to *c*. 80 cm in height), and contains scattered fire-resistant trees: e.g. *Tabebuia aurea*, *T. chrysantha*) (tajibos) (Bignoniaceae), *Pseudobombax* spp. (Bombacaceae). It is subjected to limited seasonal inundation, cattle grazing, and to annual incursions of fire started in neighbouring estancias during the August/September period to promote the growth of new grass. The fires frequently affect quite extensive areas; some controlled, 'in-house' burns are initiated also. Consequently, the savanna exhibits at any one time a patchwork of grass of different heights.

PVR estancia—forest islands. Dotted in the PVR savanna are numerous such islands ranging in size from <1 to 5+ ha. *Guazuma ulmifolia* (coco) (Sterculiaceae), *Ficus* spp. *Curatella americana* (Moraceae) and *Scheelea princeps* (motacú) (Palmaceae) are typical island trees; fire-resistant species predominate on the periphery. The centres of most islands are relatively devoid of undergrowth due to cattle grazing, but narrow foliated scrubby borders persist which attract a wide variety of birds.

Florida estancia—forest fragment (FFF). An 11 ha fragment created some 20 years ago as a result of road construction. Although grazed, the western portion retains fairly dense undergrowth and the periphery is profusely vegetated.

Laguna Normandia (LGN)—cyperacean edge. A fringe (up to 20 m wide) of *Cyperus giganteus* (Cyperaceae) (to 2 m in height) punctuated in places by other sedges, grasses and some bushes.

Triunfo (TRF) estancia. An area of savanna which is somewhat less open than that of the PVR estancia, with some patches of *chaco*-like scrub.

El Trapiche (TRC). A camp sited in low (<15 m), seasonally inundated palm forest, 700 m distant from the savanna edge and 250 m north of the Río Curiraba. Mist-netting locations were up to 1 km north of the camp, and within a narrow belt of riverine forest on the southern flank of the Curiraba, where there are many tangled bushes.

Pascana (PSC). A camp set in swamp forest alongside a small 'black-water' lagoon; situated 6 km north of Trapiche.

08 (Zero Ocho). A Chimane Indian village sited adjacent to the Río Curiraba. Mist-nets were set up in seasonally inundated forest *c*. 0.5–1 km northwest of the village, accessed by a track leading to PSC.

Final Camp (FNC). A location in the northeast of the reserve alongside the Río Manique. The camp was located in high (to 30 m) riverine and swamp forest, which is quite open in places (White *et al.* 1993).

Systematic ordering in the species accounts is conservative and follows Clements (1991). For the tyrant flycatchers, the taxonomy and English names used adhere closely to Ridgely & Tudor (1994). Species new for the BBS (1992–96) are indicated by an asterisk; species additional to those listed by Brace *et al.* (1997) are denoted by two asterisks (four species—taking the reserve total to 482). In those instances where only one of the authors observed a species, the appropriate initials appear; # signifies that neither author was involved in the sighting concerned (two species in 1992). JWP-H refers to James Pearce-Higgins who accompanied us in 1995, and BMNH to the Natural History Museum, Tring.

Species accounts

PEARL KITE *Gampsonyx swainsonii**

One watched in savanna 3 km north of PVR on 17 September 1992 (RCB *et al.*) (White *et al.* 1993) is the first record for Beni; it remains the sole sighting for the BBS. This species was known previously from the non-Amazonian lowlands of Santa Cruz and Tarija, and from La Paz (Parker 1989).

TINY HAWK *Accipiter superciliosus***

An individual seen near TRC on 29 July 1996 (George and Joan Hardie, RCB) is the first and only record for the BBS, although both a pair (28 August 1994) and a single bird (JH) (August 1995) have been observed in secondary forest with clearings, only 4 km to the south of the PVR estancia. These sightings would appear to be the second to fourth reports for Beni, the first coming from foothill forest (*c.* 600 m) 40 km west of San Borja in 1990 (Parker 1989, Parker *et al.* 1991). Within Bolivia, the species is known only from Beni, Cochabamba and Santa Cruz (Remsen & Traylor 1983, Arribas *et al.* 1995).

BURROWING OWL *Speotyto cunicularia**

A pair in residence at El Porvenir in 1995 and 1996 constitute, surprisingly, the first reports from the department of Beni.

LITTLE NIGHTJAR *Caprimulgus parvulus**

Although widespread in lowland Bolivia (Arribas *et al.* 1995), this species had not been recorded at the BBS until August 1994, when it was heard in the savanna adjacent to the PVR headquarters. Found subsequently to be prevalent in the area, with many heard, several seen and one trapped in both 1995 and 1996; a nest containing a single egg was discovered in a forest island in August 1995.

STRIOLATED PUFFBIRD *Nystalus striolatus**#

An individual noted at PSC on 15 August 1992 (White *et al.* 1993) is apparently the second record for Beni, the first coming from humid Andean foothill forest (Serranía Pilón) (Parker 1989).

PALE-BREASTED SPINETAIL *Synallaxis albescens*

This spinetail which has been found in low tangled scrub in both seasonally inundated and dry savanna (PVR and TRF estancias), particularly at the edges of forest islands and of the FFF, shows considerable, apparently undocumented plumage variation, which is assumed to be age-related. According to Ridgely & Tudor (1994), the tail should exhibit a dull brownish hue, but that of most birds examined (total of 51 trapped) displayed a rufous tinge, which can be marked and thus suggestive of Sooty-fronted Spinetail *Synallaxis frontalis*. Although some birds showed a pure rufous crown as expected, in the majority it was brown with some rufous speckling, and in a small number the crown was plain brown, variation which was apparent in skins scrutinized (BMNH). Note that the Plain-crowned Spinetail *S. gujanensis*, which has been trapped (three in 1995) in forest both at TRC and south of PVR, has more extensive rufous on the wings (remiges in addition to coverts), as is the case in *S. frontalis* and to some degree too in *S. hypospodia*, considered below. One individual controlled on 6 August 1994 was re-trapped in the same location (PVR forest island) on 23 August 1996.

CINEREOUS-BREASTED SPINETAIL *Synallaxis hypospodia**

In comparison to *S. albescens* this species was less numerous, though observed routinely (up to *c.* five per day) in the peripheries of forest islands, at the edge of the FFF and in TRF scrub, requiring seemingly slightly taller (3+ m) vegetation. The rufous wing coverts were always duller in tone, and the black of the throat more extensive. It was found to be significantly heavier too: 14.9–18.1 (16.9) g, s.d. 1.04, $n=17$ as compared to 9.2–14.3 (11.2) g, s.d. 0.89, $n=50$ ($Z=-6.130$, $P<0.001$). The two species are easily separated on song (see Ridgely & Tudor 1994). One *S. hypospodia* caught (PRV scrub) on 6 August 1995 was re-trapped at the same site on 23 August 1996. (Re-trap weights have been excluded from the comparison presented above.)

SPECKLED SPINETAIL *Cranioleuca gutturata**

An individual trapped at PSC on 12 August 1992 (White *et al.* 1993) was the first record for the BBS of this species, which has been found at a small number of other Benian localities (see Gyldenstolpe 1945, Davis *et al.* 1994). Additionally, several were seen and one mist-netted (17 August) at TRC in 1994.

PLAIN ANTVIREO *Dysithamnus mentalis*

A specimen procured at the BBS in 1988 by Omar Rocha (see Davis *et al.* 1994) was the first from lowland Bolivia. However, it had been reported from Beni previously by Parker (1989), who found it to be fairly common above 800 m (Serranía Pilón) and who heard the species also at low elevation, 20 km southeast of San Borja. We have observed it to be not uncommon at the BBS, with individuals often paired. A total of seven have been trapped: three in the FFF, three at 08 and one at TRC.

STRIPE-CHESTED ANTWREN *Myrmotherula longicauda***#

One caught at FNC on 16 September 1992 (White *et al.* 1993) is the only record for Beni of this essentially foothill species (*c.* 500–1100 m) (Remsen & Traylor 1989, Ridgely & Tudor 1994). Prior to this sighting, the putative occurrence of Streaked Antwren *M. surinamensis* was deemed far more likely since this congener, which is very similar in appearance, occupies habitats more akin to those prevalent at the BBS than those frequented usually by *M. longicauda*, although admittedly *M. surinamensis* has only a limited and discontinuous distribution in northern and eastern Bolivia.

SULPHUR-BELLIED TYRANT-MANAKIN *Neopelma sulphureiventer*

This relatively little known species occurs locally in southwest Amazonia (Brazil, Peru and Bolivia) (Gyldenstolpe 1945, Ridgely & Tudor 1994). Twelve individuals were secured at TRC (two being re-trapped in 1995), two were handled in the FFF and two mist-netted at 08. White *et al.* (1993) trapped one bird at PSC and three at FNC. From experience of the species on the Ríos Beni and Quizer in Beni and Santa Cruz, respectively, Remsen *et al.* (1988) describe it as being an inconspicuous resident of undergrowth of riverine forest, and commented that it is unclear whether or not the species is a bamboo specialist. Our work indicates that it is more catholic in its habitat preferences than the first of these two comments would suggest, and in the absence of any bamboo at the four ringing sites with which we are familiar, indicates that bamboo is not necessarily a habitat prerequisite.

OCHRE-BELLIED FLYCATCHER *Mionectes oleagineus***

A total of eight *Mionectes* were mist-netted in seasonally inundated forest at TRC in 1995, over the 2–4 and 15–17 August periods, five being caught on one day. On the basis of the presence or absence of buffy/tawny tertial edgings (Ridgely & Tudor 1994, J. V. Remsen pers. comm.), four birds were identified firmly as *M. oleagineus*, and one—having no tertial edgings—as the sibling, McConnell's Flycatcher *M. macconnelli* which had been recorded from the BBS (riverine forest) previously (Rocha 1988). Appraisal of the other three individuals remains inclusive, despite retrospective comparison with skins of the two species held by the BMNH. No *Mionetes* spp. were seen in either 1994 or 1996, and none was observed either by White *et al.* (1993), who remained at Trapiche for over one week in 1992. *M. oleagineus* is widespread in lowland Bolivia (Arribas *et al.* 1995), and although it has been reported as favouring second growth and edge habitat and *M. macconnelli* described as inhabiting undisturbed forest (Willis *et al.* 1978), the two species have been found also to occur together, in hilly upland forest and river-edge second growth (600 m altitude) near Puerto Linares in La Paz department (Capparella & Lanyon 1985).

SUIRIRI FLYCATCHER *Suiriri suiriri**

Three individuals of the northern form, *S. s. affinis*, treated separately sometimes as the Campo Suiriri (see Ridgely & Tudor 1994 for discussion), have been recorded. One was seen in the periphery of a forest island in the TRF estancia on 30 August 1995 (RCB, JWP-H), and two were observed pursuing each other subsequently in fairly open savanna (PVR estancia) on 12 August 1996. Within Bolivia this subspecies is found in Beni and Santa Cruz (Remsen & Traylor 1983, Parker & Rocha 1991, Davis 1993).

WHITE-CRESTED TYRANNULET *Serophaga subcristata*

Over the 1994–96 period 12 trapped birds were identified as this species which is widespread, but identification of those ($n=8$) examined in 1994 is regarded now as being unreliable since it became apparent retrospectively in 1995 that the White-bellied Tyrannulet *S. munda* (see below)—a confusingly similar species—is found on the reserve also. *Serpophaga* spp. were seen on almost a daily basis on the PVR estancia in 1995 and 1996; the majority were assigned tentatively to *S. subcristata*. Two individuals were re-trapped, one in 1995 (TRF estancia scrub) and one in 1996 (FFF), both in the same location as ringed. A specimen collected from forest island terrain 40 km east of San Borja on 30 August 1985 (Cabot 1990) was the first record of the species from Beni; Parker (1989) reported seeing three or four birds 20–27 km east of San Borja (June) in thorny woodland and bushes.

WHITE-BELLIED TYRANNULET *Serpophaga munda**

Of the total of nine *Serpophaga* secured (19–21 August 1995) in undergrowth at the edges of various forest islands or of the FFF, or in TRF scrub in 1995, five displayed a greyer, less olivaceous mantle and a paler belly (lacking or almost lacking any yellowish suffusion) than did the remainder, and were identified therefore as *S. munda*. That some *S. munda* can show traces of a yellow (possibly age-related) wash below necessitates that species separation must proceed cautiously (see Plain Tyrannulet *Inezia ornata* below), though is aided greatly if their characteristic calls are heard (Parker 1989, Ridgely & Tudor 1994, pers. obs.). Apparently not recorded from Beni previously (Arribas *et al.* 1995), though Parker (*loc. cit.*) indicated that he may have seen one 27 km east of San Borja. The species occurs widely in Bolivia, but has yet to be recorded from Pando. Quite possibly *S. munda* visits the BBS solely during the austral winter, descending from Andean foothill and valley breeding areas (Ridgely & Tudor 1994). The putative migratory status of this species at the BBS, and of *S. subcristata* also, requires investigation.

PLAIN TYRANNULET *Inezia inornata*

This was easily the commonest tyrannulet encountered in the peripheries of forest islands, with a total of 25 being mist-netted on the PVR and TRF estancias. It was seen occasionally too in forest at TRC (with two birds trapped), where *Serpophaga* spp. were not encountered. The species is superficially very similar in appearance and behaviour to the two *Serpophaga* spp. dealt with above, and similarly great care is needed with field identification (see Ridgely & Tudor 1994). One individual ringed in 1995 was handled again in the same forest island in 1996.

WHITE-THROATED SPADEBILL *Platyrinchus mystaceus*

Examination of birds trapped at TRC, in the FFF and in secondary forest 3 km south of the reserve (total of 20 individuals) showed that in common with three specimens secured by Rocha at the BBS previously (see Parker *et al.* 1991), they were somewhat ochraceous below, displaying intermediacy in coloration between that of lowland *P. m. bifasciatus* and of the Andean foothill form, *P. m. partridgei*. Such intermediate plumage substantiates the current subspecific status given to these forms whose ranges, together with that of *P. m. zamorae* from Peru and Ecuador, provide collectively an example of a circum-Amazonian distribution found in several bird groups (Remsen *et al.* 1991). An individual collected just south of Trinidad (Schmitt & Schmitt 1987) was bright yellow below, matching closely *P. m. bifasciatus*. Two birds were re-trapped in 1995; one of these was handled for a third time in 1996, indicating residency within the FFF.

CRESTED DORADITO *Pseudocolopteryx sclateri***

With the only other reports for this species in Bolivia relating to five males and two females acquired in December 1937 (Gyldenstolpe 1945), detection of the species on the PVR estancia in August 1996 was totally unexpected, though the site of those initial sightings, El Consuelo (Beni) to the east of Reyes, is only *c.* 100 km to the northwest of the BBS. It is pertinent to point out that the northern part of the distributional range of *P. sclateri* is characterized entirely by a scattering of highly restricted localities (Ridgely & Tudor 1994). Twenty four individuals were trapped in the LGN cyperacean fringe, where the species was detected first by Joan and George Hardie on 31 July (a party of four or five birds); singles were seen in two areas of savanna adjacent to *curiches*. Of those birds examined, nine were adult males, six were immature, and the remaining nine thought to be adult females. Six individuals were re-trapped (one twice), with four of the trap intervals being 14–17 days in length, thus demonstrating residency. Although confiding at times, the species was inconspicuous and it is possible therefore that it may have been overlooked previously.

XENOPSARIS *Xenopsaris albinucha**

One obtained in TRF scrub on 22 August 1994 (JH) is the only record for the reserve. An additional sighting relates to an individual observed on 30 July 1995 at the edge of secondary forest 3 km south of the BBS (RCB, JWP-H); seen also at Trinidad (one on 22–23 July 1996). The species appears to be scarce in Bolivia as elsewhere, though it has been found at a number of localities in Beni and Santa Cruz (Parker & Rowlett 1984) and has occurred also in Chuquisaca (Arribas *et al.* 1995).

ASHY-HEADED GREENLET *Hylophilus pectoralis**

One trapped at TRC on 17 August 1995 is the first record for Beni, although calls heard prior to this in winter 1995 near Riberalta (adjacent to the Brazilian border) by Sjoerd Mayer (pers. comm.), were probably of this species. It has a widespread Amazonian distribution

(Sick 1993), and has been recorded in Pando (Gyldenstolpe 1945) and Santa Cruz (Noel Kempff Mercado National Park) (T. A. Parker & J. M. Bates unpubl. data).

LONG-TAILED REED-FINCH *Donacospiza albifrons**

Within Bolivia, this species has been recorded only in Beni (Arribas *et al.* 1995). It was detected first in 1984, in open grassland in the vicinity of San Borja by Schmitt & Schmitt (1987), who obtained, additionally, two specimens 39 km west of Trinidad. It has been found 26–30 km east of San Borja by Parker (1989), who observed family parties. New for the reserve in 1994, when a party of five was found in the PVR savanna (1 August); two were trapped subsequently in tall grass in the TRF estancia. Observations made in 1995 and 1996 have revealed that it occurs regularly in the area, with a further five sightings in both years (maximum of two birds seen). Moreover, five individuals were mist-netted (four in 1996). It is anticipated that in due course the species will be found in the department of Santa Cruz, since otherwise this western outpost implies a distributional jump of almost 1000 km from known localities in Brazil and Paraguay, spanning much seemingly suitable terrain, an unlikely circumstance.

TAWNY-BELLIED SEEDEATER *Sporophila hypoxantha**

Known in Bolivia from Beni, Santa Cruz and La Paz (Arribas *et al.* 1995), it was not recorded until 1995 when several males in breeding plumage were identified first by JWP-H (PVR estancia); two males were trapped subsequently in 1996. These trapped birds were with a flock of *Sporophila* spp., comprising many male Rusty-collared and Dark-throated Seedeaters *S. collaris* and *S. ruficollis*, and a small number of Double-collared and male Grey-and-Chestnut (Rufous-rumped) Seedeaters *S. caerulescens* and *S. hypochroma*, together with many unidentifiable birds. No doubt the species had been overlooked previously in such flocks, which are encountered not infrequently in the savanna during the July–September period.

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Notes on the systematics of the Rockrunner *Achaetops* (Passiformes, Timaliidae) and its presumed relatives

by Storrs L. Olson

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The Rockrunner or Damara Rockjumper *Achaetops pycnopygius*, which inhabits rocky country in Namibia and southwestern Angola, has had a rather curious taxonomic history. The species was "originally" described on three different occasions, first in the African sylviid genus *Sphenoeacus* as *S. pycnopygius* (Sclater in Strickland & Sclater 1852). It was next independently described as *Drymoica* (=*Prinia*) *anchietae* by Bocage (1868). Maintaining its association with the Sylviidae, Gray (1869) listed it as *Megalurus pycnopygius*. Finally, Sharpe (1869) unwittingly described the bird anew as *Chaetops grayi*. Hartlaub (1869: 126) pointed out that this was the same species as Bocage's *Drymoica anchietae*, and Tristram (1870: 497 footnote) showed that both of these were synonyms of Sclater's name. He also quoted Jules Verreaux to the effect that the species "cannot properly be included in any one of the genera to which it has been referred, and that probably a new genus should be established for its reception". This opinion notwithstanding, the bird was known at least until 1922 as *Chaetops pycnopygius* and was associated with the South African rockjumpers *Chaetops frenatus* and *C. aurantius* in the Timaliidae (e.g. Sharpe 1883).

Roberts (1922: 227), a notorious generic splitter, paved the way for the eventual complete dissociation of *pycnopygius* from *Chaetops* by creating a new genus for it, *Achaetops*, on the basis of "its much shorter legs, and softer feathers on the crown". Nevertheless, *Achaetops* was still closely associated with *Chaetops*, and usually also with the Boulder Chat *Pinarornis plumosus*, in the family Timaliidae (e.g. W. L. Sclater 1930), a treatment that continued through the first four editions of Roberts' *Birds of South Africa* (Roberts 1940, McLachlan & Liversidge 1957, 1970, 1978).

Meanwhile, however, undercurrents arose that were to carry *Achaetops* and *Chaetops* off in different directions. These may be traced back to a few simple unsupported declarations by Delacour (1946: 11):

> Nous avons exclu du groupe des Timaliinés un certain nombre d'oiseaux africains qui y avaient été encore incorporés par W. L. Sclater [1930] et par D. A. Bannerman [1936]. Ce sont les espèces suivantes: *Pinarornis plumosus* est un Turdiné voisin de *Cercotrichas podobe*, apparenté sans doute aux *Copsychus*. *Chaetops frenatus* est un Traquet proche de *Saxicola* et de *Cichladusa*. *Achaetops pycnopygius* est un Sylviiné voisin des *Melocichla* . . .

Not one of these associations has borne up under scrutiny (Olson 1984, 1990, this study). It was thus Delacour who was responsible for *Chaetops* being placed in the Turdidae with the thrushes—I erred (Olson 1984) in crediting Ripley (1952) with being the first to do this, as he doubtless took his cue from Delacour. On the basis of its syrinx, *Chaetops* is definitely not a thrush (Olson 1984). Delacour's suggestion of a relationship between *Achaetops pycnopygius* and the Moustached Warbler *Melocichla mentalis* is evidently what led White (1960: 20) to associate these two species with the Grassbird *Sphenoeacus afer* and to suggest "that their relationships would be better expressed by placing all three species concerned in the genus *Sphenoeacus*". Not long thereafter, what had once been three different genera became the "*Sphenoeacus mentalis* superspecies" (Hall & Moreau 1970: 159), a curious term considering that *S. afer* is the type species of the genus. This is an outstanding example of the evils of "compiler taxonomy", combined with abuse of the so-called superspecies concept, both of which have had a detrimental effect on modern ornithological systematics. Although White's treatment was followed by numerous authors apart from Hall & Moreau, it is fortunate that recent influential works (e.g. Maclean 1985, Traylor 1986) have reverted to the use of three monotypic genera for these species.

So we have seen the Rockrunner saltate from being congeneric with *Chaetops*, to a monotypic genus of Timaliidae, to a monotypic genus of Sylviidae, to congeneric with *Sphenoeacus*, to a superspecies with *Melocichla mentalis* and now back to being a monotypic genus of Sylviidae, with virtually no discussion of characters or the injection of new systematic information of any kind. Except for its generic and English names, the former association of this species with *Chaetops* has become totally obscured.

Material examined

Skeletons: *Bradypterus luteoventris* USNM 318312, USNM 318313; *Dromaeocercus brunneus* MRAC 50616; *Amphilais* (*Dromaeocercus*) *seebohmi* USNM 432211; *Melocichla mentalis* UMMZ 208325, UMMZ 218573; *Achaetops pycnopygius* TM 32629; *Chaetops frenatus* USNM 558653; *Sphenoeacus afer* USNM 558700, USNM 558701; *Megalurus timoriensis* USNM 561990, YPM 7089; *Bowdleria p. punctata* NMNZ 22848; *Pinarornis plumosus* ROM 121100; *Turdoides jardineii* USNM 558675.

Results

Examination of osteology of *Sphenoeacus*, *Achaetops*, and *Melocichla* discloses that these are sufficiently distinct from one another as to rule out any two of them as being congeneric. *Sphenoeacus afer* differs from the other two in the proportionately much shorter rostrum and premaxillary symphysis, the arched ridge of the dorsal nasal bar (culmen), narrower interorbital bridge, the distinctly notched and little inflated ectethmoid, and much broader and rounded zygomatic processes. The overall resemblance of the skull of *S. afer* is actually closer to the timaliid *Turdoides* than to either of the "sylviids" with which it has been allied. The manubrium of the sternum is much shorter in *S. afer* than in either *Melocichla* or *Achaetops*. Although the skulls of *S. afer* and *Melocichla* are about the same size, the leg elements of *S. afer* are much smaller, and the distal wing elements are markedly more reduced, the carpometacarpus being about half the length of the ulna versus well over half in *Melocichla*. Compared to *S. afer*, the tarsometatarsus of *Melocichla* is longer and not as robust, and in *Achaetops* the tarsometatarsus and tibiotarsus are much longer and more slender, with the distal end not strongly curved and the plantar crest less ossified. The skull and mandible of *Achaetops* differ strikingly from *Sphenoeacus* or *Melocichla* in the very long, narrow bill, longer and more slender mandibular symphysis, and narrower frontal area. In these respects and in the morphology of the tarsometatarsus, *Achaetops* was identical to *Chaetops*. In fact, I could find no osteological differences apart from size by which these two "genera" could be distinguished.

In plumage, *Achaetops* shares a light superciliary stripe and light malar stripe with *Chaetops* and also with *Sphenoeacus* and *Melocichla*. All but *Chaetops* have a black malar stripe as well, but this would be obscured in males of *Chaetops*, in which the entire throat is black. The breast streaks of *Achaetops* are seen in females of *Chaetops* (absent in *Melocichla* and only faintly indicated in *Sphenoeacus*). In both *Achaetops* and *Chaetops* the crown and back are heavily streaked (absent in *Melocichla*, back streaked but crown only faintly so in *Sphenoeacus*). *Achaetops* and *Chaetops* share a dark rufous belly that is absent in the other two genera, the rufous extending up onto the breast in *Chaetops*. They also share a strongly rufescent rump patch of loose, decomposed feathers, absent in the other genera. The pale tips to the rectrices of *Achaetops* (also in *Melocichla*) have become large white patches in

Chaetops, which is also unique in having white tips to the secondary coverts. Interestingly, the remicle in both *Chaetops* and *Achaetops* has a white tip, lacking in the other two genera.

In summary, the plumage of *Chaetops* differs from *Achaetops* in being strongly sexually dichromatic, in the more extensively rufous underparts, expansion of the white tips of the rectrices and the addition of white to the secondary coverts, and in the black throat of males. Although there is no real difference in the "softness" of the crown feathers, the tarsometatarsus is proportionately longer in *Chaetops* (44% vs. 37% of wing length), as Roberts (1922) maintained, although such variation in tarsal proportions occurs commonly within numerous other accepted genera of birds.

Both *Chaetops* and *Achaetops* are obligate inhabitants of rocky outcrops and are apparently quite similar in behaviour (Maclean 1985). It should be noted, however, that the Boulder Chat *Pinarornis plumosus*, another rock-dwelling passerine in southern Africa, is quite dissimilar in syrinx and osteology and appears to belong among the "proto-thrushes" including *Myadestes*, *Neocossyphus*, *Stizorhina*, and *Modulatrix* (Olson 1990). Because there were no grounds for dissociating *Achaetops* from *Chaetops* in the first place, and because a close relationship between *Achaetops* and either *Sphenoeacus* or *Melocichla* is not supported by osteology, there is no reason not to regard the similarities in plumage, osteology, and habits of the rockjumpers as indicative of relationship, with *Chaetops* being a larger, more ornately plumaged derivative of *Achaetops*. This relationship is probably best expressed at the generic level, with *Achaetops* Roberts, 1922, becoming a junior subjective synonym of *Chaetops* Swainson, 1832.

This brings us back to the question of the familial relationships of the re-expanded genus *Chaetops*. When I showed that the syrinx of *C. frenatus* was not thrush-like (Olson 1984), I merely suggested that the genus be returned to the Timaliidae, where it had nearly always been placed previously. On the other hand, ornithologists have been content for some time to accept *C. pycnopygius* as a warbler, so placement of the genus in the Sylviidae would seem equally plausible. Unfortunately, these are the two most ill-defined and problematical of the larger taxa of Old World passerines and no diagnostic characters have been identified that would permit a definitive decision to be made at this point.

Irwin (1985: 99) concurred that *Chaetops* (*sensu stricto*) belonged in the Timaliidae, citing as diagnostic of that family a tail that is "moderately to well graduated with the outermost pair of rectrices sharply truncated and falling considerably short of the others". This is not a convincing character, however, considering that numerous species of presumed Sylviidae have similar tails (e.g. *Melocichla mentalis*). As remarked by Irwin (1985), however, there are relatively few timaliids in Africa, and in southern Africa there is only the enigmatic *Lioptilornis (Lioptilus* auct.) and *Turdoides*, the latter being an Asian genus that has radiated secondarily in Africa. As he notes, *Chaetops* has no resemblance to either of these genera, as is also borne out by osteology.

By contrast, the Sylviidae have radiated rather extensively in Africa, but likewise none of the African members of that family seem obviously related to *Chaetops*.

Chaetops is very distinct osteologically from *Turdoides*, but that genus differs considerably from various other Timaliidae as well. As shown here, *Chaetops* is also very different osteologically from either of the genera of Sylviidae (*Sphenoeacus* and *Melocichla*) with which *Achaetops* has been associated. An informed solution to this systematic problem cannot be had without a great deal more study using various lines of evidence. Although some core group of Asian genera in the Timaliidae are probably monophyletic, the family has long been regarded as something of a wastebasket, so that the placement of an outlying genus in the Timaliidae carries with it a certain implicit ambiguity. For this reason, it is preferable to maintain *Chaetops* (including *Achaetops*) in the Timaliidae, rather than transferring it to the Sylviidae, which might convey a misleading impression of knowledge that we do not yet possess.

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IN BRIEF

Differences in tarsal length between adult female Montagu's and Pallid Harriers: an easy method to separate specimens

by William S. Clark & Roger Clarke

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Adult females of Pallid Harrier *Circus macrourus* and Montagu's Harrier *C. pygargus* are often misidentified in museum collections as the other because of their similar plumages. Both have dark brown upperparts, buffy to creamy, heavily streaked underparts, and similar tail patterns. Adult males and juveniles differ between species and are rather easy to distinguish.

Some differences between the species, especially adult females, have been pointed out by Svensson (1971) and illustrated in Bruun *et al.* (1986). These differences, as well as some new ones, are summarized by Forsman (1995). However, none of these references mention the difference in leg lengths.

One of us (WSC) noticed, from observing Pallid and Montagu's Harriers perched on bare ground near each other, that Montagu's appear to have much shorter legs, resulting in a more horizontal perch attitude, compared to the more upright stance of Pallid Harriers.

To test if there was a clear separation between species of this measure that could be used as a species indicator, we measured the tarsal length of a large sample of adult female specimens in the British Museum

TABLE 1

Tarsal length (mm) of adult female Montagu's and Pallid Harriers

	BMNH	AMNH
C. pygargus	57.4–67.1 (26)	55.2–65.5 (16)
(mean)	61.6	61.0
C. macrourus	70.6–77.5 (27)	71.5–77.8 (18)
(mean)	74.2	75.0

(Natural History) (BMNH) and the American Museum of Natural History (AMNH). We used the standard measurement of tarsus as described in Baldwin *et al.* (1931).

We found no overlap in the measure of tarsi between adult females of Montagu's and Pallid Harriers (Table 1).

The ranges of tarsi measurements given by Nieboer (1973) are 55–65 mm (61) for *pygargus* and 63–76 mm (72) for *macrourus*. These are in general agreement with our measurements, but the overlap of ranges in his measurements and the lower mean *macrourus* suggest that his lower range of *macrourus* was due to one or more misidentified *pygargus* specimens.

Even allowing for as much as a 5% measuring error, tarsal measurement clearly facilitates the correct identification of adult female specimens.

Described differences between the two adult females are useful in field identification but are less useful for identification of museum specimens. However, they can be used to check the identity based on tarsal measurement. These are:

1. The more distinct whitish facial ring of the Pallid Harrier, which extends across the throat of Pallid but not Montagu's.
2. Differences in markings on the secondaries; illustrated by Jonsson (1993).
3. Differences in markings on axillaries and underwing coverts; pointed out for the first time by Forsman (1995).

Although the difference in the position of the emargination on primary number 9, as illustrated on page 84 of Bruun *et al.* (1986), also serves to distinguish the species, apparently it is not being used, as we have found many misidentified specimens. This method should be used to verify the identification made using the tarsal measurements.

We found that tarsal measurements of museum specimens are somewhat difficult, particularly locating the proper upper end of the tarsi with the caliper or divider. We took extra care in finding the proper measure points.

Because raptors capture prey with their talons, it seems reasonable to hypothesise that tarsus length in each species has evolved with prey preferences. Apparent adaptations to detect prey by listening (Rice

1982) imply specialisation of the genus *Circus* to prey hidden amongst rank vegetation. Long tarsi would assist in reaching such prey, and so it has been suggested that differences in tarsus length proportionate to body size in the harriers are linked to the height of vegetation in their preferred hunting habitats (Nieboer 1977). For example, the Marsh Harrier *Circus aeruginosus* has long tarsi and forages in tall marsh vegetation. However, no clear distinction between Montagu's and Pallid Harriers in habitat preference has yet been identified, but a marked contrast has been discovered in their prey preferences. Pallid Harriers most often hunt for passerines, whereas Montagu's Harriers specialise more in lizards, large Orthoptera, and probably nest contents (Clarke 1996).

In Accipiters, long tarsi occur in species that hunt for flying prey and shorter tarsi in those living on ground-dwelling prey (Wattel 1973). Long tarsi could give Pallid Harriers an edge in striking at fleeing birds. Adaptation to more agile prey is also evidenced by the greater reversed sexual dimorphism (Newton 1977) in this species as compared to Montagu's Harriers, as well as their streamlining in wing shape and larger foot size.

In summary, tarsal measurements are a quick and easy method to check the identity of all museum specimens of adult female Montagu's and Pallid Harriers.

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Franklin's Gull *Larus pipixcan* at South Georgia

by Keith Reid

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On 20 January 1997 at 18.45 (local time) an unusual gull was seen flying around Freshwater Bay, Bird Island (54°01′S, 38°03′W). When first noticed the bird was flying over the beach, after which it landed briefly on the shore before flying off to the southeast and out of sight. The initial impression was of a small buoyant gull, compared to the resident Kelp Gull *L. dominicanus*, recalling Black-headed Gull *L. ridibundus*, with noticeable long dark wings and a distinct dark marking on the head.

It was watched for approximately 5 minutes in good light through 7 × 42 binoculars at a range down to 20 m and the following description taken. Head—forehead, lores, chin and throat white; crown, nape and ear-coverts dark, forming half hood extending to just in front of eye. Eye dark with distinct pale upper and lower eye crescents. Bill dark and approximately equal in length to the loral distance. Upperparts—mantle and wing coverts dark grey, outer primaries darker and lacking pale mirrors. Inner primaries and secondaries with pale tips forming whitish trailing edge contrasting with dark secondary bar and outer primaries. Tail white with distinct black sub-terminal band. Underparts—white.

In examining the possible species involved it is apparent that this bird belonged to one of the group of small gulls which have dark head markings in adult plumage. Within this group three species which regularly occur in South America—Brown-hooded Gull *Larus maculipennis*, Andean Gull *L. serranus* and Grey-headed Gull *L. cirrocephalus*—can all be ruled out as they have much paler grey mantle and wing-coverts which form a very characteristic wing pattern (Harrison 1983), different from the bird in question. This leaves Laughing Gull *L. atricilla* and Franklin's Gull *L. pipixcan*, both of which have a much darker grey base colour across the wings and mantle. Although the Laughing Gull shows a distinct dark subterminal tail band in first winter plumage it has generally grey, not white, underparts (Grant 1982). In addition the Laughing Gull's bill is longer than the loral length, often appearing "heavy and drooping" (Grant 1982). Franklin's Gull has a distinctive dark half hood with white eye-crescents in all plumages and first winter birds show a distinct dark subterminal tail band (Grant 1982). From this combination of plumage and structural characters the bird was identified as a first winter Franklin's Gull.

Other than Kelp Gull, which is a common resident, Dolphin Gull *L. scoresbii* is the only other gull species confirmed on the South Georgia list (Prince & Croxall 1996). A single record of Brown-hooded Gull was considered unacceptable by Bourne (1988) as the description published (Delany *et al.* 1988) could apply to a second winter Franklin's Gull. Although Brown-hooded Gulls breed in southern South America, including the Falkland Islands, they disperse north after breeding (Harrison 1983). Franklin's Gull, however, nests mainly on inshore marshes in the prairies of North America and migrates south to winter along the Pacific coast of South America as far south as Valdivia, Chile (Harrison 1983). The highly migratory nature of this species is illustrated by previous records in the South Atlantic, Indian Ocean and Australia (Higgins & Davies 1996). In the South Atlantic there are single records from Tristan da Cunha in February 1956 (Swales & Murphy 1965) and the Falkland Islands, the South Orkney Islands and in the Scotia Sea (summarised in Prince & Croxall 1996). Watson (1975) refers to a single bird reported from Gough Island in February 1956, citing Swales & Murphy (1965), and records from both Gough Island and Tristan da Cunha are reported in the review of records by Higgins & Davies (1996). Clearly both references relate to the single bird on Tristan da Cunha, and there do not appear to be any authentic published records from Gough Island.

I thank J. P. Croxall, P. A. Prince and W. R. P. Bourne for their comments and advice and Carl Zeiss UK for the loan of binoculars.

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The date of publication of Montin's description of *Lagopus mutus*

by Tommy Tyrberg

Received 26 April 1997

The original description of the Ptarmigan *Lagopus mutus* was published by Lars Montin in Vol. 1 of *Physiographiska Sälskapets Handlingar*

(Proceedings of the Physiographic Society). This volume (the only one to appear) was actually published in four sections (comprising pp. 1–64, 65–132, 133–220 and 221–318 respectively) over a period of ten years (Dal 1996), but only the first section bears a date (1776), which has until now been considered the date of publication of *Lagopus mutus*.

Montin's paper comprises pp. 150–155 and was therefore part of the third section, something which is obvious from the paper itself since the pages are marked "Del I. St. 3" (Part I Section 3). The date of publication of this section can be determined from the minutes of the Physiographic Society. At the meeting on 2 May 1781 the Secretary announced that "nu 3:dje stycket af Handlingarne på Herr Assessor Gjörwells förlag war färdigt tryckt" ("the printing of the third section of the Proceedings at Mr Gjörwell's Press is now finished"), while at the next meeting on 3 October: "Secreteraren upwiste tredje stycket af Sälskapets handlingar, hwilket war från Stockholm nedkommit, sedan sista sammankomst" ("The Secretary displayed the third section of the Society's Proceedings which had arrived from Stockholm since the previous meeting") (cited after Gertz (1940, pp. 15–16)). The date of publication is confirmed by a review in *Upfostrings-Sälskapets Tidningar* (no. 32 p. 125 (26 April 1781)). That the Proceedings could be reviewed in Stockholm on 26 April, but had not yet arrived in Lund (where the Physiographic Society was situated) on 2 May is not surprising considering the distance (c. 600 km) and the slowness of communications during the eighteenth century.

From these data it is clear that the date of publication for *Lagopus mutus* is actually 1781, and that the name should therefore be cited as *Lagopus mutus* (Montin, 1781).

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Wattled Cranes in Guinea-Bissau

by N. J. Collar

Received 30 April 1997

Remarks by Hazevoet (*Bull. Brit. Orn. Cl.* 117: 56–59) concerning the handling in Collar & Stuart (1985, *Threatened Birds of Africa*) of a record of Wattled Crane *Bugeranus carunculatus* from Guinea-Bissau strike me as over-critical. As far as Collar & Stuart (1985) are concerned, this record did not require his reinstatement: if we are guilty of "less than adequate" interpretation, so is he, for his assertion that we "cast doubt on the validity of the record" is unfounded. We wrote: "A specimen, considered immature, was collected in 1948 at Lake Cufada, Fulacunda, in Guinea-Bissau", and went on exactly as quoted in Hazevoet's first paragraph, concluding by citing Snow's (1978) judgement that "it seems certain that the birds involved were either escapes or vagrants".

In no way, then, was this record doubted, and I cannot see why Hazevoet includes either Snow (1978) or Collar & Stuart (1985) amongst the unconvinced, or why he lumps Snow (1978) and Dowsett (1993) with Collar & Stuart (1985) in accusing them of failing to understand Frade & Bacelar's Portuguese, which is a remark only really dirigible at me (I drafted the account in Collar & Stuart), and one which I reject. What is true is that my comment concerning "an incomplete reference that suggests the species had previously been recorded at this locality" was made without checking the bibliography in Frade & Bacelar (1955). In accumulating many references on the Wattled Crane for the account in *Threatened Birds of Africa* I had, under considerable time pressure, merely taken a copy of the pages dealing with the crane in their paper, and therefore did not refer to any of its sources.

On re-reading these pages, however, I see that one particularly bald statement in Frade & Bacelar, also quoted by Hazevoet ("J. A. Ferreira, in his article on the 'Fauna of the Cufada Reserve', mentions the species under the designation '*grous de carúncula*' "), is clearly the source of my mistaken remark, as it can easily be misinterpreted (without mistranslation) as (a) suggesting that this work is not in the bibliography (otherwise the authors might just have written "Ferreira [1948], in his . . ."), hence my view of its citation as incomplete; and (b) implying that the species might well have been found in the reserve on several occasions (otherwise it is not clear why Frade & Bacelar, having already given the record Hazevoet is discussing, should have troubled to make this extra citation at all). Moreover, since only seven lines earlier they refer to "Major Araújo Ferreira" as supplying the specimen evidence, and on the next page credit him (albeit there as *Captain* Araújo Ferreira) for the photographs, it is not even obvious that their author "J. A. Ferreira" (a common enough name in Portuguese, almost *Smith* in English!) is the same person, which compounds the illusion of multiple records.

All this emphasises the importance of remaining alert to potential alternative readings of the literature, and of the value of tracing every reference for original rather than second-hand evidence. However, even Hazevoet may concede that the pursuit of a source as obscure as *Bol. Cult. Guiné Port.* (1948) in order to seek further details of evidence *already accepted as valid* may not represent optimal use of deadlined time in documenting a species with 110 other references to process, and with 176 other species jostling for treatment.

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Neotype of the Hooded Plover *Charadrius rubricollis* Gmelin, 1789

by Ian A. W. McAllan & Leslie Christidis

Received 17 June 1997

Examination of the Australian bird literature reveals the continued use of two different species-group names for the Hooded Plover: *Charadrius rubricollis* Gmelin, 1789 and *Charadrius cucullatus* Vieillot, 1818. Since the publication of the 1975 edition of the Australian Checklist (Condon 1975), most references in the Australian literature have adopted *rubricollis* (note that Condon also used the name in 1968). In the previous 75 years the name *cucullatus* was widely used in the Australian literature. Condon based his decision on what he stated was Oberholser's "rejection" of Vieillot's name in 1919. This is, however, not strictly true. Oberholser did not reject *cucullatus*; he resurrected *rubricollis* instead.

Oberholser's resurrection of *rubricollis* derives from Mathews' discussion on the background of the name. Mathews (1913) showed that Gmelin's description of *rubricollis* was simply a Latin translation of a description of a bird (in English) by Latham in volume III of his *General Synopsis of Birds*. This bird, called by Latham the "Red-necked Plover" was "Found in Adventure Bay, Van Diemen's Land" and was evidently based on drawings of birds delineated on Captain Cook's third voyage by the artist William Ellis (drawings now held in The Natural History Museum, London). One of these, number 67, is clearly that of a Hooded Plover (see for example Whitley 1970, wherein there is a monochrome photograph of this drawing). Latham's description also recorded that the Red-necked Plover had "on each side of the neck a large square chestnut spot, the size of a silver penny," and "a little mixture of white around the bastard wing", characters not found in the Hooded Plover, nor in Ellis' drawing 67. Mathews determined that Latham's bird was also based in part on Ellis' drawing number 63, a picture of a Red-necked Phalarope *Phalaropus lobatus* (Linnaeus, 1758), which had the relevant features. On the basis of Latham's description and the evidence of the drawings, Mathews considered that the name *rubricollis* was not valid because it was based on two different species.

Oberholser's decision to resurrect the name involves the incorrect argument that Latham's description was based primarily on the Hooded Plover. However as the name *rubicollis* refers to more than one taxon it would appear to be a case of instant homonymy and is thus not valid.

Today the species-group name *rubicollis* is applied almost universally to the Hooded Plover. It has been used in many widely read publications such as Peters (1934), Condon (1975), Marchant *et al.* (1986), Sibley & Monroe (1990), Marchant & Higgins (1993) Collar *et al.* (1994) and Christidis & Boles (1994). However, the name *cucullatus* has been used several times since the publication of Condon's Checklist in 1975, principally in publications by the late G. M. Storr (in particular Storr, 1986a, b, 1987, 1991, Storr & Johnstone 1979, 1988). In these works there is no discussion on the reason for using *cucullatus*.

Given that there is still potential confusion with these names, and that the issue of the incorrect description has never been resolved, we think that it would be most appropriate for stability and universality of usage that the type of *rubricollis* be defined more precisely. The original descriptions were based on two drawings. Under the I.C.Z.N. (1985) the type specimens of a description based on illustrations are the animals described and not the illustrations themselves (Art. 72c (v)). The original specimens can no longer be located. Some specimens were known to have been associated with the corresponding drawings of Ellis, but a specimen of a Hooded Plover was not amongst these (Stresemann 1950). In any case there are very few bird specimens in existence of any species that can be proved to have been collected on any of Cook's voyages (Whitehead 1969).

Thus in this situation no lectotype can be made. Although we are reluctant to assign a neotype on the chance, albeit unlikely, that the original type can be located, it is essential for this taxon that its name be stabilised. The Hooded Plover is considered a threatened species (Collar *et al.*, 1994) and its name has been used in legislation of the Australian States in which it is found. We therefore put forward the specimen HLW 5741 located in the H. L. White collection in the Museum of Victoria as the neotype. It is an adult male collected near Burnie on the north coast of Tasmania on 13 January 1906 by W. H. Moffitt. This specimen was selected as it was collected near the original type locality. Ellis' bird was from Adventure Bay on Bruny Island, within a few kilometres of mainland Tasmania. The type locality now becomes the locality at which the neotype was collected (vide I.C.Z.N. 1985 Art. 75f), that is, near Burnie on the north coast of Tasmania.

Acknowledgements

The reasons for neotypification were reviewed by Dr R. Schodde of the Standing Committee on Ornithological Nomenclature of the International Ornithological Congress and W. E. Boles of the Taxonomic Advisory Committee of the Royal Australasian Ornithologists Union.

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BOOKS RECEIVED

Snow, D. W. & Perrins, C. M. (eds) 1998. *Birds of the western Palearctic, Concise Edition*. Pp. 1694, 594 plates in colour, maps and text figures. Oxford University Press. ISBN 0-19-854099-X. £150. 26 × 22 cm. 2 Vols. in slip case.

When I was an enthusiastic youngster (the adjective still applies!), the principal ornithology text, Witherby's *Handbook of British birds*, was beyond the reach of my pocket. The publication in 1952 of *The popular handbook*, followed in 1962 by its companion on rarer birds, thankfully allowed me access to a condensed, but nevertheless invaluable, account of the identity and lives of the birds around me.

A similar evolutionary pathway has now been followed by the successor to Witherby's *Handbook*, Oxford University Press's *Handbook to the birds of Europe, the Middle East, and North Africa*, generally known as the *Birds of the western Palearctic*, or *BWP*. The 9 volumes of *BWP* were published over a 17-year period. This period encompassed a massive proliferation in the ornithological scientific literature, major changes in the distribution and numbers of some birds, a huge increase in the number of bird-watchers, and a greatly increased propensity of these to travel to see birds. Thus by the time volume 9 appeared in 1994, the species accounts in volume 1 were beginning to look distinctly aged. However, the time taken to produce the 9 volumes was an inevitable consequence of *BWP*'s scope, giving the latest comprehensive information on the lives of the birds of the region in some 7000 pages.

For many, the detail of the information in *BWP* has proved too much, and its cost will render it beyond the reach of many who were unable to collect the volumes as they appeared over the years. A need was therefore felt for a shorter version, leading to the production of this *Concise Edition*, in two volumes and a mere 1700 pages! But these volumes are far more than a condensed version of *BWP*.

The shortening of species accounts has entailed a complete re-write; during this process data have been up-dated, incorporating new taxonomic considerations and up-to-date information on distribution, movements and populations. This clearly required an extensive revision of the maps, all of which have been re-drawn and presented in colours which allow easier interpretation than in *BWP*.

In bringing the *Concise Edition* up-to-date over 80 species, not included in *BWP*, had to be added, necessitating new or revised artwork. Of the 594 colour plates, 231 are new or revised, and they are dispersed in the text so that most accompany the species accounts; however, this has not always been possible (e.g. the Varied Thrust *Zoothera naevia* is illustrated with the Northern Mockingbird *Mimus polyglottos* and Eastern Phoebe *Sayornis phoebe*, about 100 pages away from the Varied Thrush account and, more important, from plates of its relatives). The overall quality of the plates is excellent and, although the postures of some birds are suspect, they are designed to show off important distinguishing features. If only pipits would display themselves in the field as depicted on p. 1091, and waders as on p. 623! I found an error on p. 790 involving the transposition of the labelling of the Sooty and Bridled Terns *Sterna fuscata* and *S. anaethetus*.

What has been lost from *BWP*? Sections headed Plumages, Bare parts, Moult, Measurements, Weights and Structure have been omitted (although wing length and weight ranges are given), as have the plates of eggs. All other sections are of course much reduced, especially those detailing Food, Social pattern and behaviour, and Voice (there are no sonograms). Nevertheless, Field characters, when used in conjunction with the improved plates, are adequate for identification and especially distinction from similar species. Sections on Distribution and Population are up-to-date and incorporate much recent information from eastern Europe. A major sacrifice throughout the book, but especially important here where changes in range, status and population size are described, has been the omission of references to original sources of data.

Although those who need in-depth information on species biology will still need access to *BWP*, those who want to identify west Palearctic birds from descriptions and colour illustrations, to know where they occur, when and where they breed, and their status and population trends, will find their needs amply met in the *Concise Edition*. The volumes are attractively produced, but more important is the content, which is clearly presented and concise, and information should be readily located thanks to indexes of vernacular names in eight European languages. David Snow and Chris Perrins are to be congratulated on the production of this fine work, and these editors are clearly concerned at the precedent set by *BWP*, in that no-one calls it by its full title; they suggest that the *Concise Edition* should be called *BWPC*! I am concerned that young ornithologists may be prevented from owning copies by the cost, but with the launch of these volumes in January 1988, there is plenty of time for them to request parents to start saving now for next Christmas!

Chris Feare

Mikhailov, K. E. 1997. *Avian eggshells: an atlas of scanning electron micrographs*. Pp. 88, 16 monochrome plates, 36 text figures. British Ornithologists' Club *Occasional Publication* No. 3. ISBN 0-9522886-2-1. £35. 30.5 × 21.5 cm.

This book is not for the faint-hearted! Part of the difficulty in assessing work of this kind is that it is such uncharted territory; Dr Mikhailov's work is so specialised that it is difficult, even for those with considerable knowledge of eggs, to comment meaningfully on the correctness of his results. The work is in two parts: the first discusses avian eggshell structure in general terms, making comparisons with the structure found in other vertebrates; the second, which constitutes the main part of the "atlas", consists of detailed descriptions of the vertical structure of eggshells in each of the major avian orders, suborders and families which Mikhailov has been able to examine. These are accompanied by excellent line diagrams, and microscopic photographs of cross sections of individual representative eggs. The photographs are beautifully reproduced, but to the uninitiated,they are likely to be difficult to interpret; I certainly found them to be so. As a result, the general reader will probably have to take the conclusions on trust. This is not to decry Dr Mikhailov's achievement, as his work is highly important.

While the results of this work are often at variance with the conclusions of Sibley and Ahlquist, they do not depart in any material way from the "traditional" arrangement of Peters' Check List, and lend support to a number of taxonomic relationships that were long suspected. Mikhailov shows, for example, that the emus and cassowaries are more closely related to each other than to other ratites, and likewise that the ostriches and elephant birds, with their branched pores, are probably close to each other and not to other ratites. The suborder Ciconii, as set up by Sibley and Ahlquist, is not supported by Mikhailov's results, but support is given to the long-held but unconfirmed view that the Shoebill is an aberrant Pelecaniform. On the other hand, eggshell data do support a close relationship between the cathartids and the storks, and the Accipitridae and Pandionidae appear close to each other but not to other diurnal birds of prey.

Michael Walters

Mearns, Barbara & Richard 1998. *The Bird Collectors*. Pp. xvi+472, numerous text-figures. ISBN 0-12-487440-1. Academic Press. £29.95. 25 × 17 cm.

This book—beautifully produced, well illustrated and readable—has one of its aims to present a reasoned defence of what the authors describe as a now "generally vilified" class of ornithologists, those who built up the collections now residing in the world's museums. It is also much more than that. The bird collectors whose lives and ornithological careers are described are a varied and fascinating lot; they are here brought to life (a few are still alive) by detailed accounts of their exploits, with a wealth of apt quotations from their diaries, journals and letters, and many old photographs and other illustrations.

The 12 middle chapters devoted to the collectors, which make up the bulk of the book, classify them under headings such as "Army Officers", "Clergymen and Missionaries", "The Professional Field Collectors", "The Great Accumulators" (Lord Rothschild is an easy first in this category), thus imposing some order though it is admitted that many collectors could be treated under more than one heading. The decision whom to include or exclude cannot always have been easy; some clearly had to be included, others were more borderline. In the main the list seems well chosen, except for the omission of any mention of Admiral Lynes, surely one of the outstanding collectors, unique in his day for collecting with a particular object in mind, to work out the taxonomy of a very difficult and species-rich genus (*Cisticola*), and notable too for his detailed, meticulous labelling of specimens.

Three preliminary chapters include a survey of the historical and cultural background, followed by a useful discussion of methods of collecting and preserving specimens, and the place of collecting in the development of scientific ornithology. A concluding chapter discusses the importance of collections today, stressing their continued use by ornithologists and the varied data obtainable, and now often only obtainable, from museum specimens. A 12-page Appendix lists the world's largest collections of study skins, with numbers of specimens held, main geographical areas covered, and other points of interest.

This is a book not only for the museum worker but for all who are interested in the history of ornithology.

D. W. Snow

Juniper, T. & Parr, M. 1998. *Parrots: a guide to the parrots of the world*. Pp. 584, 88 colour plates. Pica Press. ISBN 1-873403-40-2. £35. 24.5 × 18 cm.

This latest guide from Pica Press follows earlier models in its general format, but deals with a large family of attractive birds of great commercial importance and partly as a result of this, of considerable conservation concern. The book recognises 352 species of parrot, and their classification is based on that of Sibley & Monroe (1990, 1993), with minor amendments. The species, and many gender, age and racial variants, are illustrated in the 88 plates by five artists. Introductory sections outline evolutionary relationships, classification, natural history, conservation status, threats and captive breeding. The species accounts provide information under the headings of identification, voice, distribution and status, ecology, description, sex/age, measurements, geographical variation and references, and a distribution map. In view of the international trade in parrots, the authors state that the book is designed to meet the identification needs of both field ornithologists and those involved in monitoring the movements and legal status of birds in the captive bird trade; for some species the identification section gives characters that may be used to identify birds in the field and in the hand.

The introductory sections are disappointing and largely without references; in fact of the 9 references, 2 are not included in the reference list and one is incorrectly cited. The section on natural history is especially poor and here it is difficult to know what are established facts and what are the authors' views. Examples of unsupported statements include: pre-roosting calling and intense interaction 'may be linked to . . . foraging effectiveness'; 'some species "appoint" (authors' quotes) sentinels to watch over feeding flocks'; 'pairs that know each other well and have experience of one another breed more successfully'; there 'may be a linkage between the onset of laying and incubation behaviour and the daytime darkness experienced by birds spending time in their nest-hollows'. The sections on conservation and threats are more substantial (but still largely un-referenced) and make important point, e.g. emphasising the political, social and economic basis of forest loss, a major threat to many parrot species. The authors recognise the socio-economic need for exploitation of parrots in some places, but also stress the need for improvements in welfare during transportation; this consideration could also have been extended to the conditions of parrots in their final homes as caged birds.

The species accounts are concise and accompanied by clear distribution maps; these are monochrome, but as most parrots are non-migrants colour is unnecessary. Measurements, given as ranges, are largely taken from Forshaw (1989) but sample sizes are not given, so that without reference to this publication it is not possible to assess the reliability of these data. In the account of one of the species with which I am familiar, the Seychelles race of the Black Parrot *Coracopsis nigra*, the authors recognise the existence of the race (*barklyi*) and describe it as critically endangered, but include a surprising and unsupported statement that the species was possibly introduced to the Seychelles! One of the references at the end of this species account is not cited in the reference list.

With plates by five artists, variation in style is to be expected. Most are typical of many post-Peterson field guides and are of high quality and attractive; those by Dan Powell are especially pleasing as, in addition to displaying identification features, his birds appear wonderfully alive. A helpful feature is the appearance of a drawing of a budgerigar on the caption page facing each plate, to show the relative sizes of the birds depicted.

The index lists vernacular names, specific and subspecific names, but strangely does not provide an alphabetical listing of generic names.

Overall, this book is an attractive addition to the series and well undoubtedly be useful for those who need to identify parrots, though somewhat heavy to be taken into the field (along with all the other family guides!). For those who need more detailed information, however, this will have to be sought elsewhere and the references provided by this book may be of limited help.

Chris Feare

NOTICE TO CONTRIBUTORS

Papers are invited from Club Members or non-members, especially on taxonomic and distributional topics; descriptions of new species are especially welcome and may be accompanied by colour photographs. **Two copies** of manuscripts, typed on one side of the paper, **double spaced and with wide margins**, should be sent to the Editor, Prof. Chris Feare, 2 North View Cottages, Grayswood Common, Haslemere, Surrey GU27 2DN, UK. All contributions, **including *In Brief* articles**, should follow the style of main papers in this issue of the *Bulletin*.

A contributor is entitled to 10 free offprints (16 if 2 or more authors) of the pages of the *Bulletin* in which his contribution, if one page or more in length, appears. Additional offprints or offprints of contributions of less than one page may be ordered when the manuscript is submitted and will be charged for. Authors may be charged for proof corrections for which they are responsible.

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Only Members of the British Ornithologists' Union are eligible to join the Club, and to receive (postage free) four quarterly issues of the *Bulletin*, and the annual index, for an annual subscription of £12 (or U.S. $26). Applications, enclosing the annual subscription, should be made to the Hon. Secretary (address as below).

The 1998 List of Members, and addresses will not be published with the *Bulletin* this year, but copies are available, on application (with a remittance of **£1.00** to cover costs of production and postage), to the Hon. Secretary. Please advise the Hon. Secretary, without delay, of any address changes, or corrections, for despatch of the *Bulletin*.

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All amounts quoted are net and should be paid in £ sterling, if possible. Payments in other currencies must include a further £4 for UK bank charges (except for annual rates in U.S. dollars, which are inclusive). All cheques or drafts should be made payable to the British Ornithologists' Club. If preferred, remittances may be made by bank transfer direct to the Club's bank account—Barclays Prime Account, Dale House, Wavertree Boulevard, Liverpool L7 9PQ, U.K. (Sort Code 20-00-87 Account No. 10211540), with confirmation to the Hon. Treasurer, D. J. Montier, Eyebrook, Oldfield Road, Bickley, Bromley, Kent BR1 2LF.

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Correspondence on membership, changes of address and all other matters should be addressed to the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants GU31 5PA, U.K. For details of Club Meetings see inside front cover.

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British Ornithologists' Club

Edited by
Prof CHRIS FEARE

Volume 118 No. 2 June 1998

FORTHCOMING MEETINGS

Tuesday 15 September 1998. Dr Nigel Collar, of BirdLife International, will speak on **"Two Indian Enigmas"**, based on work he has done jointly with Dr Pamela C. Rasmussen, of the Smithsonian Institution, on the Forest Owlet *Athene blewitti*, (recently rediscovered partly as a consequence of this work). Nigel began his ornithological career with the Great Bustard Trust, then served as editor of the *Birds of the Western Palearctic*, before moving to his current position as Red Data Book compiler with BirdLife (formerly ICBP).

*Applications to the Hon. Secretary by **1 September**, please.*

Tuesday 13 October 1998. Dr Ben Hatchwell will speak on **"The cooperative behaviour of Long-tailed Tits"**. After reading Zoology at Oxford (1981–84), he worked on population and biology and coloniality of Common Guillemots on Skomer Island, Wales, for his PhD at Sheffield, and subsequently moved to Cambridge to carry out research on the mating systems and parental behaviour of Dunnocks and Alpine Accentors. He became Lecturer in Zoology at Sheffield, in 1993, from where he has been studying Long-tailed Tits. His main interests in ornithology concern breeding systems, in particular the evolution of social behaviour and the conflicts of interest that exist between males and females. He has also conducted research on more applied topics, including the importance of woodlands for farmland birds, and the population biology of vulnerable seabirds.

*Applications to the Hon. Secretary by **29 September**, please.*

Tuesday 17 November 1998. Dr W. G. (Bill) Porteous will speak on **"Birds of the Humboldt Current"**. Bill was born and raised in Shetland, and may therefore be unique in having added Booted Warbler to his life list before he added Blue Tit. He subsequently qualified as a geologist, and this has given him the opportunity to pursue birds in various parts of the world, particularly in north and south America. He recently spent five years in Colombia, which provided some welcome exposure to the neotropics, which had long been a particular interest of his. The opportunity to participate in a voyage southwards along the coasts of Peru and Chile in late 1995 provided the material we are to see this evening.

*Applications to the Hon. Secretary by **3 November**, please.*

Meetings are held in the Sherfield Building of Imperial College, South Kensington, London SW7. The nearest Tube station is at South Kensington, and car parking facilities are available; a map of the area will be sent to members, on request. The cash bar is open from 6.15 p.m., and a buffet supper, of two courses followed by coffee, is served at 7.00 p.m. (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion, at about 8.00 p.m.

Overseas Members visiting Britain are particularly welcome at meetings. For details in advance, please contact the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants GU31 5PA.

Tel/Fax: 01730-825280 for late bookings and cancellations.

Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

Vol. 118 No. 2 Published 19 June 1998

CLUB NOTES

The eight hundred and seventy third meeting of the Club was held on Tuesday, 20 January 1998 at 6.15 p.m. 36 Members and 11 Guests attended.

Members present were: The Rev. T. W. GLADWIN (*Chairman*), S. P. de ALBUQUERQUE, Miss H. BAKER, P. J. BELMAN, I. R. BISHOP, D. M. BRADLEY, D. R. CALDER, Cdr. M. B. CASEMENT RN, Professor R. J. CHANDLER, Professor R. A. CHEKE, Professor C. J. FEARE, G. D. FIELD, F. M. GAUNTLETT, A. GIBBS, D. GRIFFIN, C. A. HELM, J. A. JOBLING, R. H. KETTLE, M. B. LANCASTER, Dr C. F. MANN, D. J. MONTIER, Mrs A. M. MOORE, R. G. MORGAN, Mrs M. N. MULLER, P. J. OLIVER, M. L. PALING, Dr R. P. PRYCE-JONES, N. J. REDMAN, J. E. RICHARDSON, R. C. SELF, P. J. SELLAR, R. E. SHARLAND, Dr D. W. SNOW, N. H. F. STONE, C. W. R. STOREY and R. W. WOODS.

Guests attending were: Mrs G. BONHAM, Dr I. BURROWS (*Speaker*), Mrs J. B. CALDER, Mrs C. R. CASEMENT, Mrs J. M. GLADWIN, Mrs M. H. GAUNTLETT, Ms C. HOFF, Mrs M. MONTIER, P. J. MOORE, Mrs M. OLIVER and Mrs A. WOODS.

On completion, Ian Burrows spoke on the *Birds of Papua New Guinea*, illustrated with an impressive selection of his own photographic slides. New Guinea is well known for its Birds of Paradise and Bowerbirds, and is recognised as a major centre for the adaptive radiation of many genera including the Fruit-pigeons *Ptilinopus* and *Ducula*, Owlet-nightjars *Aegotheles* and several kingfisher and honeyeater genera. This has resulted in almost 400 species endemic to the New Guinea region, with over 350 of these present in Papua New Guinea and its satellite islands.

Ian's talk focused on some of the major biogeographic zones of Papua New Guinea, with particular reference to the common birds present and, where relevant, some of the rare or unusual species endemic to each area.

The volcanic island of Lihir in New Ireland Province provided the scene for a brief description of the breeding behaviour of the Melanesian Scrubfowl *Megapodius eremita* which uses geothermal energy to incubate its buried egg. The precocious fledgling digs its way to the surface after 30 days untended incubation and, shortly after reaching the surface, is fully independent and able to fly short distances.

Tench Island, again in New Ireland Province, illustrated the large seabird colonies which may be found on remote atolls. Many thousands of White-capped Noddies *Anous minutus*, Brown Noddies *A. stolidus* and Sooty Terns *Sterna fuscata* breed here with minimal human interference.

The avifauna within a 50 km radius of Port Moresby is probably the most extensively studied in Papua New Guinea. Major habitats include savannah, mangroves, freshwater marshes, lowland rainforest and forested foothills. Away from the forested areas, the avifauna is dominated by Australian species. Common breeders include Rainbow Lorikeet *Trichoglossus haematodus*, Rainbow Bee-eater *Merops ornatus* and Fawn-breasted Bowerbird *Chlamydera cerviniventris*, whilst Sacred Kingfisher *Halcyon sancta* and Shining Bronze-Cuckoo *Chrysococcyx lucidus* are migrants from the south. The freshwater marshes and lagoons support large numbers of herons and egrets Ardeidae and are vital refuelling sites for at least 23 species of transient Palearctic wader. Sharp-tailed Sandpiper *Calidris acuminata*, Pacific Golden Plover *Pluvialis fulva* and Red-necked Stint *Calidris ruficollis* are the commonest migrants.

The lowland and foothill rainforest contains a diverse variety of endemic species and this was illustrated by some 20 slides of typically representative species including Common Paradise Kingfisher *Tanysiptra galatea*, Blue Jewel-babbler *Ptillorrhoa caerulescens*, Emperor Fairy-wren *Malurus cyanocephalus*, Golden Monarch *Monarcha chrysomela*, King Bird of Paradise *Cicinnurus regius* and Raggiana Bird of Paradise *Paradisaea raggiana*.

The vast sago swamps of the Gulf Province have a similar range of species as the rainforests around Port Moresby, but their remoteness and low human population density results in an abundance of the large "game" birds such as Southern Cassowary *Casuarius casuarius* and Southern Crowned Pigeon *Goura scheepmakeri*. A method of luring these species, and the rarely seen New Guinea Flightless Rail *Megacrex inepta*, into 50 mm lens range was described.

In contrast, the Bensbach river floodplain in Western Province resembles the Northern Territories of Australia, reflected by impressive numbers of resident Brolga *Grus rubicunda*, Australian Bustard *Ardeotis australis* and Black-necked Stork *Ephippiorhynchus asiaticus*, and up to 20 000 migrant Little Curlew *Numenius minutus*. The rare endemic Fly River Grassbird *Megalurus albolimbatus* also occurs there and the slides shown may be a photographic first.

Stark contrast was provided by the Owen Stanley mountains in Central Province. Many species in the hill forest zone are endemic and are altudinal replacements for their lowland congeners. Slides of 10 representative species were shown, including Brown-headed Paradise Kingfisher *Tanysiptera danae* by its nest. Most species in the lower montane forest are endemic, and different from those of the lowlands. Typical species shown included Hook-billed Kingfisher *Melidora macrorrhina*, Hooded Pitohui *Pitohui dichrous* (the first bird shown to be poisonous), New Guinea Harpy-eagle *Harpyopsis novaeguineae*, Feline Owlet-nightjar *Aegotheles insignis* (Plate 1), Macgregor's Bowerbird *Amblyornis macgregoriae* and Magnificent Bird of Paradise *Cicinnurus magnificus*. The high mountain forests and alpine grasslands of Mount Victoria host a small range of almost wholly endemic species. Typical examples shown included Papuan Lorikeet *Charmosyna papou*, Painted Tiger-Parrot *Psittacella picta*, Mountain Owlet-nightjar *Aegotheles albertsi*, Greater Ground-Robin *Amalocichla sclateriana*, Crested Bird of Paradise *Cnemophilus macgregorii* and Macgregor's Bird of Paradise *Macgregoria pulchra*.

The speaker concluded with a range of Papua New Guinea men in full tribal regalia showing plumes from many different species of Bird of Paradise and other endemic species.

Erratum

In the review by Michael Walters of Mikhailov's book *Avian eggshells: an atlas of scanning electron micrographs* (*Bull. B.O.C.* 118(1): 63), the final sentence should read "On the other hand, eggshell data do *not* support a close relationship between the cathartids and the storks . . .".

BOOK RECEIVED

Barlow, C. and Wacher, T. 1997. A Field Guide to Birds of The Gambia and Senegal. Illustrated by A. Disley. Pp. 400. 48 colour plates, maps, text figures. Pica Press, ISBN 1-873403-32-1. £26. 22 × 15 cm.

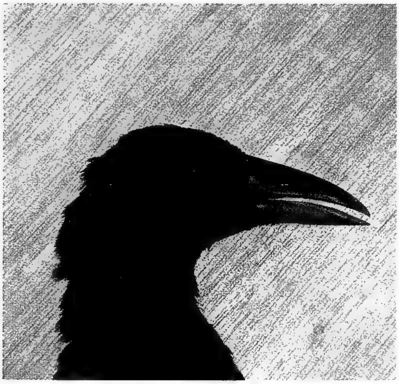
This is a first class book which will be tremendously useful and popular with the large number of birders who visit the Gambia. It will also be very useful throughout West Africa as proven on a recent trip to Nigeria where it was greeted with great enthusiasm.

The text is informative, giving the salient identification features with a most useful section explaining differentiation from the most similar species. The plates are well-organised covering 618 species and the illustrations for most of the species are good and capture the stance of the birds. Details of voice and habitat preference are comprehensive with much information not previously published. Status and distribution sections are up to date including the most recent information from Senegal. Taxonomic treatment is modern and the very comprehensive Indigobird section will be particularly appreciated. With such a well-produced book it seems churlish to mention a fault but the record of Adamawa Turtle Dove from Djoudj and attributed to me is an inexplicable error.

This book is a credit to the authors and the publisher and should be bought by anyone travelling to West Africa and also to anyone who has an interest in the birds of the region.

S. J. R. Rumsey

Plate 1.



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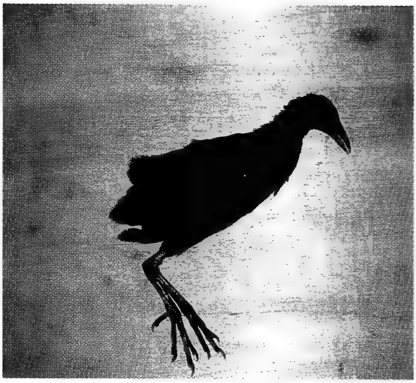

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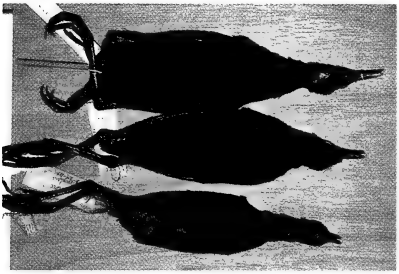

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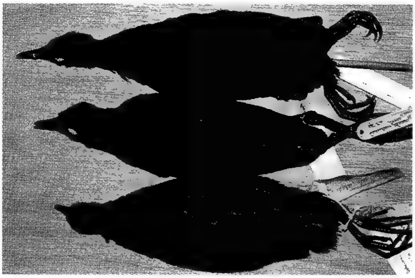

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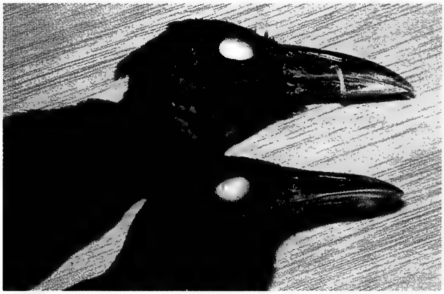


4.

Plate 2

1. Head of recently dead *Amaurornis magnirostris* Karakelong Island, September 1996.
2. Recently dead *A. magnirostris*, Karakelong Island, September 1996.
3a. Comparison of *A. magnirostris* type specimen with specimens of *A. olivaceus* and *A. moluccanus* underparts.
3b. Upperparts.
4. Comparison of bill structure and length of *A. magnirostris* and *A. olivaceus*.
Photographs by Frank Lambert.

A new species of *Amaurornis* from the Talaud Islands, Indonesia, and a review of taxonomy of bush hens occurring from the Philippines to Australasia

by Frank R. Lambert

Received 7 February 1998

Bush hens in the Talaud Islands

During August and September 1997, I observed and heard several forms of rail, whose identity was puzzling, on the island of Karakelong in the Talaud archipelago, Indonesia. One of these proved to be a new species of *Gymnocrex* (Lambert 1998), whilst a second is the subject of this paper.

The first observation was made on 17 August, when a rallid was heard giving very quiet single alarm notes on a steep slope in primary forest, inland from Toabatu in the vicinity of Mt Manuk (4°19′N 126°50′E). This observation was made at an altitude of 300–400 m a.s.l. in an area of understorey dominated by rattan *Calamus* sp., in undisturbed habitat. The bird was very inquisitive, and approached to within a few metres but was never seen well. However, it was clearly large and appeared to be a species of *Amaurornis*: I had already heard the distinctive grating and squealing calls typical of a bush hen, believed to be Plain Bush Hen *A. olivaceus*, near the coast on 15 August 1996.

The presence of a bush hen on the island was of interest in itself, since no previous records of *A. olivaceus* had been reported for the Talaud Islands by White and Bruce (1986), although F. G. Rozendaal (*in litt.* 1997) had heard bush hens on the island during a visit in 1985. The brief views of the bird obtained on 17 August did not suggest a typical bush hen, the bird appearing to be considerably larger and darker than individuals of *A. olivaceus moluccanus* that I had seen elsewhere in Indonesia (This taxon is treated as a separate species, *A. moluccanus*, by some recent authors, including Sibley & Monroe (1990)). Furthermore, the habitat was perhaps unusual, since in Indonesia *A. olivaceus* is usually encountered in secondary growth and adjacent damp grasslands rather than in primary forest (pers. obs.). In some parts of its range, however, it has been found in swampy forest bordering wetlands (Rand & Gilliard 1967) and in forest edge (Beehler *et al.* 1986).

Three days later, another individual of this *Amaurornis* was observed, again in tall primary forest inland from Beo, but this time in a relatively flat area with scattered patches of very swampy ground and a relatively sparse understorey, at *c.* 100 m altitude. I disturbed the bird and it ran about 20 m before stopping abruptly. Here it extended its neck upwards and stood motionless, evidently watching me. A clear

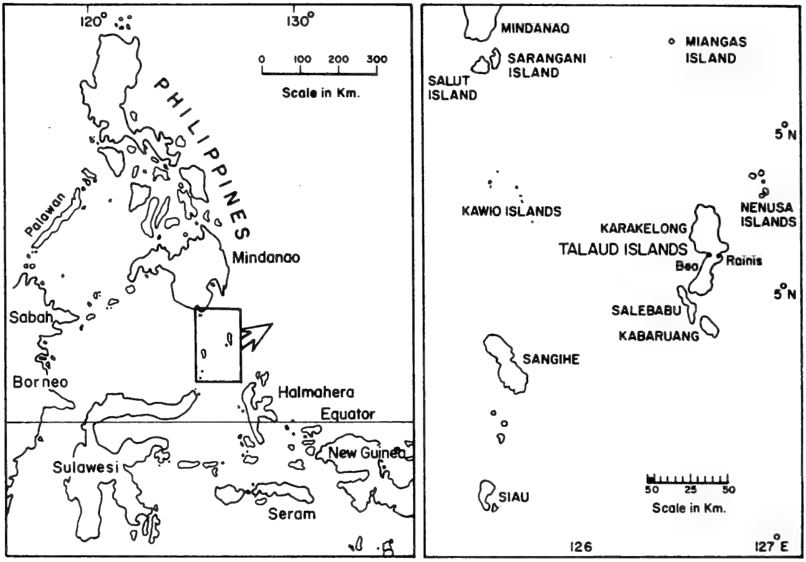


Figure 1. Location of the Talaud Islands.

impression of the bird was obtained: it was very robust, all dark and had a striking long, broad, deep-based pale greenish bill and a red eye.

On 2 September, an *Amaurornis* was observed three times, in forest edge near the coast, to the south of Beo (see locality map, Figure 1). Calls presumed to be bush hens had been heard in the area at first light, but later some other unusual calls were heard that at first were mistakenly believed to have been made by a frog. They had been coming from a wet scrubby area on the edge of forest where there was permanent water. The same calls were also heard originating in forest beside a road and, apparently in response, from a narrow strip of littoral swamp forest bordered by coconut plantation on the other side of the road.

Using playback of these frog-like vocalisations, an *Amaurornis* resembling that observed on 20 August was again observed, albeit very briefly, as it approached quietly from the swamp forest in response to the tape. The bird was exceedingly shy and burst into a run before binoculars could even be raised. A slightly longer view was obtained of a different individual from a hidden vantage point behind a tree, again using playback. Lastly, on 2 September, a pair was briefly observed again, without using playback, as they moved along the edge of a small stream covered with scrub and patches of trees but bordering more open dense herbage and grassland.

Despite the brevity of these accumulated views, it was clear that this was a different taxon to the Plain Bush Hens that the author had observed previously in the Moluccas, and on the island of Sangihe in the previous month.

Subsequently, on 6 September 1996, a man was encountered selling various rallids in Beo. These had been caught near the small town of Rainis, and included one dead specimen of the unidentified *Amaurornis*, three live and one dead Plain Bush Hen *Amaurornis olivaceus moluccanus*, as well as one live *Gymnocrex* rail (Lambert 1998). After discussion with officers from the local office of the Directorate of Forest Protection and Nature Conservation (PHPA), the dead, unidentified *Amaurornis* was purchased from the hunter and a specimen was made.

The presence of two species of *Amaurornis* bush hen on Karakelong is of great significance, and provides good reason to review the taxonomy of the bush hens that occur from the Philippines to Australasia. The White-breasted Waterhen *Amaurornis phoenicurus*, which also occurs in this region, is not considered a bush hen and is not dealt with in this review.

Amaurornis taxonomy

There have been two views of the taxonomy relating to the *Amaurornis* bush hens that occur in the Philippine archipelago, the Moluccan Islands, New Guinea region and Australia. Apart from the very distinctive Isabelline Bush Hen *A. isabellinus* of Sulawesi, the majority of recent authors, presumably following Peters (1934), have treated all the "plain" bush hens from Philippines to Australasia as one species: Plain Bush Hen *A. olivaceus* (e.g. Olsen 1973, Ripley 1977, White & Bruce 1986, Dickinson *et al.* 1991, Andrew 1992, Marchant & Higgins 1993). These authors did not discuss any alternative treatment.

A. olivaceus of the Philippines was originally described as a species (Meyen 1834) and was retained as such by Sharpe (1894) in his catalogue of the birds in the British Museum, vol. 23, which was the first attempt at a classification of the family. Sharpe also listed *A. moluccanus*, with a range covering the Moluccas, New Guinea, Bismarck Archipelago and Australia. In contrast to other authors, McAllan & Bruce (1988) also recognised two species, treating those in the Philippines as Plain Bush Hen *A. olivaceus*, but other populations, from the Moluccas to Australia, as a separate species, Rufous-tailed Bush Hen *A. moluccanus*. This latter taxonomic treatment was subsequently adopted without discussion by Sibley & Monroe (1990) and del Hoyo *et al.* (1996), despite the fact that no author had ever provided adequate reason for recognising two species. McAllan & Bruce (1988), for example, simply stated that "the populations of bush-hen in Australasia are quite distinct from *A. olivaceus* (Meyen 1834) of south east Asia (White & Bruce 1986) and may best be treated as an allospecies, as adapted by us here (see also Wolters 1982)".

In contrast, the recent authoritative and more taxonomically rigorous checklist to birds of the Indomalayan region (Inskipp *et al.* 1996) treated these taxa as conspecific (as Plain Bush Hen *A. olivaceus*), following Marchant & Higgins (1993) and specifically mindful of the fact that no publication had provided a reasoned account of why two separate allopatric species should be recognised (T. Inskipp, pers.

comm.). However, the existence of two similar, sympatric *Amaurornis* taxa on Talaud clearly provides a good reason to re-examine the taxonomy of these birds.

How many species of bush hen?

Bush hens from the Philippine Archipelago are consistently larger than those to the south-east (i.e. Moluccas to Australasia). Indeed, my measurements of the series of *Amaurornis* from the Philippines, Moluccas, New Guinea, New Britain and Australia in the Natural History Museum (BMNH), Tring (Table 1), and those published elsewhere (Table 2), show that *olivaceus* from the Philippines is longer-billed, longer-winged, has a longer tarsus and is heavier than other populations. Only tail measurements seem to overlap. Furthermore, the plumages of these two populations, though rather plain, also show consistent differences. Philippine *A. olivaceus* is overall slightly darker than are other populations, and although all share a contrast in colour between the undertail-coverts and the rest of the underparts, this is much more evident and striking in the paler south-eastern birds. The undertail-coverts, tarsal feathering and often lower belly of south-eastern birds are buff, typically closest to the Cinnamon-Drab (colour number 219c) or Tawney (38) of Smithe (1975), but sometimes paler (Pale Pinkish Buff; 121D) on the lower belly, whilst those of populations in the Philippine islands are usually a much darker russet colour (Cinnamon-Brown (33) to Russet (34)). Some individuals from the Philippines, however, have the extreme tip of the undertail-coverts a similar colour (Tawney (38)) to birds from the south-east.

Comparison of vocalisations of the population of bush hens is difficult because few recordings exist of birds from the Philippines. However, four recordings of the shrieking calls (Clarke 1975) of Philippine birds, when compared with a series of recordings of shrieking calls of Australian birds, clearly sound very different (comparison made using the Wildlife Collection in the British Library's National Sound Archive). Whilst similar in pattern, those of Australian birds are distinctly less harsh, higher-pitched and probably best described as being more melodious than those from the Philippines.

Based on these differences in plumage and biometrics, and on differences in known, comparable types of vocalisations, it would seem reasonable to treat the populations of bush hens from the Philippine Islands as a species separate from those to the east, therefore supporting the opinion of McAllan & Bruce (1988) that there are two species: *A. olivaceus* in the Philippines, and *A. moluccanus* elsewhere. Whilst other authors have proposed the common names Rufous-tailed Bush Hen or Rufous-tailed Moorhen for *A. moluccanus*, this does not seem to be very appropriate. The tails of *moluccanus* and *olivaceus* are very similar in colour: between Prout's Brown (121A) and Brussels Brown (121B). Furthermore, all the bush hens are rather plain, so that Plain Bush Hen is also a poor name: more appropriate alternatives are suggested here; Philippine Bush Hen for *A. olivaceus* and Pale-vented Bush Hen for *A. moluccanus*.

TABLE 1

Biometrics of five species of *Amaurornis*. Comparison of wing measurements are not included since the wing of the only specimen of *A. magnirostris* was frayed and missing feathers (but see Table 2). (Measurements in mm)

Taxon		Bill length[1]	Nares to tip	Depth at nares	Tarsus length	Proximal tarsus width[2]
Amaurornis olivaceus	Mean (sample size)	37.64 (15)	16.71 (14)	9.98 (12)	59.57 (15)	7.87 (15)
(Philippines)	Range	32.2–39.4	15.2–18.6	8.6–10.9	51.0–63.9	6.9–8.3
	Standard deviation (SD)	1.96	1.16	0.7	3.2	0.4
A. magnirostris	(type specimen)	45	23.2	12.6	62	8.7
(Karakelong)						
A. moluccanus	Mean (sample size)	32.59 (12)	16.04 (11)	9.33 (9)	49.33 (13)	6.58 (12)
(Australia to Moluccas and Sangihe)	Range	29.4–35.2	14.7–17.5	8.6–10.2	46.1–54.4	6.3–6.9
	SD	2.08	1.1	0.52	2.74	0.22
A. isabellinus	Mean (sample size)	35.72 (5)	17.0 (5)	9.32 (4)	58.7 (5)	8.0 (5)
(Sulawesi)	Range	32.9–38	16.9–181.3	8.4–10.0	52.3–64.7	7.5–8.9
	SD	2.06	1.1	0.81	4.4	0.57
A. akool	Mean (sample size)	33.83 (10)	17.77 (10)	8.47 (9)	48.46 (10)	6.16 (10)
(SE Asia)	Range	31.8–36.4	16–19.5	8.1–9.3	45–50.8	6.0–6.4
	SD	1.35	0.99	0.38	1.65	0.17

[1] Gape to tip.

[2] Proximal tarsus width=width of tarsus at widest point.

TABLE 2

Published biometrics of *A. olivaceus* and *A. moluccanus*. Values in parenthesis are means. Note that these measurements may not all be directly comparable because of differences in methods of measurement and because they were made by numerous different people. (Measurements in mm; weights in g; M=male, F=female)

Taxon/author	Sample	Locality data	Bill Length M	Bill Length F	Tarsus M	Tarsus F	Wing M	Wing F	Tail M	Tail F	Weight M	Weight F
A. olivaceus		Philippines										
Ripley 1977	Not given	Philippines	36–41#	31–38#	65–69	57	166–178	148–166	57–63	53		
Parkes 1971	4F, 1M	Siquijor	39#	35.5–38 (37)#			171	160–166 (164.5)				
Parkes 1971	10F, 10M	Rest Philippines	36–39 (37.25)#	31–35 (34.3)#			166–178 (168.4)	148–162 (155.2)				
Rand & Rabor 1960	1F, 2M										292.5–312.5	250
A. m. moluccanus		Sulawesi, Moluccas, New Guinea										
Ripley 1977			27–35 (unsexed)#		40–46 (unsexed)				50–59 (unsexed)		182, 205	200, 205
Mayr 1949	2M						138,157					
Mayr 1938	5F			29–31 (30.4)		47–51 (49.2)						
Mayr 1938	3M, 6F		34–35 (34.3)		49–53 (50.7)		145–158 (153)	135–143 (139.2)				
Meyer & Wigglesworth 1898	3						145–147					
Meyer & Wigglesworth 1898	1M, 1F						146	141				
A. m. nigrifrons		Bismark Archipelago east to Solomon Islands										
Mayr 1949	20M, 20F		29–33	25–30	54–58	49–54	130–146 (139.2)	126–142				
Gilliard & Lecroy 1967	1M, 1F										179	177
A. m. ultimus		East Solomon Islands										
Mayr 1949	11M		28–32 (30.4)	25–30 (28.3)	50–55 (53)	47–52.5 (50.5)	124–134 (129.5)	121–132 (125.5)				
Mayr 1949	6M, 3F										189–248	135, 162, 192
A. m. ruficrissus		S and E New Guinea, Australia										
Marchant & Higgins 1993	12M, 6F	Australia	30–35 (31.5)	27.5–29.5 (28.9)		44.5–50 (48.3)	145–159 (152)	133–150 (143.8)		52–63 (58)		
Marchant & Higgins 1993	11M	Australia							61–71 (64.5)			
Marchant & Higgins 1993	14M	Australia			49.5–55 (51.7)							
Marchant & Higgins 1993	9M, 3F (im)	Australia									129–208 (177)	131–163
Ripley 1977	Not given		c35#	c28–30#	c56		142–158	129–142	56	56		175, 180

#Bill measurements given as "culmen". Other measurements refer to "bill length".

Although some authors have mentioned presence or absence of a red or orange swollen patch at the base of the culmen as a character distinguishing the different populations of bush hens, very few data are available concerning the actual distribution of this feature. Certainly, this feature can be seen on some specimens of *A. moluccanus* from New Britain and New Guinea (*A. m. nigrifrons*), and it is well documented for Australian birds (*A. m. ruficrissus*). However, it is not permanent, and is apparently associated with breeding (Marchant & Higgins 1993); hence its presence in other populations could have been overlooked. Whilst there is no present evidence that *A. olivaceus* can also show a swollen base to the culmen, this cannot be stated with certainty; nor is it known whether other populations of *A. moluccanus*, for example the nominate subspecies inhabiting the Moluccas, ever show this feature. This possible difference between the two species therefore needs further investigation, and indeed, if it were lacking the Moluccan population of *A. moluccanus*, might point to there being yet another allospecies.

Finally, it is worth noting that Brown Crake *A. akool* of mainland Asia has long been treated as a good species, and yet it is no more different in appearance to bush hens from the Moluccas than are bush hens from the Philippines. The plumage of *A. akool* shows many similarities to *A. moluccanus*, with the grey of the underparts only slightly paler and the upperparts only slightly more olive. [The underparts of *akool* are closest to Smithe's (1975) Light Neutral Gray (85); those of *moluccanus* are between the latter and Medium Neutral Gray (84), whilst *olivaceus* has underparts between Medium Neutral Grey (84) and Dark Neutral Gray (85)]. In plumage *A. akool* only differs from *A. moluccanus* in having a white throat (like immature *A. moluccanus*) and in lacking the buff undertail-coverts. Biometrics are also quite similar, though *A. akool* has a narrower bill (Table 1). Of additional interest is the fact that the underparts of *A. isabellina* of Sulawesi are almost exactly the same colour as the undertail-covert colour of *A. moluccanus*. In this suite of species, therefore, there are only very subtle differences in the few colours exhibited, and in the extent or distribution of such colours. Biometric differences, however, are clearly evident, and, in the case of *A. moluccanus* and *A. olivaceus*, combination with the subtle plumage changes provide compelling reasons to treat these taxa as good species.

A new species of bush hen

Having concluded that the Philippine, and Moluccan to Australasian forms of bush hen represent two good species, the question then arises as to how to treat the newly discovered taxon on Karakelong. This is apparently the only island where two bush hens are sympatric, and lying between the Philippines and Moluccas, one might anticipate that *A. olivaceus* and *A. moluccanus* would meet here. One of the species, based on the relatively small size and plumage of the birds seen that had been trapped, was identified as *A. moluccanus*: this being also known from the nearest island to the south—Sangihe—and directly to the east on Morotoi and Halmahera (White & Bruce 1986). *A. olivaceus* occurs to the north of Talaud, on Mindanao. However, comparison with the specimen of the second *Amaurornis* from Talaud clearly shows it to be different to both of these species. It is therefore concluded, for reasons given below, and using the biological species concept, that the largest *Amaurornis* taxon from Talaud, which is sympatric with *A. moluccanus*, should also be considered a separate species. The proposed name for this new species of bush hen is:

TALAUD BUSH HEN ***Amaurornis magnirostris*** **sp. nov.**

Holotype

Museum Zoologicum Bogoriense, Bogor, Indonesia, specimen number MZB 30.272: collected by Frank R. Lambert on 15 August 1996; unsexed. The bird was purchased in Beo, Karakelong Island, Talaud, from a hunter who had trapped it near Rainis (4°14′N 126°51′E) at an altitude of less than 100 m a.s.l. (Plate 2).

Diagnosis

Most similar to *Amaurornis olivaceus* but also superficially similar to *A. moluccanus*, which is sympatric with *A. magnirostris* on Talaud. *Amaurornis magnirostris* differs from both these species in being darker below with no contrasting paler-coloured undertail-coverts and in having a considerably bigger skull and longer, broader bill (Table 1) with a distinctly arched culmen.

The skull is 8.0% wider (25.5 mm in *magnirostris*, measured at the widest point) than the largest intact skull of nine *A. olivaceus* (20.3–23.7 mm) in BMNH. Bill of *A. olivaceus* (measured from the gape to the tip) ranged from 32.2–39.4 mm in the series of 15 birds with intact bills in BMNH. In comparison, the bill length of the holotype of *A. moluccanus* is 45 mm, or *c.* 14% longer than the longest bill of *A. olivaceus*. The longest-billed specimens of *A. moluccanus* in BMNH have bill lengths of 35.2 mm.

Although the depth of the bill of *A. magnirostris* falls into the range for that of *A. olivaceus* when measured at its base, the depth of the former is 15.6% larger at the nares than that for the largest measurement for any of the specimens of *A. olivaceus*. This clearly demonstrates the difference in shape of the bill, which is strongly arched in the former species, and broad along a considerable length—that of *A. olivaceus* is shorter and more tapered. The large head and bill size of *A. magnirostris* can also be discerned by comparing measurements with *A. isabellinus*, which has usually been considered to be a large species.

Compared with *A. olivaceus*, which is most similar in size, measurements of the tarsus and foot suggest that, although of similar length, lying at the upper range limit of the latter, the leg of *A. magnirostris* is stouter and the feet heavier.

A. isabellinus is similar in size to *A. magnirostris* but is smaller-headed with a smaller bill, and has more slender, longer legs. The culmen is concave or straight, not arched as in *A. magnirostris*.

It should be noted that Ripley's (1977) measurement of *A. olivaceus* and *A. moluccanus* (Table 2), based on an unknown sample size, differ in range from those provided in Table 1. Those of Parkes (1971), however, are in general agreement with those made by myself and presented in Table 1.

Although not all vocalisations are well documented, those of *A. magnirostris* that were recorded (the "piping" calls—see under Vocalisations) appear to be significantly different from those of *A. moluccanus*, which are well documented in Australia (see Figure 2).

Finally, *A. magnirostris* seems to be an adaptable forest bird, penetrating tall primary forest far from secondary vegetation, rather than a bird of disturbed habitats.

Description of holotype

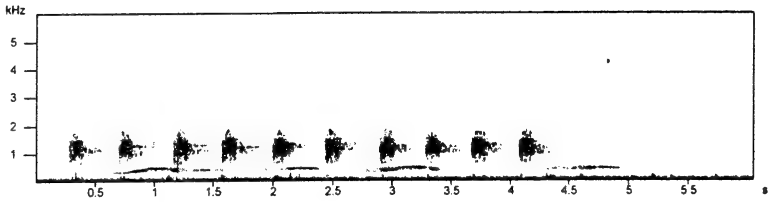
Plumage very worn, with heavy body, wing and tail moult. Worn feathers different in colour to those that are fresh. Tail feathers missing, apparently lost during capture. Presumed to be an adult (immatures of *A. olivaceus* are pale, not dark). The following description uses colour names and codes of swatches from the Naturalist's Colour Guide where it was possible: the names from Smithe (1975) start in uppercase.

Forehead to nape Dusky Brown (19) with paler tinge to some feathers; lores and feathers of orbital region similar but more sooty. Mantle Fuscous (21), Cinnamon-Brown (33) and becoming very slightly olive on back; lower back and rump Burnt Umber (22). Upperwing coverts like mantle but with patches of Cinnamon-Brown (23) (these appearing mostly on worn feathers) more pronounced on greater and median coverts. Primaries and secondaries Fuscous (21) with diffuse Cinnamon-Brown (33) leading edges. Underwing coverts dark brown. Chin, throat and neck Dark Neutral Gray (83); breast and belly a patchy mixture of Dark Neutral Gray (83) and Fuscous (21), becoming more Burnt Umber (22) on flanks and feathers of tarsus. Undertail-coverts Dark Neutral Gray (83), not contrasting with belly. Iris bright red; bill long, broad and arched, the lower mandible pale green becoming pale blue-green on distal third; upper mandible below nostril and basally pale green, culmen dark olive from base to past nares, but distal third pale green. Legs dark olive brown with bright yellow frontal part to upper leg from feathering to just below ankle joint (i.e. covering the entire tibiotarsus).

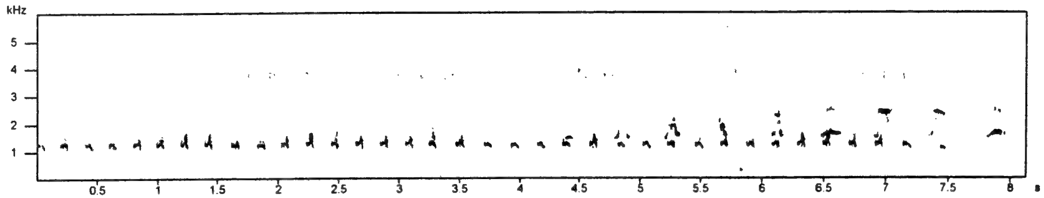
Biometrics are provided in Table 1. Primary three (counted descendently) missing, and wings frayed, but wing length estimated to be approximately, or slightly longer than, 168 mm (although in heavy moult, the absence of primary three may have resulted from capture/transportation).

Etymology

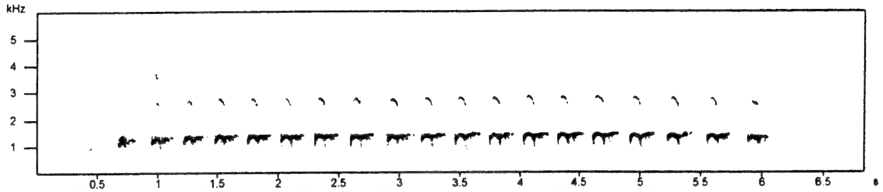
This species has been named in recognition of its large bill. The three taxa of "plain bush hens" that occur from Philippines to the New Guinea region are similar in many respects, but the bill and large skull of *Amaurornis magnirostris*, as well as its uniform underparts, set it apart from the others. The large bill is its most striking character in the



rails1.wav [Lambert]



aus1rail.wav [Swaby]



aus2rail.wav [Stewart]

Figure 2. Sonagrams of the piping calls of *A. moluccanus* and *A. magnirostris*. Top: *A. magnirostris*, recorded by F. Lambert, 2 September 1996, Karakelong Island, Talaud. Middle: *A. moluccanus*, Cape York, Australia, Swaby & Griffin 1978. Bottom: *A. moluccanus*, recorded by David Stewart, reproduced in Buckingham & Jackson 1987.

field. The common name of the species, Talaud Bush Hen, is chosen to emphasize the known range of the species, which may be very restricted.

Vocalisations

Bush hens were heard on Karakelong on many occasions, although never in the interior of primary forest, despite the presence of *A. magnirostris* in this habitat. The distinctive growling shrieks of bush hens are well known, and are made by both *A. moluccanus* and *A. olivaceus*. They sound different, the latter sounding harsher, when tape recordings are compared, but there is considerable variation in such calls (Beruldsen 1975). These calls are often made in antiphonal duet (Clarke 1975). It was not proved whether or not *A. magnirostris* also makes these "shrieking" calls, although quiet shrieks (perhaps better described as croaking with rasping—R. Ranft pers. comm.) can be heard in the background of a tape recording of the "piping" call of *A. magnirostris* and seem likely to have been this species. These calls sound quite similar to four tape recordings of the shrieking call of *A. olivaceus* held in the British Library National Sound Archive collection, but it was not possible to make sonagrams of the probable *A. magnirostris* calls (since sounds produce no discernible pattern, but rather a smudge mixed with background noises). This tape recording made by the author is deposited at the British Library National Sound Archive.

The only call definitely attributable to *A. magnirostris* was a monotonous series of very loud notes that sound rather frog-like. The notes can best be described as low-pitched barks. Although significantly different from the monotonous series of calls made by Australian *A. moluccanus*, the type of call is similar in pattern, and hence here referred to as the piping call based on those described and illustrated (using sonagrams) by Clarke (1975). He observed *A. moluccanus* feeding whilst making this call. Playback of the piping call of *A. magnirostris* elicited an immediate response from calling birds, which quietly but rapidly investigated the area from where the playback emanated. Figure 2 compares two sonagrams of piping calls of *A. olivaceus* with those of *A. magnirostris*. Other sonagrams of the piping calls of *A. olivaceus* are provided by Clarke (1975) and Marchant & Higgins (1993).

Distribution, habitat and status

The Talaud Bush Hen is presently known only from Karakelong Island, in the Talaud Archipelago. It seems likely that it must also have occurred on neighbouring islands, but whether it survives on them (in particular, Salebabu and Kabaruang) remains to be determined. Karakelong is the largest island (*c.* 600 km^2) in the Talaud Archipelago and is still endowed with good areas of forest that occur from near sea level to the highest peak. Evidence suggests that the Talaud Bush Hen is widespread on the island. Sightings in various habitats at different altitudes, from rank vegetation near forest edge to dry dense primary forest slopes, suggest that the species is adaptable and can probably tolerate limited habitat modification. Karakelong still has significant natural forest cover and a diversity and abundance of wetland habitats, including pristine rivers, forested swamps and rank scrub and grasslands bordering forest. At the present time, it therefore seems very unlikely that the Talaud Bush Hen is threatened.

Nevertheless, since the ecological requirements of the Talaud Bush Hen are unknown, future changes in land use on such a small island could conceivably alter habitats to the extent that it becomes threatened. Whilst there are two protected areas totalling *c.* 21 000 ha on Karakelong, there is virtually no provision to protect these areas on the ground (Sujatnika *et al.* 1995, Sujatnika *in litt.* 1997; pers. obs). Both areas are under pressure from smallholder encroachment, and forest clearance for transmigration may also pose a threat in the long term (Whitten *et al.* 1987, Lambert 1997).

Bush hens are occasionally trapped for food using snares, or caught by dogs. However, the trapping of terrestrial birds for food did not seem to be an intensive activity, and usually occurs only in the vicinity of villages (these being virtually confined to the coast). Hunting is unlikely to constitute a significant threat to the species at present levels.

I noted that large rats (*Rattus* sp.) were abundant on the nearby island of Sangihe in 1996, particularly in plantations and the more degraded forest areas, but I did not encounter them on Karakelong. Rats (of unidentified species) are present, however, in altered habitats on the island (J. Wardall, *in litt.* 1998) and more extensive habitat modification there could conceivably alter patterns of abundance.

Studies of bones excavated on Pacific islands suggests that large numbers of birds that inhabited remote islands became extinct subsequent to the arrival of man. These studies suggest that, considering all bird groups known to be present on these islands, rails have lost most species to human impact (Steadman 1995). Whilst the exact cause of such extinctions will never be known, it is likely that rats played a role in many cases (see, for example, Atkinson 1985). If susceptibility to depredation by rats is accepted as a characteristic of island rail populations, the Talaud Bush Hen should be considered as a Near-Threatened species (N. J. Collar, pers. comm.). The potential threat from rats and other introduced mammalian predators to the rallids of Talaud should therefore be carefully monitored.

Discussion

Although the Talaud Islands are a remote archipelago, it is surprising that previous ornithologists who have made observations or collected specimens on the islands have failed to find either of the bush hens that live there, since both are very vocal. The Talaud Islands lie within the Sangihe–Talaud Endemic Bird Area (ICBP 1992, Sujatnika *et al.* 1995, Stattersfield *et al.* 1998), but prior to the discovery of *A. magnirostris* and the recently described Talaud Rail *Gymnocrex talaudensis* (Lambert 1998), no undisputed species were known to be confined to Talaud, although one taxon, Obscure Kingfisher, has been variously treated as a full species *Todiramphus (Halcyon) enigma* (e.g. White & Bruce 1986) or as a distinct subspecies of Collared Kingfisher *T. chloris* (e.g. Fry *et al.* 1992, Inskipp *et al.* 1996). The discovery of two rails possibly endemic to Talaud is therefore of great importance, considerably elevating the conservation value of the islands.

The sympatry of *A. magnirostris* and *A. moluccanus* on Talaud is of great interest since this is the only known locality where two apparently ecologically similar species of *Amaurornis* coexist (Ripley 1977). Only the strikingly different, and migratory, White-breasted Waterhen *A. phoenicurus* is broadly sympatric with congeners throughout its range. Bush hens have not, apparently, colonised Sulawesi, where the endemic Isabelline Waterhen *A. isabellinus* is found in many habitats from sea level to 1,400 m (White & Bruce 1986, Coates *et al.* 1997).

Amaurornis moluccanus is not known to make regular movements and must be assumed to be resident on Talaud. Its presence on many islands from Australasia to Wallacea, however, is indicative of good powers of dispersal and it may be a relatively recent arrival in the archipelago. This could partly explain why it has not been previously recorded from Karakelong. That *A. moluccanus* has not colonised the Philippines might be a reflection of closer ecological requirements of *A. moluccanus* and *A. olivaceus*.

On Talaud, both *A. magnirostris* and *A. moluccanus* occur in open, scrubby habitats, but based on the observations of *A. magnirostris* to date, it seems probable that this species is more of a forest bird, and that it wanders into adjacent scrub, rank vegetation and overgrown plantations. Although *A. moluccanus* may also occur in forest, this may be a marginal habitat for the species.

Examination of the collection of *Amaurornis* bush hens in the BMNH clearly supports the idea that previously recognised taxa of these birds belong in two separate species differing significantly in appearance and size. That their taxonomic status has remained in doubt for so long is merely because careful examination of museum specimens was not carried out. There are clearly many unanswered taxonomic questions in the Oriental region (see, for example, the excellent annotations in Inskipp *et al.* 1996), and the alarming ongoing lack of professional taxonomists who are able to devote time to answering such questions should be a cause for considerable concern. Recent opportunistic investigations into various bird taxa (e.g. Collar & Andrew 1987, Brooks *et al.* 1992, Collar & Long 1996, Lambert & Woodcock 1996) suggest that avian biodiversity within this region is presently underestimated, and that many taxonomic revisions are needed.

Summary

This paper reviews the taxonomy of bush hens occurring from the Philippines through Indonesia to Australia and the New Guinea region and describes a new species of Rail, the Talaud Bush Hen *Amaurornis magnirostris*.

Examination of bush hen specimens in BMNH showed that there were consistent differences in plumage and biometrics, and in comparable types of vocalisations between the Philippine population

and the populations to the east, therefore supporting the opinion that there are two species: *A. olivaceus* in the Philippines, and *A. moluccanus* elsewhere. Two species of bush hen were found on Karakelong Island, in the Talaud Islands of Indonesia. One of these species was identified as *A. moluccanus*, whilst the other, collected on 6 September 1996, is shown to be a new species, the Talaud Bush Hen *A. magnirostris*. The sympatry of *A. magnirostris* and *A. moluccanus* on Talaud is of great interest since this is the only known locality where two apparently ecologically similar species of *Amaurornis* co-exist. Talaud Bush Hen differs from the other bush hen species in having darker underparts with no contrasting paler-coloured undertail-coverts and in its considerably bigger skull and longer, broader bill with a distinctly arched culmen. Its habitat preferences may also differ, being primarily a forest species and occurring in primary forest far from disturbed areas. Vocalisations apparently differ from comparable calls of *A. moluccanus*, although it was not possible to compare these with similar calls of *A. olivaceus*. Prior to the discovery of *A. magnirostris* and the recently described Talaud Rail *Gymnocrex talaudensis*, no undisputed species were known to be confined to Talaud. The existence of two rails possibly endemic to Talaud therefore considerably elevates the conservation value of the islands. Evidence suggests that the Talaud Bush Hen is widespread on the island, where significant areas of suitable habitat still occur. The species is therefore probably not immediately threatened. Nevertheless, since its exact ecological requirements remain unknown, and in view of the proven vulnerability of rails on islands, many of which have become extinct in the past, the Talaud Rail should be considered to be Near-Threatened.

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Courtship behaviour, vocalizations, and species limits in *Atthis* hummingbirds

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Hummingbirds of the genus *Atthis* were first described scientifically in 1839 by Lesson & DeLattre, based on specimens from Jalapa and Coatepec in central Veracruz, Mexico (*A. heloisa*). Some 40 years later, in 1878, Ridgway described a second form of the genus, *A. ellioti*, from Volcán de Fuego, in the Pacific cordillera of Guatemala. Griscom (1932) subsequently described another southern form *A. "h." selasphoroides* from the highlands of Honduras, and Moore (1937) described another northern form *A. h. margarethae* from northwestern Mexico.

Confusion reigned long regarding species limits in the genus. In spite of their original description as a separate species, populations south of the Isthmus of Tehuantepec were included within *A. heloisa* by Baird *et al.* (1874) and Boucard (1892–1895). Since then, opinions have differed about whether *ellioti* deserves recognition as a species, with some authors arguing for conspecificity (e.g. Peters 1945, Johnsgard 1983) and others separating them as two species (e.g. Berlioz 1938, Friedmann *et al.* 1950, AOU 1983). In general, the debate seems to centre on the idea that the two *Atthis* hummingbirds differ only in minor details of colour; given their allopatric distributions, the decision hinged upon taxonomic viewpoint only.

Even the distinctiveness of the genus has been disputed, with the suggestion that it should be merged into *Selasphorus* (Johnsgard 1983), in spite of its perhaps closer relationship with *Stellula* (Ridgway 1892, Wolters 1976, Sibley & Monroe 1990). The close relationship of the genera *Archilochus*, *Atthis*, *Calypte*, *Stellula*, and *Selasphorus*, together with other small, gorgeted hummingbirds is supported by skeletal synapomorphies, but little resolution of relationships has been possible within the clade (R. L. Zusi pers. comm.). Howell & Webb (1995) merged *Atthis* into *Selasphorus*, and combined *Archilochus*, *Calypte*, and *Stellula* into *Archilochus* with no comment or justification. We regard this arrangement as preliminary and arbitrary.

Unfortunately, little has been published regarding the ecology, behaviour, and vocalizations of either form of *Atthis*. Especially relevant to the question of species limits, the displays and vocalizations associated with courtship have been described only briefly by Howell & Webb (1995) and Skutch (in Bent 1940). The purpose of the present paper is to present descriptions of the courtship displays and vocalizations of the northern populations of these hummingbirds, compare with descriptions of these displays in southern populations, to point out differences in behaviour and morphology between the two forms, and to comment on implications for their specific status.

Methods

As part of avifaunal inventory studies, KZ and DAK observed *Atthis* hummingbirds at two localities in cloud forest in the Sierra Mazateca in northern Oaxaca: 29–31 January 1994, at Puerto de la Soledad, a microwave station at the highest point along the road from Teotitlán del Camino to Huautla de Jiménez, Oaxaca (specific locality: Distrito de Teotitlán del Camino, Puerto de la Soledad, GPS coordinates 18°9.951′N, 96°59.891′W, 2280 m); and 21 May–2 June 1994 near San Martín Caballero, a town in an isolated northeastern spur of the Sierra Mazateca (specific locality: Distrito de Teotitlán del Camino, 1 km NE San Martín Caballero, 18°6.721′N, 96°38.426′W, 1470 m). Two specimens were preserved as vouchers [OMVP 1041 (male) and 1130 (female)], deposited at the Museo de Zoología, Facultad de Ciencias, Universidad Nacional Autónoma de México. *A. ellioti* was observed by ATP on 3–10 July 1995 in cloud forest in Parque Nacional Los Andes, Volcán Santa Ana, Departamento de Santa Ana, El Salvador.

To assess differences in vocalizations, we studied recordings of *Atthis* hummingbirds provided by the Cornell Library of Natural Sounds, and compared them to vocalizations heard during our field studies. This material included recordings by Theodore A. Parker III of *A. heloisa* (LNS 17214) from above Puerto Los Mazos, Jalisco, Mexico, and of *A. ellioti* from Cerro Verde, Santa Ana, El Salvador, made by W. A. Thurber.

To provide a preliminary assessment of morphological variation, we examined specimens of both forms in the collections of the University

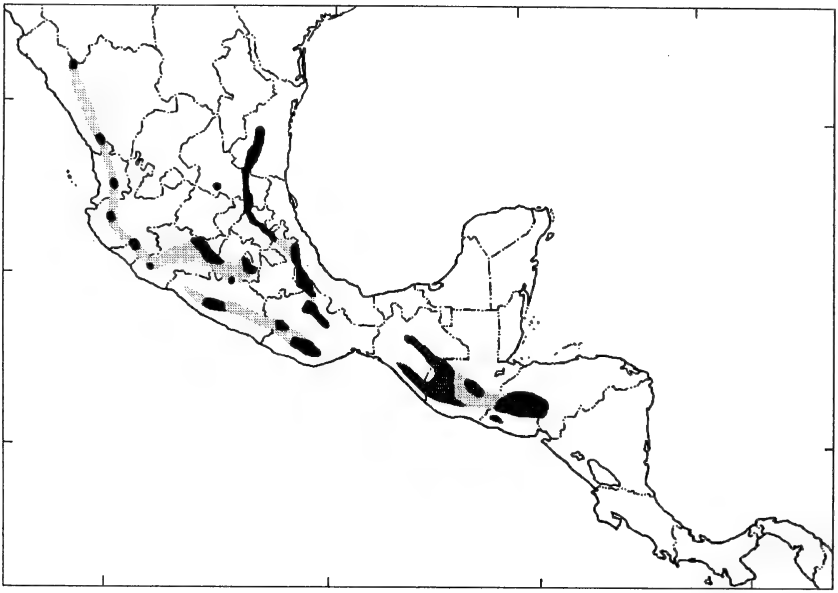

Figure 1. Distribution of hummingbirds of the genus *Atthis*. Black areas indicate populations of *A. heloisa*; dark grey indicates populations of *A. ellioti*; and light shading indicates probable continuity of populations in appropriate habitats.

of Kansas Natural History Museum, Field Museum of Natural History, Southwestern College, and the Museo de Zoología, Facultad de Ciencias, Universidad Nacional Autónoma de México. In all, we inspected 41 males and 13 females of the northern populations, and 7 males and 2 females of the southern populations. Additional specimen information was kindly provided by the Louisiana State University Museum of Natural Science.

Distribution

The distribution of *Atthis* hummingbirds generally follows the major mountain systems of northern Mesoamerica (Fig. 1). Populations assigned to *A. h. heloisa* range from central Tamaulipas south in the Sierra Madre Oriental to the Nudo de Zempoaltépetl of northern Oaxaca, in the interior in the vicinity of the Federal District and on Cerro San Felipe in northern Oaxaca, and through the Sierra Madre del Sur of Guerrero and Oaxaca; but the species was not detected on the peripheral montane forest island of Cerro Piedra Larga in east-central Oaxaca (Peterson *et al.* in prep.). An isolated population apparently occurs in southcentral San Luis Potosí in the vicinity of Alvarez; Salvin & Godman (1879–1904) reported a specimen, perhaps of doubtful veracity, collected by A. Dugés in Guanajuato (not included on map for lack of a more specific locality). A specimen collected by Mario del Toro Avilés at "Montañas Gineta", Oaxaca, is an example of *A. h. heloisa* outside of that form's range, another example of that collector's notoriously unreliable labelling of specimen material (Binford 1989).

Populations referred to as *A. h. margarethae* are restricted to the coastal slopes in Sinaloa, Nayarit, and Jalisco, and then apparently in the Transvolcanic Belt east to western Estado de México. Their absence from the higher peaks of the main body of the Sierra Madre Occidental is odd, given their occurrence in similar habitats in the Transvolcanic Belt. Our limited reexamination of the characters used by Moore (1937) indicated that the differences appear real, although the distributional gap that he mentioned does not, based on ranges outlined in Friedmann *et al.* (1950) and Howell & Webb (1995). Two female specimens described as *A. morcomi* by Ridgway (1898) from southeastern Arizona appear to represent either stragglers or mislabelled specimens; Bangs (1929) pointed out that both fall completely within the range of variation of *A. h. heloisa*. Hummingbirds of this genus have not been found subsequently at the type locality, in spite of its extreme popularity among birdwatchers. Although these extralimital records might suggest seasonal or altitudinal movements, evidence available is insufficient to demonstrate this phenomenon convincingly.

Courtship behaviour

Observations of courtship behaviour of *A. h. heloisa* were as follows. Males were distributed relatively uniformly through the habitat, especially along ridgetops, frequently perching on high, exposed branches of *Podocarpus* sp. in disturbed vegetation along trails. Females were less obvious, often hidden nearby in dense vegetation closer to the ground. Individuals of both sexes were observed to feed low to the ground from red-flowered *Salvia* sp. (Lamiaceae) at Puerto de la Soledad, and from yellow-flowered *Palicourea galeottiana* (Rubiaceae) at San Martín Caballero.

Males sang from perches, and appeared to be consistent in their use of particular branches, being seen in the same positions on as many as 12 consecutive days. Vocalizations included a rather soft, short *tsi*! given by individuals of both sexes. Perched males, however, gave the same *tsi*!, followed by a thin whistling *weeeeeeeeeew* that rose and then fell in pitch, lasting a total of two or three seconds (Fig. 2), the whistled portion being reminiscent of songs of *Calypte costae* (Wells *et al.* 1978, KZ pers. obs.). Some immature-plumaged males at San Martín Caballero were heard to sing two or three repetitions of a briefer version of this song in quick succession, much as described by Wells *et al.* (1978) for *C. costae*.

Perched males oriented themselves towards nearby females, which were often perched or foraging. As frequently as once per minute, a male would fly to within 10 cm of a female and hover horizontally in front of her, spreading his gorget and cocking his spread tail vertically

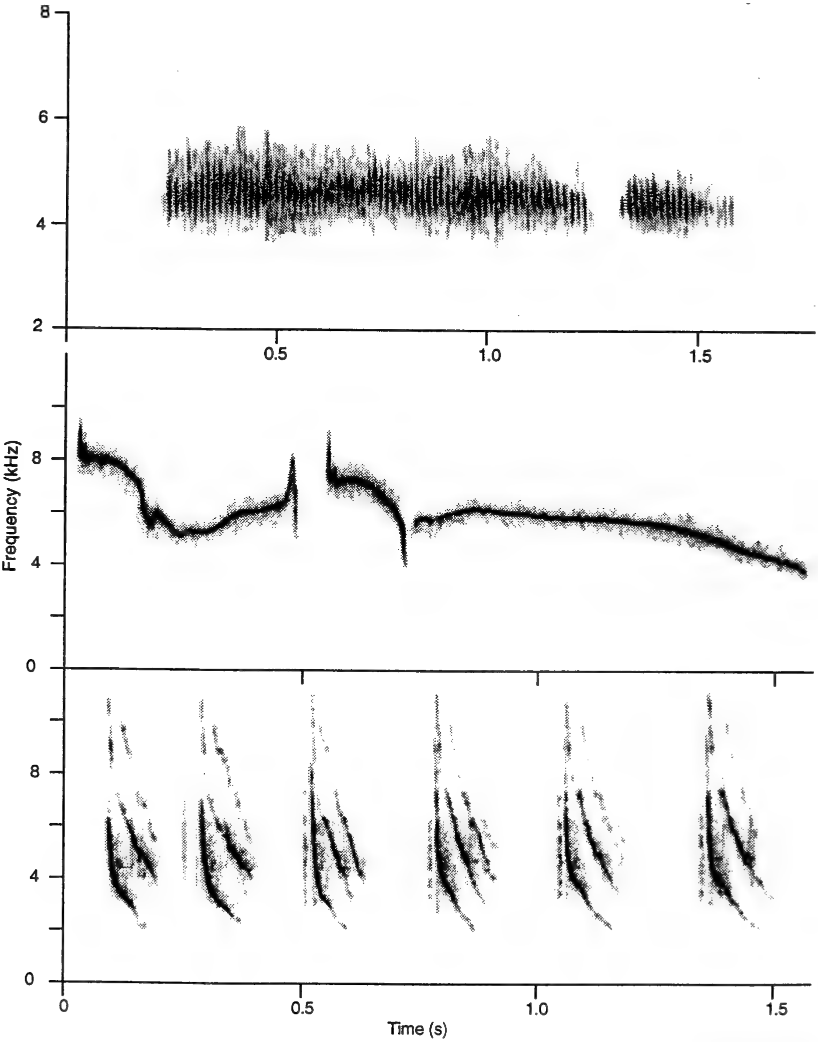

Figure 2. Sounds made by *Atthis* hummingbirds: wing noise (top) and song (middle) of *A. heloisa*, recorded in Jalisco, Mexico; and song of *A. ellioti* (bottom), recorded in El Salvador.

over his back, but was not observed to make any display dive, as do other related genera (Wells *et al.* 1978, Johnsgard 1983). During the hovering, the male's wings produced a wavering thrumming noise (Fig. 2; Robins & Heed 1951), and he often followed the female's movements closely. The noise produced by the wings was similar to that of courting *Selasphorus platycercus*, although somewhat softer (KZ pers.

obs.). Occasionally, while courting females, males flew in horizontal loops as long as 8 m, making the wing noise continuously. The wing noise was also noticeable when males flew in non-courtship behaviours such as foraging, but whether it is always produced during flight is unclear; Howell & Webb (1995) also noted that wing noise is louder during displays, but produced continuously. Immature males were not seen to court females; nor were immature males or females heard to produce wing noise when flying. Observations in January included both singing and courtship, but in May only singing was noted, suggesting that nesting was already well underway or completed.

These observations contrast in some respects with those of Skutch (Bent 1940) of *A. ellioti* in Guatemala and of Thurber *et al.* (1987) from El Salvador. They described assemblies of males spaced 25–30 m apart, with no other such assemblies detected within 2 km. Similar to our observations, the males sang from exposed perches, but their song was described as rising and falling in pitch, more rich and varied (lacking the whistling quality) than in *A. heloisa*, and lasting 30–40 seconds, much longer than in *A. heloisa*, as was borne out by the recordings we studied (Fig. 2). No pronounced wing noise was noted. Excepting the latter point, these differences are largely in accord with descriptions in Howell & Webb (1995). Displaying males apparently moved their gorgets, and often sang while in looping flights, but were not observed to approach the females closely (but see Howell & Webb 1995).

Hence, several marked differences seem to exist in the vocalizations and courtship behaviours of the two forms of *Atthis* hummingbirds. The northern form (*A. heloisa*) sings a simpler song and only while perched, approaches closely to females while in flight, and produces a loud humming wing noise while flying. Observations (ATP) at close range of *A. ellioti* in El Salvador indicated that its wing noise is much quieter and less throbbing than in *A. heloisa*; this observation contradicts a brief mention of display behaviours in Howell & Webb (1995). Finally, and perhaps most interesting, is the possibility that the southern birds display in groups (leks?), whereas the northern birds show no obvious tendency towards clumping; S. N. G. Howell, however, reports observations of clumped and nonclumped displaying males in each form (pers. comm.).

Morphology

Our examinations of study skins revealed several differences between males of the northern and southern forms of *Atthis*. The inner web of the outermost primary of all adult males of *A. heloisa* examined was notched for an average of 6.5 mm from the feather tip (Fig. 3). No females or immature males showed this modification, nor did any individual examined of *A. ellioti*. This structural modification, noted by Ridgway (1892), probably accounts for the humming noise produced by adult male *A. heloisa* (Monroe 1968). An interesting sidelight of this observation, if the pulses in the noise represent wingbeats (Fig. 2), is that the wingbeat frequency for *A. heloisa* can be calculated at 61.3 beats per second.

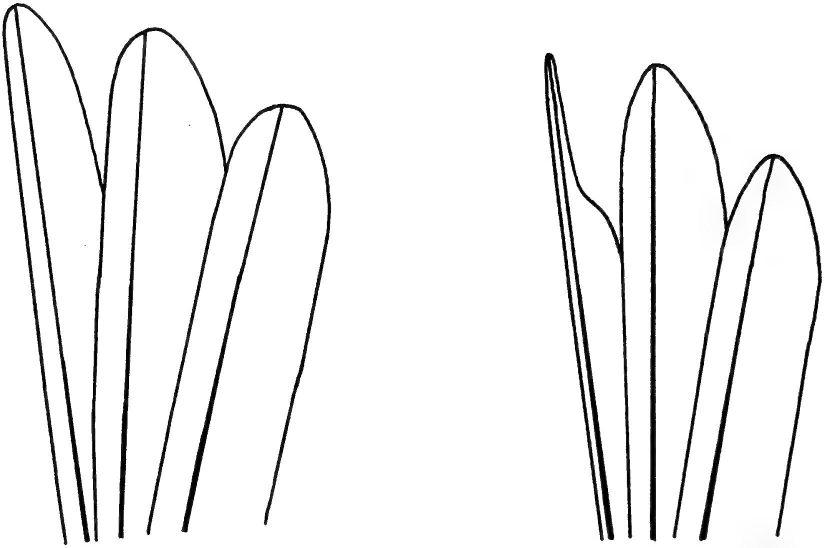

Figure 3. Shape of outer primaries of left wings in *Atthis ellioti* (left, FMNH 42768) and *A. heloisa* (right, KU 46137), both adult males.

This notch of the inner web of the outer primary in *A. heloisa* is the most extreme within the five closely related genera *Selasphorus*, *Atthis*, *Archilochus*, *Calypte*, and *Stellula*. The latter three genera and *Selasphorus flammula* show no notch of the outer primary, whereas *S. platycercus* shows a notch of the distal portion of the feather only. Other *Selasphorus* (*S. rufus*, *S. sasin*, and *S. scintilla*; *S. ardens* not determined) have a pointed outer primary, but no notch.

The colour of the two *Atthis* forms' gorgets differs, in that gorgets of *A. heloisa* are of a rich magenta purple or bluish purple, but those of *A. ellioti* lack blue almost completely and are decidedly more reddish, especially in Honduran *A. e. selasphoroides* (Monroe 1968), even when specimens of similar time since collection are compared. Additionally, the length of the gorgets of adult males may differ, although this feature is difficult to evaluate quantitatively; gorgets of *A. ellioti* seem to be about 3–5 mm longer than those of *A. heloisa*. Our measurements of body dimensions were based on too few individuals to permit statistical testing, but seem generally to support the notion that *A. ellioti* is somewhat smaller than *A. heloisa* in bill and tail length, but slightly larger in wing length, as documented by Ridgway (1892, 1911).

Species limits

The sum of the information presented above is that the northern and southern forms of *Atthis* differ in several regards. The two forms differ in courtship behaviour, song structure, wing morphology, and coloration. Character distributions are nonoverlapping in several cases, and their status as valid phylogenetic species is unquestionable.

The unresolved question, however, is whether they should be considered as representing two biological species. Because of their allopatric distributions, no test of sympatry is available to aid in this decision. Comparisons with sympatric species pairs in related genera are not illuminating because sympatry among congeners (e.g. *Calypte* spp.) is relatively rare; however, species pairs in more distantly related hummingbird clades (e.g. *Amazilia* spp.) are maintained in sympatry even though they are more similar in courtship behaviours than the *Atthis* species treated herein. The marked differences in courtship behaviour and associated morphological modifications strongly suggest that they would not interbreed were populations to come into contact. Hence, we recommend that these two forms be recognized as full biological species.

Acknowledgements

This contribution is dedicated to the memory of Ted Parker, for his many insights, observations, and records that have enriched so much of our work with Neotropical birds, and for his contributions of the recordings used in this paper. We would like to thank our field companions, especially Griselda Escalona-Segura, Blanca E. Hernández-Baños, and Laura Gonzáles-Guzmán, for their assistance and support. We also thank the curators and staff of the American Museum of Natural History; Natural History Museum, Tring; Canadian Museums of Nature; Carnegie Museum of Natural History; Delaware Museum of Natural History; Field Museum of Natural History; Louisiana State University Museum of Natural Science; Moore Laboratory of Zoology; Musée d'Histoire Naturelle de Paris; Museo de Zoologia, Facultad de Ciencias, U.N.A.M.; Museum of Comparative Zoology, Harvard; Museum of Vertebrate Zoology, Berkeley; Royal Ontario Museum; San Diego Natural History Museum; Southwestern College; Texas Cooperative Wildlife Collections; Universidad Michoacana San Nicolás de Hidalgo; University of Arizona; Western Foundation for Vertebrate Zoology; and Yale Peabody Museum for access to specimens and data under their care; Gary R. Graves, Steve N. G. Howell, Adolfo G. Navarro-Sigüenza, James V. Remsen, and Mark B. Robbins for critique of the manuscript; and Greg F. Budney of the Library of Natural Sounds, Cornell University, for providing the sound recordings.

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A new taxon of the Barred Honeybuzzard *Pernis celebensis* from the Philippines

by Anita Gamauf & Monika Preleuthner

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The Barred Honeybuzzard *Pernis celebensis* is restricted to Sulawesi and the Philippines. Two subspecies have been distinguished: The very colourful and uncrested nominate subspecies *Pernis celebensis celebensis* Wallace, 1868, is found on Sulawesi, including Muna and Peleng Islands; the paler banded and crested *Pernis celebensis steerei* Sclater, 1919, has been reported from all over the Philippines, except Palawan (Delacour & Mayr 1946, Brown & Amadon 1969, del Hoyo *et al.* 1994). Dickinson *et al.* (1991) compiled a list of 17 islands where the occurrence of this subspecies has been documented.

In the course of an ecomorphological study of Philippine birds of prey (Gamauf *et al.* 1998) we carried out morphological measurements on 21 raptor species in various museum collections. Sixty external measurements were taken from each specimen. While comparing the specimens from different Philippine islands, we were struck by clearcut differences in colour and plumage pattern among birds from northern and southern provenances. To investigate these geographic differences in greater detail, we looked for representatives of this species in 30 different museum collections. Finally, from nine museums (for abbreviations of museum names, see Acknowledgements), a total of 37 specimens was available, from 10 different islands. In addition, 75 observations in the field were available, carried out over a period of more than 9.5 months.

Plumage variation

The most striking difference between the two population groups is the uniformly brown colour of the adults in the northern population which does not display the rich contrast and coloration of specimens from the southern islands. This may be the reason for some confusion in the past concerning age classes, since plumage characteristics were often used to determine age (Stresemann 1940, Brown & Amadon 1969). The holotype of *steerei* (Sclater 1919), now in the Natural History Museum, Tring—BM 1896.4.15.40, is an adult male of the south Philippine subspecies which was collected by Steere on 17 February 1888, in San Antonio (Negros). We agree with Sclater's statement that "... other examples from Samar, Mindanao, and Basilan closely resemble the type ...", since we were able to confirm the occurrence of representatives of the southern population on those islands.

Morphological variation

Table 1 gives a comparison of 14 external morphological measurements of individuals from northern and southern provenances. From the total of 37 specimens we could include 29 sexed and fully feathered birds in a discriminant function analysis (12 from the north and 17 from the south). With a combination of 6 variables (Fig. 1) we were able to discriminate unambiguously between populations as well as between age classes. In the northern population the separation according to sex and age class was clearcut without any overlap: females are larger than males, immatures are smaller than older birds (adults and subadults) in some measurements. In the slightly smaller southern form no clear discrimination was found between the sexes. This may be partly due to incorrect sexing of the museum specimens, as has been proven for other species with much more pronounced sexual dimorphism. Nevertheless, the age class could be determined correctly. Discriminant function (DF) 1 concerns characters related to the mode of handling the prey as well as the flight apparatus. It segregates the subspecies largely by the length of the bill and middle toe. A negative correlation exists with the number of notches and Kipp's distance. Along DF 2 the honeybuzzards fall into two distinct groups largely according to the length of the tail as a character for flight (lift and ability for manoeuvring) and the tarsus length (presumably connected with feeding habits).

Thus, based on the characters discussed above, the northern population is distinct in both plumage pattern and morphology. Every specimen can be clearly diagnosed. We therefore consider this population to represent a third taxon, for which we propose the name

TABLE 1

Morphological measurements (mm) of the two Philippine populations of the Barred Honeybuzzard *Pernis celebensis* according to age and sex. Numbers of study skins are given in parentheses. F=female, M=male

	Northern population (*winkleri*)										
	Holotype Adult M (1)	Adult and subadult M (5)[1]			Adult and subadult F (5)			Immature M (3)			Immature F (1)
Age and sex		x̄	s.d.	Range	x̄	s.d.	Range	x̄	s.d.	Range	
Body length	530.0	543.0	8.3	530.0–553.0	556.4	24.8	520.0–590.0	561.0	27.9	525.0–593.0	535.0
Wing length	375.0	371.6	3.6	367.0–376.0	395.6	12.0	375.0–408.0	366.7	13.4	348.0–379.0	363.0
Kipp's distance	113.0	111.0	4.2	103.0–115.0	116.8	3.8	112.0–123.0	115.0	4.3	111.0–121.0	125.0
Number of notches	7.0	7.0	0.0	7.0–7.0	7.0	0.0	7.0–7.0	6.3	0.5	6.0–7.0	7.0
Length of central tail feather	245.0	240.8	7.5	226.0–260.0	241.4	9.8	222.0–267.0	235.0	6.2	227.0–247.0	230.0
Length of outermost tail feather	251.0	246.8	10.8	227.0–260.0	254.4	6.7	247.0–267.0	239.3	9.5	226.0–247.0	227.0
Length of hindtoe	21.4	22.7	1.4	21.4–25.2	22.5	2.2	20.0–25.8	24.1	3.0	20.0–27.1	27.7
Length of middle toe	42.2	44.2	1.5	42.2–46.0	41.8	2.1	39.0–44.2	45.5	0.5	45.0–46.0	45.5
Length of hindclaw	—	21.5	0.6	21.0–22.5	21.5	0.6	20.5–22.3	21.8	0.9	20.9–23.0	20.4
Length of middle claw	—	21.3	1.0	20.0–22.7	22.5	0.9	21.5–24.0	22.1	0.7	21.6–23.1	20.0
Tarsus length	40.2	42.3	2.3	40.0–46.0	41.7	2.7	40.0–47.0	41.3	2.4	38.0–43.0	44.0
Bill length with cere	37.9	38.2	0.4	37.8–38.8	37.2	1.9	35.0–40.6	37.2	1.5	35.6–38.7	36.8
Bill width with distal edge of cere	21.7	23.0	1.1	21.7–24.1	24.3	0.8	23.5–25.6	22.9	0.1	22.8–23.1	24.0
Bill depth	17.9	18.4	0.5	17.9–19.0	18.5	0.7	17.5–19.5	19.2	0.0	19.2–19.2	—

[1] Holotype included

TABLE 1 (*Continued*)

Southern population (*steerei*)								
	Adult and subadult M (12)			Adult and subadult F (4)			Immature M (1)	Immature F (1)
Age and sex	$\bar{x}$	s.d.	Range	$\bar{x}$	s.d.	Range		
Body length	529.0	9.9	525.0–542.0	554.8	15.2	533.0–575.0	582.0	553.0
Wing length	371.6	10.7	355.0–395.0	381.0	4.9	375.0–388.0	361.0	381.0
Kipp's distance	110.5	6.1	102.0–125.0	115.3	3.1	112.0–120.0	117.0	110.0
Number of notches	7.3	0.7	6.0–9.0	7.3	0.4	7.0–8.0	7.0	7.0
Length of central tail feather	229.5	10.5	212.0–251.0	241.0	6.4	231.0–245.0	249.0	242.0
Length of outermost tail feather	236.6	9.0	223.0–251.0	242.8	3.3	237.0–245.0	252.0	265.0
Length of hindtoe	22.9	1.0	21.3–24.3	22.8	0.6	22.0–23.4	22.4	26.7
Length of middle toe	40.9	1.8	38.5–43.9	43.0	1.6	41.0–45.4	40.5	38.6
Length of hindclaw	20.4	1.1	19.0–22.4	20.8	0.9	19.6–22.2	19.3	24.0
Length of middle claw	21.1	0.9	19.5–22.5	21.8	1.2	20.2–23.0	19.8	22.4
Tarsus length	40.2	2.1	38.0–46.0	39.1	2.2	37.0–42.0	38.0	39.8
Bill length with cere	35.6	0.7	34.0–37.0	35.1	0.7	33.9–35.7	35.5	35.0
Bill width of distal edge of cere	23.2	1.6	20.5–25.8	22.6	1.6	20.5–25.0	23.7	21.5
Bill depth	17.5	1.2	15.4–19.3	16.8	0.5	16.2–17.3	—	18.2

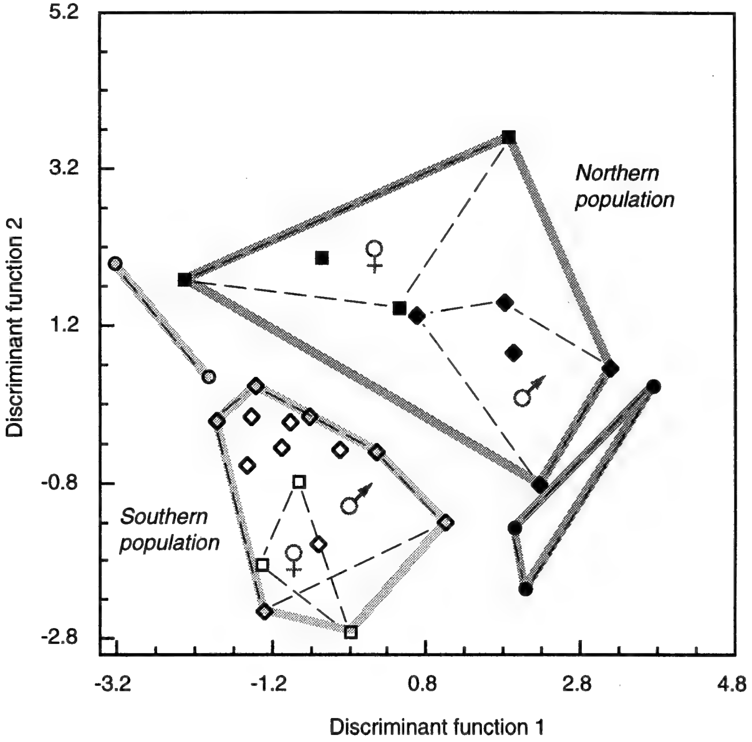

Figure 1. Separation of the two Philippine populations of the Barred Honeybuzzard *Pernis celebensis* (12 study skins from the north, filled symbols; 17 study skins from the south, open symbols) according to discriminant function analysis of 6 morphological variables (bill length, length of the middle toe, number of notches, Kipp's distance, length of the tail, tarsus length). Immatures are marked by round symbols.

Pernis celebensis winkleri subsp. nov.

Holotype. Adult male, from Bataan, Luzon, collected by O. Koch, 17 August 1881, Zoologisches Museum der Humboldt Universität Berlin, Germany, cat. no. ZMB 25.464 (Fig. 2). This is the specimen listed as "immature?" by Stresemann (1940, pp. 192/193).

Diagnosis. The subspecies can be distinguished unequivocally in subadult and adult specimens. In contrast to *winkleri*, individuals of *steerei* are much more contrasting in plumage. The ground colour of crown and neck is paler with dark stripes, the long pointed crest (up to 73 mm) is black. The throat is white with black mesial and lateral stripes. The breast is whitish to buffy with bold black streaks. The lower breast is white with narrow rufous-brown bars. Lower belly, undertail coverts, leg feathers and underwing coverts are barred medium to dark brown and white. All illustrations in publications to date show *steerei* (duPont 1971, Brown & Amadon 1969, Weick 1980,

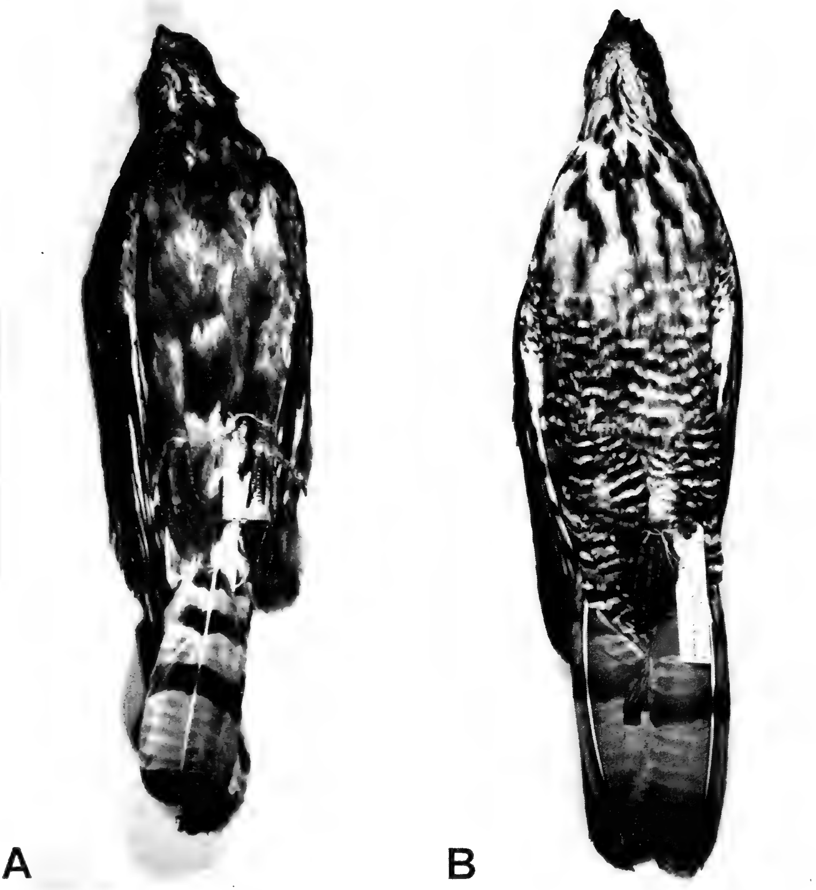

Figure 2. A. Holotype of *Pernis celebensis winkleri* subsp. nov. (Zoologisches Museum der Humboldt Universität Berlin, Germany, cat. no. ZMB 25.464). B. Typical adult representative of *Pernis celebensis steerei*, Universitets Zoologiske Museum, København, Denmark, cat. no. 940).

del Hoyo *et al.* 1994). In the course of our investigations we discovered several misidentified specimens among study skins, as was also noted by Dickinson *et al.* (1989). These obvious errors are due to close similarities between corresponding subspecies of the Philippine Hawk-Eagle *Spizaetus philippensis* (Preleuthner & Gamauf 1998) and of the Barred Honeybuzzard *Pernis celebensis*. The respective northern subspecies from both species resemble each other, as also is the case with the southern subspecies. Whether this could be caused by mimicry will be discussed elsewhere.

Description of holotype. Generally a dark uniformly brownish coloured bird. Especially as the holotype was originally a mounted specimen, the slender honeybuzzard form can be easily recognised. Crown and the sides of the head are hazel to blackish-brown with fine black streaks on the sides and with broader black streaks on the crown. The short bluish-grey imbricated feathers extending from the lores to the supercilium and the anterior part of the auriculars, together with additional morphological measurements, suggest that the specimen may be sexed as male. The longest lanceolate feather of its pointed crest has a length of 57 mm. The throat is buffy white and every feather has a black shaft. Additionally, the throat is divided by a black median stripe and bordered by black lateral moustachial stripes. The breast feathers are hazel to cinnamon brown with more or less bold black streaks. Belly and undertail coverts are uniform cinnamon brown like the underwing coverts and the legs. The plumage of the anterior part of the legs covers the upper third of the short tarsus. The primaries are barred on their distal part, the proximal part is indistinctly mottled. The wing-shape is typical for a forest-living honeybuzzard, relatively short and rounded, and the wing tips extend more than halfway to the tail tip. The upperparts are uniform dark umber to sepia brown, with narrow paler edges; the primaries are blackish-brown. The long tail is the same ground colour on the dorsal side, the broad black subterminal bar separated by a broader pale greyish-brown unmarked zone from 3–4 narrower bars basally. The cere is dark grey and the bill black, only the innermost half of the lower mandible is warm buff. The legs are a deep yellow.

Etymology. We have chosen to name this subspecies after the well-known ornithologist Prof. Dr Hans Winkler, director of the Konrad Lorenz-Institute for Comparative Ethology, Austrian Academy of Sciences, and expert in the field of ecoethology. We wish to emphasise our appreciation of his scientific competence and our gratitude for his patience and encouragement of our work.

Paratypes. Eight specimens of *winkleri* from Luzon are herein designated paratypes (1 adult male and 4 subadult/adult females, 2 immature males and 1 immature female). Adult male, 05.06.1894, Molino, Isabela Province; BMNH, cat. no. 394.6.14.13. Adult female, 15.03.1894, La Trinnadad, Benguet Sub-province, Mountain Province; BMNH, cat. no. 334.99.14.12. Adult female, 27.07.1894, Manito, Albay Province; BMNH, cat. no. 399.97.5-13.143. Subadult female, 01.08.1959, Pangil, N.A. Icarangal, Laguna Province; AMNH, cat. no. 782423. Subadult female, 01.12.1969, Ipo Dam, Bulacan Province; DMNH, cat. no. 3622. Immature male, 02.07.1958, Bataan Province, J. E. duPont; DMNH, cat. no. 1300. Immature female, Saray, Pakil, Laguna Province; DMNH, cat. no. 43724. Immature male, 30.03.1975, Diman, Pangil, Laguna Province; CMNH, cat. no. 47656. Seven additional study skins of the northern population were available from Polillo (1 immature, AMNH), Catanduanes Island (1 unsexed subadult, DMNH; 1 immature male, PNM; 1 juvenile female, PNM), Marinduque Island (1 subadult male, DMNH), and Sibuyan Island (1 subadult male, DMNH). One adult female, without designated locality (BMNH, cat. no. 1057), belongs also the subspecies *winkleri*.

Plumages. Adult: All adult birds are dark and with little contrast. The crown and the side of the head are buffy to blackish brown with heavy streaks broadening towards the crown. *Winkleri* is characterised by a prominent pointed crest (up to 60 mm). Adult males show bluish-grey feathers at the side of the head as described for the holotype. In adult females, the bluish-grey zone covers only the lores; but this characteristic appears also in the other two subspecies. In comparison to *Pernis apivorus* and *Pernis ptilorhyncus* this zone is clearly smaller, especially in males. The colour of the iris is bright yellow, cere and bill are dark grey to black. The throat is white to buffy white, often with fine black longitudinal stripes along the shafts, divided by a black median stripe and bordered by black lateral moustachial stripes. Breast feathers are chestnut to hazel with more or less bold black streaks. Lower breast and belly are uniformly chestnut brown. The feathered tibiotarsus and the undertail coverts are cinnamon. The underwing coverts are either uniformly coloured or of a mottled brown showing no bars whatsoever. The upperparts including the tail are uniformly coloured, umber to sepia with somewhat darker primaries. Freshly acquired wing and tail feathers are tipped with white. The long tail feathers have a broad black subterminal bar adjacent to a broader unmarked zone and usually 5–6, occasionally up to 7, narrower dark bars basally. The innermost bars are narrow and closely spaced. They are barely visible in perching birds. The full coloration is acquired approximately at the age of 3 years, as is the case with *P. apivorus* and probably also *P. ptilorhyncus*. Second year plumage: The feathers at the crown and the neck are paler than in adults. A tawny mask is clearly visible. The typical bluish-grey feathered zone is already developed. The characteristic throat pattern with the black mesial stripe and the lateral moustachial stripes is less contrasting and pronounced than in the adult. The breast is white to buffy with more or less distinct streaks. Lower belly, legs and undertail coverts are usually darker. The underwing coverts are buffy to washed brownish without pattern. Only in one specimen chestnut axillary patches could be observed. The pale band on the upperwing (present in the first-year plumage) becomes darker, smaller and also more indistinct. Pattern and colouring of primaries, secondaries and tail feathers generally resemble the adult plumage. Immature: The first-year ventral plumage is white (only in one specimen buffy) and there is almost no variation, unlike the immatures of *P. apivorus* or *P. ptilorhyncus orientalis*. The head is white, neck and crown are whitish to buffy with fine dark streaks. The long pointed crest is black and clearly visible. A blackish mask in the form of a dark eyeline reaches from the bill to the auriculars. The cere is yellow, the bill blackish-grey and the inner half of the lower mandible warm buff to yellowish. On the ventral side the distal half of the primaries is blackish-brown, with up to 8 bars on the longest primary (usually the 6th). On the proximal half the bars are reduced; the wing-base, therefore, appears almost white. The secondaries are greyish-brown with bars less contrasting than in the adult plumage.

The back is sepia brown, and the uppertail coverts vary from cinnamon to buffy and whitish. Especially the greater and median wing coverts show wide pale edgings, which were, however, lacking in a few newly fledged birds. The secondaries are of a deep sepia colour, the primaries blackish brown. The tail feathers are sepia with 6–8 regularly spaced bars, in some individuals the areas between the bands becoming increasingly more closely set towards the tail-base. Feather tips are white and more pointed than in adults. The feet are yellow. Presumably, based on his knowledge of the European Honeybuzzard *P. apivorus*, Stresemann (1940) assumed that the specimen here designated the holotype of *winkleri* might be immature. This misinterpretation was due to the fact that most juveniles of *P. apivorus* are almost exclusively brown on the ventral side and thus resemble the adults of *winkleri*.

Specimens examined. Including the holotype, 16 study skins of *winkleri* were available from 5 different museum collections (see above), for *steerei* 21 study skins were examined at 7 collections (BMNH 5, UPLB 4, PNM 3, USNM 3, DMNH 3, AMNH 2, UMZC 1). In the course of our study *winkleri* has not been observed in the field, whereas 75 observations of *steerei* were recorded, all on Mindanao. Altogether this species could be observed for 7.41 hours between January and April 1993, November 1993 to February 1994, and March to July 1994.

Distribution. The occurrence of *winkleri* on Luzon (9), Polillo (1), Catanduanes (3), Marinduque (1), and Sibuyan (1) is documented by the study skins mentioned above. For *steerei*, specimens were available from Samar (5), Negros (1), Siargao (1), Mindanao (11), and Basilan (3). According to these data, in the east the borderline between the two subspecies runs along the Bernardino Strait between Luzon and Samar. Towards the west it follows the Sibuyan Sea south of Romblon. Since no study skins from Mindoro could be found during our investigations, the division line remains uncertain for the western part of the Philippine Archipelago. According to literature compiled by Dickinson *et al.* (1991) *P. celebensis* has been documented for seven additional islands. From our distribution data it can be concluded that six of those islands (Leyte, Tablas, Bohol, Tawitawi, Dinagat, Masbate) are inhabited by *steerei*, whereas Romblon, because of the close vicinity to Sibuyan, may probably be inhabited by *winkleri*. The present borderline between the two subspecies can be interpreted as the result of changes in the sea level during the Pleistocene (Diamond & Gilpin 1983, Heaney 1985), as discussed in Preleuthner & Gamauf (1998).

Habitat and conservation. The Barred Honeybuzzard is morphologically adapted to tropical rainforests (Gamauf *et al.* 1998). More than half of the 75 observations (*steerei*) have been made in lowland primary rainforests or secondary forests selectively logged 2–3 decades ago. The habitat choice of lowland areas is confirmed by our findings in the field as well as by the label data of the skins examined. Half of the observations were made at altitudes between 90 and 200 m a.s.l., the rest more or less evenly distributed up to 1400 m a.s.l. (highest location 1550 m a.s.l.). Of 11 skins bearing altitudinal data, 9 originate from areas between sea level and 400 m a.s.l. Another specimen of *steerei* was collected between 610 and 760 m a.s.l. (Goodman & Gonzales 1990). As has been shown by Collins *et al.* (1991), the condition especially of the lowland forests is rather poor. The major part of the rainforest has been lost due to logging and *kaingin* (shifting cultivation) activities. In 1988 only about 17 700 km^2 of intact lowland forest still existed. The recent extent of the rainforest is not exactly known, but considering the prior deforestation rate the present range of the potential habitat for *winkleri* can be estimated at 5000 km^2, for *steerei* at 7500 km^2 only (Preleuthner & Gamauf 1998). While according to Hauge *et al.* (1986) the Philippines ranked high among tropical countries in the rate of deforestation, as well as in the extent of deforested area in the 1980s, some years later Collins *et al.* (1991) classified the Philippines as arguably the worst case in tropical Asia.

Steerei was found at four study sites on Mindanao (NW and E Mt. Kitanglad area/Bukidnon, Carmen-Cantilan and PRI, former PICOP/Surigao del Sur). For these four areas population densities were estimated. In the lowland forests of PRI (58 km^2, 90–180 m a.s.l.) we found 7–8 pairs (12–14/100 km^2) and in Carmen-Cantilan (27 km^2, 80–540 m a.s.l.) 2–3 pairs (7–11/100 km^2). The density at higher elevations was up to 2.6 times lower than in these lowland areas. At NW Mt. Kitanglad (590–1400 m a.s.l.) 3–4 pairs were found in 45 km^2 (7–9 pairs/100 km^2), and on the eastern side of the same massif (900–1800 m a.s.l.) 2 pairs were resident in the lower part of the 38 km^2 study site (5 pairs/100 km^2). A population density of 8.3–10 pairs/100 km^2 was taken as a basis for estimating the total number for both populations, because *winkleri* could not be observed in the field. According to these calculations 400–500 pairs of *winkleri* may still live in the potential habitat of 5000 km^2. Using the same approach for *steerei* the corresponding number is 600–750 pairs in an area of 7500 km^2 of potential habitat. However, the actual number of *winkleri* may be much smaller since Danielsen *et al.* (1993) have classified the Barred Honeybuzzard as scarce for the Sierra Madre region, Luzon, and *steerei* could not be found at Mindoro, Negros and Sibuyan in recent studies (Brooks *et al.* 1992, Dutson *et al.* 1992, Evans *et al.* 1993).

P. celebensis has not yet been included in the world list of threatened birds (Collar *et al.* 1994). Based on our recent investigations, at least one criterion for this classification would be fulfilled: population numbers of all three subspecies are lower than 10 000 mature individuals. Additionally, the highly fragmented habitat is still subject to further destruction by continued logging, shifting agriculture and soil erosion. We therefore propose to include *P. celebensis* into the IUCN category "vulnerable".

Acknowledgements

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Distribution and status of the Ethiopian population of the Chough *Pyrrhocorax pyrrhocorax baileyi*

by Anne Delestrade

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The Chough *Pyrrhocorax pyrrhocorax* has a wide distribution, from the Palearctic to the Afrotropics. However, this distribution is highly fragmented, with numerous small isolated populations, such as in Scotland, Wales, the Canary Islands, several Mediterranean islands, Algeria and Ethiopia (see, e.g., Cramp & Perrins 1994). It inhabits mountain areas in the main part of its range, with only the western populations living on sea cliffs and inshore islands. The Chough population in Europe is currently declining (Monaghan 1988, Cramp & Perrins 1994, Tucker & Heath 1994, Madge & Burn 1995), but the status of Chough populations outside Europe has never been accurately assessed.

The Ethiopian population is of particular interest because it is the southernmost (the Bale mountains are some 850 km north of the equator), and the only population living within the Afroalpine ecosystem. This population is currently completely isolated from the others, and has been classified as a distinct subspecies, *P. p. baileyi* (Rand & Vaurie 1955). There are very limited data from Ethiopia (Brown 1967, Cramp & Perrins 1994), and the precise distribution and the size of the population are currently unknown.

Methods

The field study was carried out in Ethiopia between 16 November 1996 and 18 January 1997, i.e. the dry season and harvesting time. During this season, Choughs are not breeding (pers. obs.), and thus gather in large flocks (see Blanco *et al.* 1993). Flocks at roosting or at foraging

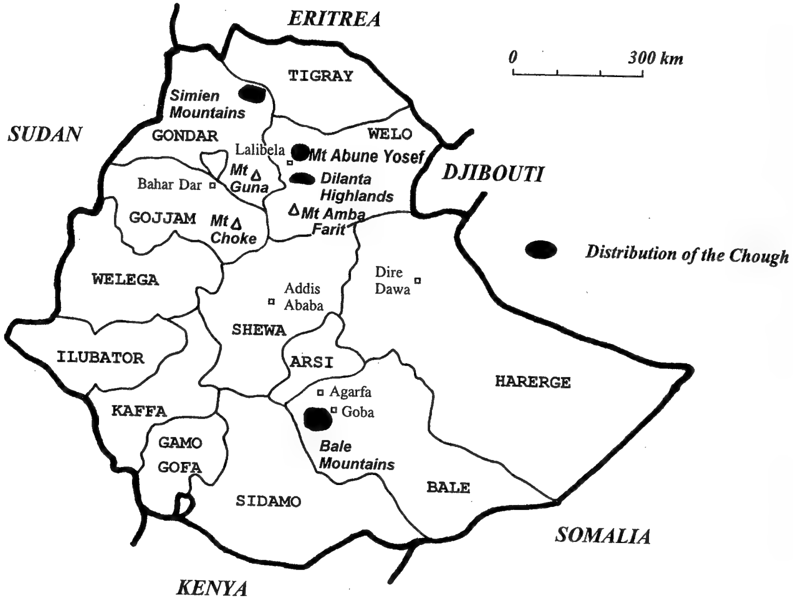

Figure 1. Distribution of the Chough in Ethiopia.

sites were censused by visiting most suitable high-altitude massifs: Mt Choke (Gojam region, 4,052 m), Mt Guna (Gondar, 4,135 m), Dilanta highlands (Welo, 3,601 m), Mt Abune Yosef (Welo, 4,284 m), Simien Mountains (Gondar, Mt Ras Deshen 4,533 m), and Bale Mountains (Bale, Mt Tullu Deemtu 4,377 m) (Fig. 1). Estimates of population size were derived from observations of flock size, flock movements, and identification of areas used by each flock. Roosts were recorded by observations of flock movements on cliffs just before sunset. I spent 14 days (7–20 December 1996) in the Simien Mountain National Park and 20 days (27 December 1996–15 January 1997) in the Bale Mountain National Park in order to obtain exhaustive censuses in these two areas.

Results

Distribution

During this study, the presence of Choughs was recorded in four difference massifs: Bale Mountains and Simien Mountains, where they were already known (Brown 1967, Urban & Brown 1971); The Dilanta highlands, from where there had been an early report by Blanford (1870); and a new area, the massif of Mt Abune Yosef in the Welo region. Choughs were not observed at Mt Choke (Gojam region) nor at Mt Guna (Gondar), and farmers from these areas were not familiar with the species, which suggests that Choughs are absent from these mountains.

In view of the apparently suitable habitat, Choughs could be present in the Amba Farit Mountains (Welo region, 4,247 m, Fig. 1) but a search could not be arranged there. In the northern part of the Bale mountains, Choughs were reported by local people near Agarfa (Fig. 1), but their presence was not confirmed in this study.

Flock and population size

Three roosts in the Simien Mountain National Park were frequented respectively by 80, 150 and 170 individuals. One roost located in the Abune Yosef massif (near Lalibela, Fig. 1) was visited by 25 individuals. Lastly, in the Bale Mountain National Park, large flocks gathered from different sites at dusk in one area of the Harenna escarpment (Rafu area), and were estimated at more than 100 individuals, although the precise location of the roost could not be identified. For all areas combined, the average foraging flock size was 60 (range 9–150, s.d. 35.5, n=26).

Population sizes could be estimated precisely only for the Simien and Bale Mountains National Parks, where careful counts were made. Based on flock locations and sizes, the Simien Mountain National Park (179 km^2) population was estimated at 350–500 birds, while the population of the Bale Mountain National Park (2,471 km^2, but with the Harenna forest excluded only some 1,700 km^2 suitable) was estimated at 250–400 birds. Thus, the total population of Choughs in Ethiopia living within the Parks was between 600 and 900 birds.

The minimum size of the Ethiopian Chough population based on the present counts would be in the order of 675–975 birds. As all areas outside the Simien and Bale Mountain National Parks, known to be inhabited by Choughs, were not checked in this survey, a total of 1,000–1,300 birds in Ethiopia is possibly a more likely figure. One is obliged to wonder how these isolated populations survive at very low densities, and what controlling factors are involved.

Habitat

In Ethiopia, Choughs live in high mountains. During this study, the 26 foraging flocks observed were in open habitats between 2,800 and 4,200 m. Five roost sites were found in cliffs, between 3,000 and 3,900 m. Although outside the breeding season, many pairs were visiting nest-sites, all in cliffs between 3,000 and 4,300 m. Foraging Choughs were noted in the following habitats: grazing areas, field crops (mainly barley and wheat), afroalpine belt, escarpments and cliffs. During harvesting of the cereal crops, Choughs fed on the seeds left on the ground. Overall therefore, Choughs depended mainly on grassland areas and field crops for foraging, and on cliffs for roosting and breeding.

Discussion

This study has provided distributional data and an estimate of population size for the Chough in Ethiopia, a first step toward the analysis of long-term trends in this population. Recognised as an endemic subspecies, the Ethiopian population is the most isolated one, the nearest other population being in southern Iran (Desfayes & Praz 1978), about 3,000 km distant. Calls of the Ethiopian birds were found to differ substantially from Choughs living in the Alps (pers. obs.); a detailed analysis of recording will be published elsewhere. Even within Ethiopia, Choughs may be divided into three sub-populations, each composed of several hundred individuals, two in the north in the West Highlands (Simien and Welo Mountains), and one in the South-East Highlands (Bale Mountains). The two northern populations are separated by 200 km of unsuitable habitat, and the Bale population is 600 km distant from the nearest northern population. Chough density was higher in the Simien Mountains National Park than in the Bale Mountains National Park (1.9–2.8 birds/km^2 versus 0.1–0.2 birds/km^2 respectively), probably as a consequence of a greater availability of nest and roost sites in cliffs in the Simien Mountains. Obviously more data are needed to assess the presence of Choughs in other massifs (e.g. Amba Farit in Welo region). With a total population of about 1,000 birds, and given the complete isolation from other populations, as well as the highly fragmented distribution within Ethiopia, it is very likely that exchanges of individuals between sub-populations are few (if they occur at all) as Choughs are known to be highly sedentary, and thus the status of this Ethiopian population appears to be vulnerable if not threatened.

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On the existence of a melanistic morph of the Long-tailed Hawk *Urotriorchis macrourus*

by Ron Demey & L. D. C. Fishpool

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The Long-tailed Hawk *Urotriorchis macrourus* (Hartlaub, 1855) is a little recorded raptor occurring in the Upper and Lower Guinea forest blocks of tropical Africa. New information concerning its distribution has come to light since the publication of *The Birds of Africa* (Brown *et al.* 1982) and its range is now known to extend from eastern Sierra Leone (Gola forest), Liberia and southeastern Guinea (Ziama forest) through Ivory Coast and Ghana to western Togo, and from western Nigeria and Cameroon southwards to Equatorial Guinea, Gabon, Congo, Cabinda and former Zaïre, and eastwards to southwestern Central African Republic, just reaching the extreme south of Sudan and Bwamba in western Uganda (Allport *et al.* 1989, Britton 1980, Brown *et al.* 1982, Carroll 1988, Cheke & Walsh 1996, Dowsett-Lemaire & Dowsett 1989, Elgood *et al.* 1994, Halleux 1994, Hillman & Hillman 1986).

The species is monotypic; the formerly recognised race *batesi*, supposed to have a longer tail, and proposed for populations from Cameroon eastwards (Bates 1930, Dekeyser & Derivot 1966, Mackworth-Praed & Grant 1970) is now considered invalid (Brown *et al.* 1982, Kemp 1994).

The purpose of this note is to draw attention to some conflict or inconsistency that exists in the literature concerning the colouration of this species, which emphasises how poorly known it is.

The general colouration of the adult is entirely dark grey on the upperparts with contrasting white uppertail-coverts; the exceptionally long, graduated tail is black tipped and barred white. Below, it is paler grey on the throat, with the remainder of the underparts and the underwing-coverts, typically, a rich chestnut brown; undertail-coverts are white. This much is non-controversial. There is, however, dispute over the existence of the so-called melanistic morph of this species in which the chestnut is replaced by a dark slaty grey.

The melanistic morph was first described by Sharpe (1870) from a specimen, sex unspecified, secured for the Norwich Museum, which apparently constituted the first example of this species to have reached Britain, the type (a juvenile) having been sent to the Leiden Museum by Pel, provided by Temminck and described by Hartlaub in 1855. An accurate colour lithograph by Keulemans illustrates Sharpe's paper. For reasons now unclear, four years later Sharpe (1874) considered the colour difference to be sex related, with the grey morph being male, the chestnut form female. This was repeated by Reichenow (1901). Bannerman (1930) mentions having examined the melanistic specimen from the Norwich Museum and gives a description of it ("breast and belly entirely grey, a faint indication of reddish-brown feathers appearing on the throat and here and there on the breast"). He does not mention, however, the existence of this morph in the shorter, two-volume version of his work (Bannerman 1953). It is not mentioned either by Bates (1930), Lippens & Wille (1976), Mackworth-Praed & Grant (1952), Serle, Morel & Hartwig (1977), Snow (1978) and Williams & Arlott (1980). In the forty years between Bannerman (1930) and Mackworth-Praed & Grant (1970), Schouteden (1954) seems to be the only author to make explicit reference to it, stating that "the breast is sometimes grey". Not to mention it is, of course, not to deny its occurrence—one might infer that in some cases lack of space or superficial treatment may have precluded mention. This seems, however, to have had the unfortunate result of leading others at least to overlook or ignore its existence.

Thus, Brown *et al.* (1982) describe the underparts of the adult as being wholly chestnut, and do not mention the melanistic morph. This is surprising, however, because Mackworth-Praed & Grant (1970) clearly state that the underparts may be either chestnut or blackish slate and include a colour illustration of both morphs. It is even more remarkable in view of the fact that the principal author of the former, in another major work (Brown & Amadon 1968), illustrates both colour morphs in a plate but, curiously, omits any mention of the melanistic phase in the text. Recently Kemp (1994), although mentioning that "a melanistic morph has been claimed to exist and even been depicted", has gone so far as to conclude that this was "apparently unsubstantiated".

The Natural History Museum (Tring) holds 23 adult specimens of which two are grey morphs. One specimen (reg. no. 1955.6.N20.3245) was that originally held in the Norwich Museum and illustrated in Sharpe's paper (it bears a label to this effect). Locality data are given simply as Denkera, Fantee County [Ghana]. The second specimen (reg. no. 1938.4.6.3) was collected on 18 January 1938 at Ondo, Nigeria. No other data are given. Among the 21 adult specimens in the Royal Museum for Central Africa (Tervuren, Belgium), all except one of which are from the Lower Guinea forest block in former Zaïre, no grey morphs are present. Neither of the grey specimens in Tring is sexed, making Sharpe's (1874) claim for the dimorphism being sex-linked the more intriguing. Brown *et al.* (1982) state that females average larger than males, although the measurements they give are for both sexes combined. The range for wing length is stated to be 266–310 mm (sample size unspecified). Wing lengths of the grey individuals from Ghana and Nigeria measured 305 and 268 mm respectively. While not conclusive this might be taken to suggest that the grey morph occurs in both sexes.

In Ivory Coast, the Long-tailed Hawk is not uncommon in Yapo Forest, 5°42′N 4°6′W (Demey & Fishpool 1994). Although we regularly heard the species there, we rarely saw it. Indeed, during 167 visits to Yapo forest over the course of five years we observed the Long-tailed Hawk on 18 occasions only, involving 22 individuals: two of these were seen to be melanistic birds, although the proportion could have been slightly higher since in some cases (number unrecorded) the observations concerned rear views of birds in flight. Brief details of these sightings are as follows. On 25 May 1986, RD observed a bird corresponding to the description of the melanistic morph (Mackworth-Praed & Grant 1970). The bird crossed a clearing at less than 10 m from the observer, and landed in a tree. It was not shy, allowing close and detailed observation through a telescope of 20 × magnification during more than 15 minutes. Notes taken on the spot describe the underparts as slate-grey, concolorous with the upperparts; upper- and undertail-coverts pure white; tail very long, black with white spots, looking somewhat worn; underwing barred. Eye yellow; bill greyish-black; legs yellow. A second melanistic individual was seen under similar circumstances at a different locality in Yapo by LDCF on 14 February 1988. The plumage description taken at the time matches the foregoing exactly. The only addition was that the cere of this individual was noted as grey.

Another record of this morph has been documented from the Lower Guinea forest block, in Gabon. Brosset & Erard (1986) report a sighting, in April 1985, of a 'mixed' pair, of which one of the birds showed uniformly grey underparts.

It thus appears that the claims of the existence of a melanistic morph of the Long-tailed Hawk are indeed well founded.

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Food delivery and chick provisioning in cypseloidine swifts

by Charles T. Collins

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Swifts (Apodidae) catch all of their arthropod food on the wing. These items, mostly insects, are brought back to nestlings in two strikingly different ways which in turn affect the kind of food adults capture, their foraging range and chick provisioning rate.

Swifts and swiftlets in the subfamilies Chaeturinae and Apodinae bring the food items back to nestlings in a consolidated mass or bolus glued together with saliva and carried in the mouth. For *Apus apus*, an individual bolus typically weighs 0.70–1.75 g, occasionally 2.0–2.5 g (Lack & Owen 1955, Martins & Wright 1993), and contains 90–850 individual prey items (Lack & Owen 1955, Collins unpublished). A bolus can contain as many as 1500 very small insects such as aphids (Homoptera, Aphididae) (Lack & Owen 1955). Although food boluses can occasionally consist of only one or a few types of insects, they typically contain representatives of numerous orders and families of insects and ballooning spiders (Hespenheide 1975, Collins 1968, Tarburton 1986a, Bull & Beckwith 1993). The food bolus causes a visible distension of the floor of the mouth which is observable in swifts returning to feed nestlings (Lack 1956, Arn-Willi 1960, Cramp 1985). The adult inserts its bill into the open mouth of the begging chick (Lack 1956, Arn-Willi 1960) and usually passes most or all of the bolus to a single older chick; the bolus may be divided among several very small chicks (Lack & Lack 1951). Swifts are efficient foragers and can rapidly gather a bolus of food. Lack & Lack (1951) report individual *Apus apus* gathering 1.2 g and 1.7 g of insects in 47 and 64 minutes respectively. Feeding rates in the Chaeturinae and Apodinae are highly variable, ranging from 3–4 feedings per hour to 4.6–10.7 feedings per 10 hours (Moreau 1942a,b, Lack & Lack 1951, Collins 1968, Tarburton 1986b, Bull & Collins 1993). Feeding rates are correlated with both brood size and weather-related differences in food abundance (Lack & Lack 1951, Lack & Owen 1955, Tarburton 1986b). The mode of food delivery, boluses carried in the mouth, directly limits the amount of food which can be brought back per feeding trip and, indirectly, the effective foraging range. It would be inefficient for such birds to expand their foraging range to the extent that excessive time and energy are spent in transport of individual boluses from distant foraging areas. The Ecological Cost of Transportation (Garland 1983) or "percent of total daily energy expenditure which is consumed by locomotion" to and from foraging areas (Whitacre 1992) would become unacceptably high. Additional theoretical discussion of foraging efficiency in birds and the trade-offs between load size and foraging distance is presented by Krebs & Davies (1993).

The 12–13 species of New World swifts in the genera *Cypseloides* and *Streptoprocne* (Sibley & Monroe 1990, Chantler & Driessens 1995) have many distinctive morphological and breeding characteristics warranting their separation as the subfamily Cypseloidinae (Brooke 1970). Included is their tendency to nest in dark damp locations, frequently near or behind waterfalls (Knorr 1961, Snow 1962, Collins 1968, Marin & Styles 1992). It has also been noted that the rate of food delivery to chicks is notably low. In the Chestnut-collared Swift *Cypseloides rutilus*, feeding intervals were usually longer than 100 minutes (Collins

1968). Similarly, in the Black Swift *Cypseloides niger* Michael (1927) noted several hours between feedings and possibly only a single feeding late in the day or at dusk. The larger White-naped Swift *Streptoprocne semicollaris* and White-collared Swift *Streptoprocne zonaris* also appear to make only a single feeding trip to the nest per day (Whitacre 1992).

Another subfamilial difference which has not been given attention is the mode of food delivery to chicks. The cypseloidine swifts do not carry food for the chicks as a saliva-coated bolus in the mouth, but as an unconsolidated mass in the oesophagus. The distended oesophagus in White-naped and White-collared Swifts was 100–135 mm long, 26 mm in diameter, and contained 538–1078 insects 80.7% of which were flying ants (Formicidae: *Azteca*, *Solenopsis*) (Rowley & Orr 1962, 1965). There also appeared to be a "fringed valve situated immediately behind the glottis" (Rowley & Orr 1962). The mean weight of the oesophagus contents of White-collared and White-naped Swifts was 5.0 g and 6.7 g, and they contained up to 1044 and 1218 prey items respectively (Whitacre 1992). Collins & Landy (1968 reported masses of Hymenoptera (72.4% of one species of winged ant) in the "throat" (=oesophagus) of two adult Black Swifts collected at night near nests in Veracruz, Mexico. Captured individuals of several swifts in both *Cypseloides* and *Streptoprocne* readily regurgitated masses of insect food, 35–100% again being winged ants (Foerster 1987, Marin & Styles 1992, Whitacre 1992, Collins unpublished). Other swarming insects as fig-wasps (Hymenoptera, Blastophagidae) and termites (Isoptera) were also prominent in some food samples (Collins 1968, Whitacre 1992, Marin & Styles 1992).

The preponderance of swarming insects, particularly lipid-rich winged ants, in the diets of *Cypseloides* and *Streptoprocne* swifts ranging in size from 20 to 180 g body mass suggests that the Cypseloidinae are foraging specialists feeding on prey that occur in dense, but possibly widely dispersed, patches. These swifts would be expected to forage over wider ranges than other swifts (Chaeturinae, Apodinae) to locate such food sources. This seems to be true for several species of *Cypseloides* (Collins pers. obs.) and has been confirmed by radio telemetry for *Streptoprocne* (Whitacre 1992). The ability to bring back in the oesophagus larger quantities of food, than could be accommodated as individual boluses carried in the mouth, would seem to involve a critical morphological adaptation enabling these swifts to utilize both distant and patchily distributed prey resources. I suggest that a single large mass of food carried in the oesophagus can be used to provision a chick in the form of multiple feedings at one time, or sequential feedings over an extended period of time, thereby compensating for the infrequent feeding trips to the nest which is typical of these swifts.

Recent observations support these suggestions. On 19 July 1997, at a breeding colony of Black Swifts located at Mosse Brae Falls near Dunsmuir, Siskiyou Co., California, an adult returned to the nest at about 19.40 local time. Shortly afterwards it was seen to make open-mouth gaping and stretching motions. The mouth was clearly empty of food at this time. Following this, the floor of the then closed mouth bulged out with regurgitated food which was promptly fed to a half-grown nestling. In rapid succession, over the next 2–3 minutes 10 more similar sized regurgitations were fed to the chick. In each case, prior to feeding the chick, the floor of the mouth appeared distended, approximately to the same extent as in swifts carrying a single food bolus, and empty afterwards. In total, the chick appeared to receive, in one bout of provisioning, the equivalent mass of food as many individual boluses delivered throughout the day. Multiple feedings over a period of eight minutes has also been observed in British Colombia (Grant 1966). On 8 August 1987, at a nesting site at Lawler Falls in southern California (Foerster & Collins 1990, Collins & Foerster 1995) an adult Black Swift was photographed feeding its chick at dusk shortly after returning to the nest for the night. What appeared to be the same adult again fed the chick over an hour later, well after dark (Collins & Peterson 1998). Thus multiple feedings over a longer period of time are also confirmed. Elsewhere, Black Swifts collected after dark, at a nest, had large quantities of food in their oesophagus (Collins & Landy 1968). This also suggests that the chick would be provisioned one or more times during the night.

Hespendeide (1975) was perhaps the first to suggest that some swifts might be specialists on a limited array of species, particularly calorically-dense swarming insects. However, he suggested that this was limited to a few of the very large species, as those in *Streptoprocne*. Whitacre (1992) verified that swarm feeding was typical of both White-collared and White-naped Swifts but related it mostly to patchily distributed food resources in seasonally dry climates and the development of coloniality. I think there is now enough information on swarm feeding by all species of the Cypseloidinae studied to date to suggest a stronger phylogenetic component to this behavioural specialization, and its morphological correlate, of carrying larger quantities of food in the expanded oesophagus and provisioning chicks at longer intervals. Swarm feeding, however, may not be limited to the Cypseloidinae but also appears in several species of swiftlets (*Aerodramus*) (Harrison 1976, Collins & Francis, unpublished). Studies of the foraging range and feeding rate in these species are clearly called for.

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The taxonomic status of *Halcyon enigma* on the Talaud islands, Indonesia

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The kingfisher *Halcyon enigma* Hartert, 1904 is endemic to the Talaud islands, a small archipelago located between Sulawesi and the Philippines. The unresolved taxonomic position of *Halcyon* kingfishers on these islands partly reflects a lack of recent fieldwork, but new information gathered by the authors in September and October 1995 and January to March 1997, suggests that *enigma* should be regarded as a species, and not a subspecies of *Halcyon chloris*.

On the three largest islands in the Talaud group, Karakelang, Salibabu and Kabaruan, kingfishers resembling Collared Kingfisher *H. chloris* have been collected, specimens of which can be fitted into two exclusive size ranges. The small specimens were initially thought to be forms of Sacred Kingfisher *Halcyon sancta* (Meyer & Wiglesworth 1895) or immature *H. chloris* (Meyer & Wiglesworth 1898).

These conclusions were shown to be erroneous, and the small form was first described as a separate species, *Halcyon enigma*, by Hartert (1904). His conclusions were based on eight specimens with bills 35–40 mm long against 45–50 mm in *chloris* specimens from the Talaud group, and wings 94–98 mm as opposed to 108–120 mm in *chloris*. Hartert noted "Whether this small form on Talaut is a geographical representative of *chloris* (though both are found on Talaut, one might only breed there, the other be an occasional immigrant), or a perfectly developed species coexisting with typical large *chloris*, or a local aberration—for it is only known on Talaut—it will be desirable to have a name for it".

Oberholser (1919) treated both large and small forms as *Halcyon chloris enigma*, concluding that an unusual variation in size occurs, although he examined only one specimen of *enigma*. Such a large size dimorphism within a population of birds is unknown (Eck 1978), and Oberholser's conclusion can be discounted.

Eck (1978) reviewed the taxonomic position of the two forms, having for examination 12 small specimens from Karakelang and 21 large specimens from Karakelang, Salibabu and Kabaruan. The small birds were shown to be close to *H. c. chloris* of Sulawesi in colouration, whilst the larger birds were closer to *H. c. collaris* of the Philippines or *H. c. teraoki* of Palau. Measurements were taken from the specimens and it was shown that an uninterrupted series can be made from skins. Eck therefore concluded that the two forms on Talaud were conspecific; *enigma* represented a small form of *chloris* on Talaud, whilst larger birds were named *Halcyon chloris* ssp.

Greenway (1978) suggested that large birds could be migrants from Sulawesi that had lingered on Talaud, but the seasonal movements of Sulawesi and Philippine birds need further investigation (White & Bruce 1986).

Other reviews noted that if both forms were shown to breed on the islands and behavioural differences are observed, *enigma* would represent a separate species (Fry 1980, Eck 1978). Bruce visited Salibabu in 1978 and "found apparent ecological separation, with one form in the forested areas (presumably *enigma*) and others in more characteristic coastal habitat" (White & Bruce 1986).

Recent authorities (Andrew 1992, Sibley & Monroe 1990) list *enigma* as a separate species. In recent years researchers have failed to record the species on Karakelang (Taylor 1991, Bishop 1992, D. A. Holmes *in litt.*), although Rozendaal collected 6 specimens in the period 12–25 February 1985 (R. W. R. J. Dekker *in litt.*).

In 1995 and 1997 *chloris*-type birds were observed on both Salibabu and Karakelang, and our fieldwork supported the suggestion that the small form on Talaud should be regarded as a separate species, *Halcyon enigma* and the larger form as *Halcyon chloris*. This conclusion is based on new information gathered in four areas and a review of the published data. In the discussion that follows, small birds are named *enigma* and large birds *chloris*.

Field characters

The two forms were easily identifiable in the field by the differences in colouration and size noted by Eck (1978). The following description is based on features noted in the field.

Enigma. Eye dark; legs dark; bill - upper mandible black, lower mandible basal half horn, distal half black. Clean white underparts, slightly washed with buff on the throat. The white extends round the neck to form a broad, well marked collar, bordered above by black, the black not extending onto ear-coverts. Small white spot on the nape. Crown, forehead, ear-coverts and upper nape are uniform deep bottle-green with a blue tinge. Loral patch is white and extends to reach the eye. Back and mantle are dirty olive green, contrasting with the green–blue of the wings. The wings are darkest on flight feathers; scapulars same colour as back and mantle; coverts light blue and slightly iridescent. Rump electric blue, lighter than iridescent blue tail.

Chloris. In contrast has a black band extending from the eye to the black collar. The upperparts and wings of *chloris* are a uniform blue without green hints, and *chloris* has only a small white loral patch, which never reaches the eye.

In the field *enigma* is most easily separated by its shorter bill that appears less heavy, partly because the lower mandible is less protruding and more extensively coloured horn from the base. *Enigma* also has a noticeably shorter tail compared to *chloris*. *Enigma* characteristically adopts a slightly hunched posture when perched, leading to a dumpy appearance.

Ecological separation

As suggested by White & Bruce (1986), the two forms were found to show clear ecological separation. *Enigma* was found only in forest or forest edge habitats, and is commonest in undisturbed forest on Karakelang. It was also commonly encountered in degraded or secondary forest, and so seems able to withstand some habitat alteration, although in cultivated areas it is apparently out-competed by *chloris*.

Enigma was most commonly observed in the mid-canopy, between 6 and 15 m above ground, and was not seen in the sub-canopy, being replaced in this zone by the Ruddy Kingfisher *Halcyon coromanda*. At rest birds habitually perched in the mid-canopy layer, but were observed in the crowns of trees of heights up to 20 m. Birds were seen feeding along rivers and streams, as well as within forest, utilising a suitable vantage point to scan the ground below, before diving down onto prey. Prey items appeared to include small grasshoppers and river snails.

Chloris was noted on Salibabu and Karakelang in coastal habitats typical of the species, including mangroves, cultivated areas, such as coconut plantations and low-lying secondary scrub habitats. The species was commonly observed in these areas and was even found in towns, perching on electricity cables.

Sympatric breeding

It has been suggested that *chloris* are migrants to Talaud from Sulawesi or the Philippines and *enigma* are resident breeders on the islands (Eck 1978, Greenway 1978). As noted by Fry (1980), if both forms are shown to be resident and breeding on Talaud, *enigma* must be accorded specific status.

There are now dated specimens and field observations of *enigma* between January and November and of *chloris* between January and November; the absence of records for either form in December simply reflects the fact that no ornithologists have visited Talaud in this month. If emigration were taking place, some seasonal variation in relative encounter rates would be expected; in 1995 and 1997 *enigma* and *chloris* were observed at similar frequencies in both years. Hence it may be concluded that both *enigma* and *chloris* are resident on the islands.

Previous observations of *chloris* indicate that its breeding season is August–October in Sulawesi (White & Bruce 1986) and April–June in the Philippines (Dickinson *et al.* 1991). All published sightings of *chloris* on Talaud therefore fall within the known breeding seasons of adjacent populations, suggesting that the population is resident on Talaud and breeds. Evidence of a breeding population of *chloris* on Karakelang was provided when a single juvenile bird was observed near the village of Bengel (4°14′N, 126°49′E) on 23 September 1995. The bird had been captured by local children, who reported it had recently fledged from a site near the village. The bird was identified tentatively as *chloris* on size, in particular the large bill which, although not measured, even in a young bird appeared proportionately too large for *enigma*, and as a juvenile by a faint buff wash to the underparts and brown–buff freckling on collar and breast. The September date falls within the range given by White & Bruce (1986) for breeding on Sulawesi. In late March 1997, on a tiny offshore islet near Dapalan, Karakelang (4°24′N, 126°55′E), a pair of *chloris* were seen displaying, both birds perching close together on a tree branch, simultaneously uttering a quiet, harsh toned *kur kur kur* call whilst twisting heads from side to side, alternately stretching and pointing the bill up or down.

No conclusive proof of breeding by *enigma* was obtained, but during late September and October 1995, birds were paired and holding territory in central Karakelang. Males were seen aggressively defending territories from encroaching individuals and on one occasion pair-bonding behaviour was observed; a presumed male caught a prey item, flew to join the female and presented the prey to her before both birds flew away.

Vocalisations

The two forms on Talaud are separable by call. *Enigma* most commonly gives a repetitive *kee kee kee kee kee*, each note usually repeated five times followed by a brief pause followed by 5 more notes; occasionally birds give 4 or 6 repeats; there is no variation in pitch and all notes are of equal length. *Chloris* also gives a version of this call, but there are always more repeats, sometimes up to 20, but more usually 7 to 10 notes and the call note is slightly disyllabic. The call of *enigma* is noticeably higher in pitch than *chloris*, and the note is monosyllabic.

A second call given by *enigma* consists of a disyllabic *ki-kac* or *ki-kee*, the first note hard and grating, rising in pitch, whilst the second note descends in pitch slightly, is more drawn out, but cuts off sharply. This call is similar to a double note call commonly given by *chloris*, but the latter species always produces a stronger, harsher note of lower pitch and the sequence is given at a greater speed and is not as stuttering as that of *enigma* usually is. This characteristic double note of *chloris* can be transcribed as *kee-ka*, the emphasis being on the second note.

On 2 March 1997 a pair of *enigma* were repeatedly chased and harried by an adult Black-naped Oriole *Oriolus chinensis* in the lower canopy of a 15 m tall tree. The kingfishers responded with a rapid, loud and monosyllabic alarm call *ki ki ki ki ki ki* lasting for approximately 5 or 10 seconds.

Discussion

Based on the evidence from recent fieldwork, in addition to that already available from specimens, *Halcyon enigma* should be accorded specific status. The two forms found on Talaud are morphologically similar; vocalisations, plumage and size differences alone might not provide sufficient basis on which to separate them. However, since there is clear ecological separation of the forms, with both almost certainly breeding residents on the islands, it seems that they exist sympatrically and must be regarded as distinct species.

Enigma is the only species endemic to the Talaud islands and listed as Near-threatened (White & Bruce 1986, Collar *et al.* 1994). Its conservation status is not of immediate concern, but recent developments on Karakelang, notably the establishment of a logging concession in the north of the island, require the species' status to be monitored. *Enigma* is dependent on forest, but on Karakelang large areas of habitat still exist, with approximately 36 000 ha having protected status (PPA 1980). In addition the species does seem to be able to survive in heavily degraded forest habitat. Since deforestation is already widespread on Salibabu and in particular Kabaruan, it would be interesting to assess the present distribution of *enigma* on these islands. A clearer indication of the species' ability to adapt to secondary habitats, in competition with *chloris*, would then be available and predictions of the possible effect of logging on the species' population would be easier to assess.

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A hybrid munia?

by S. (Bas) van Balen

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In *Bull. Brit. Orn. Cl.* 116: 137–142, R. L. Restall described in detail the new munia *Lonchura pallidiventer*. The bird has a very distinctive appearance and seems to make a good (and attractive) new species. However, I feel that the author did not convincingly exclude the possibility of a hybrid in suggesting the species' authenticity. The following incongruities were found in his account.

1. The birds described show a suspicious amount of variation in plumage pattern, and the following characters in particular were apparently not consistent and not linked with sex: (a) presence or absence of black tips to the under tail coverts; (b) presence or absence of white spots on the breast; (c) colouring of heel barring: chestnut/black or buff/black; (d) colour of lower breast: black or chestnut.

2. It appears that no offspring were produced by the birds, some of which were reportedly kept in captivity by apparently expert munia breeders for five years. Though munias are not always prolific breeders, and some even reputedly difficult, this low fertility (or perhaps sterility) of the birds, suggests hybrids.

3. Though hardly any part of Kalimantan has been explored very exhaustively, the hinterland of Banjarmasin is one of the best surveyed areas, and new species are quite unexpected from this region.

Whilst looking at the illustrations of Scaly-breasted Munia *Lonchura punctulata* and White-bellied Munia *Lonchura leucogastra* (both depicted very conveniently on one plate by Clement *et al.* 1993) I could not help thinking of Cream-bellied Munia being the perfect cross of these two species. The southern Kalimantan race of White-bellied, *castanota*, is very distinct from the other races because of its chestnut or deep warm brown upper parts, contributing even more to the rich brown uppers of Cream-bellied. Moreover, both species co-occur in South Kalimantan and are scarce (Smythies 1981; Holmes & Burton 1987), which would promote hybridization as choice of mates is restricted (see Campbell & Lack 1985). The Cream-bellied's slightly larger size than either of these species can be explained by hybrid vigour producing larger and stronger birds (Campbell & Lack 1985).

Two sex-linked differences were described by Restall: (1) the grizzled lines on the upper part of the cream belly, which are also found in both sexes of White-bellied; (2) slight barring on the lower rump, which is found in both sexes of Scaly-breasted. This may be consistent with subtle sexual differences found in both, supposedly monochromatic 'parent' species.

At least three things should be done to 'test' this new species. 1. Breed the new species and examine its fertility and consistency of specific characters in their offspring, 2. Cross-breed White-bellied and Scaly-breasted Munias, 3. Find the birds in the wild. Especially the last is of importance because it remains questionable whether or not these birds, if hybrids, are of a natural provenance or a product of genetic manipulation by a local aviculturist. High prices are sometimes paid for rare, exotic bird species, and it is conceivable that especially new and attractive-looking forms would make good prices on the national and international market. The relatively large number of birds during the last five years (13 specimens), as reported by the author, suggests the latter possibility.

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The distribution and type locality of the extinct Slender-billed Grackle *Quiscalus palustris*

by A. Townsend Peterson

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The Slender-billed Grackle *Quiscalus palustris* was described by Swainson (1827), based on specimens collected by W. Bullock. The type locality was described as "marshes and borders of the lakes round Mexico", which was long interpreted as indicating the large lakes that formerly existed within the Valley of Mexico itself. However, this interpretation, and indeed the type locality of the species itself, were changed by Dickerman (1965), and accepted by most subsequent authorities (e.g. American Ornithologists' Union 1983).

Dickerman (1965) provided convincing evidence that the species also occurred in the marshes east of the Valley of Mexico along the headwaters of the Río Lerma. E. A. Goldman collected the species at Lerma in 1904, describing the habitat as follows: "The marsh is filled with a varied assortment of aquatic vegetation, including tules, sedges, and many submerged species . . . The marsh is an important watering place for migratory waterfowl, and a breeding area for resident waterfowl" (Goldman 1951). Wilmot W. Brown, Jr., collected additional series at "San Mateo" in 1910. Dickerman (1965) argued that this locality also was in the Lerma marshes; his identification of this site as San Mateo Atenco, 13.5 km ESE of Toluca, is borne out by localities given on a few of Brown's labels, which read "Mexico, Toluca (13.5 km ESE; San Mateo)". Hence, the occurrence of Slender-billed Grackles in the Lerma marshes is well established (Dickerman 1965, Hardy 1967).

However, Dickerman (1965) went on to argue that the species never occurred in the Valley of Mexico, and that in fact no grackle had occurred there until the 1950s, when a population of Great-tailed Grackles *Q. mexicanus* was established in Xochimilco. Nevertheless, the marsh habitats in the Valley of Mexico were of impressive dimensions. In 1520, Hernando Cortés described his first view of the valley, in the vicinity of Ixtapalapa, as follows (Morris 1928):

> There are trees and flowering shrubs, and with the lake there are innumerable fish and birds, such as wild duck, wigeon, and other waterfowl, and in such number that they almost cover the surface of the water.

Descriptions provided by several other sixteenth century visitors to the Valley of Mexico (e.g. Gage 1980) support Cortés' view of its immense marshes. After 300 years of European presence, however, in the early 1800s, the valley was described by Mme. Calderón de la Barca (1987; translation mine) as follows:

> The scenery on this side of Mexico is arid and flat, and where the waters of the Lagunas, covered with their gay canoes, once surrounded the city, forming canals through its streets, we now see melancholy marshy lands, little enlivened by great flights of wild duck and waterfowl.

Clearly, these marshes would originally have constituted ideal habitat for Slender-billed Grackles, much as in the case of the Nicaraguan Grackle *Q. nicaraguensis* and Lake Nicaragua, but were on their way to extinction by the mid-nineteenth century.

The type locality provided by Swainson (1827) indicates that the type material was indeed taken in the Valley of Mexico. In the same contribution, Swainson reported on 65 species taken in Mexico, at sites including "near Vera Cruz", "Table land", Real del Monte, Temiscaltipec [*sic*], "Sides of the Cordilleras", and "maritime land"; one other specimen was described as having been purchased in the city of Mexico. Only that of the Slender-billed Grackle was referred to as "the lakes round Mexico", suggesting that the material was *not* just another haphazardly labelled record from Temascaltepec or en route to or from. Remembering that in Mexico, the term "Mexico" frequently refers to the city, Swainson's type locality could easily refer to the lakes and marshes of the Valley of Mexico.

Apart from the type specimen, however, other records exist of Slender-billed Grackles from the Valley of Mexico. Herrera (1891; translation mine), in a report on the vertebrates of the Valley of Mexico, listed the occurrence of Slender-billed Grackles as follows:

> In the marshy areas, among mammals, *Arvicola pinetorum*, *A. mexicana*, and *Mustela brasiliensis*; among birds, besides cranes and waterfowl, *Pandion haliaetus* (Fishing Hawk), *Ceryle alcyon*, *Ceryle cabanisi* (kingfisher), *Sayornis nigricans*, *Sturnella magna mexicana*, *Anthus ludovicianus*, *Quiscalus tenuirostris* [=*Q. palustris*], *Melospiza fasciata mexicana*, *Cinclus mexicanus*, *Anthus ludovicianus*, *Cistothorus palustris* . . .

Also, Herrera (1889; translation mine) made the following footnote to a list of the vertebrates of the Valley of Mexico:

> New research has confirmed what I have already said about this species being confined to Xochimilco. According to the Biologia [Salvin and Godman's *Biologia Centrali-Americana*], it is not *Quiscalus macrourus* [=*Q. mexicanus*], but *Q. tenuirostris* Sw., or *Scaphidurus palustris* Sw.
>
> The grackles of Xochimilco prefer to feed on corn, which is as abundant there as elsewhere in the valley.

Hence, given reports of the species in the scientific literature and the abundant available habitat, the former occurrence of Slender-billed Grackles in Xochimilco, at the southern end of the Valley of Mexico, seems certain, and the type locality is probably correctly interpreted as referring to the Valley of Mexico.

Since the arrival of Europeans, however, the great lakes of the Valley of Mexico have been severely degraded. Worst of all, between 1609 and the first part of the present century, a series of canals was cut to drain the lakes, and the marsh habitats there have been destroyed completely. This destruction probably led to the species' extinction in the Valley of Mexico prior to the twentieth century, leaving only the Lerma populations extant when Goldman and Brown were collecting. The Lerma populations probably did not last much longer than 1910, as no substantially later records are known.

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First record of the Striped Manakin *Machaeropterus regulus* in Guyana

by David J. Agro & Robert S. Ridgely

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While examining specimens in the collection of the Academy of Natural Sciences of Philadelphia (ANSP), we were surprised to find a specimen of *Machaeropterus regulus* that, for over 100 years, had been incorrectly identified as a Tiny Tyrant-Manakin *Tyranneutes virescens*. This specimen represents the first and, to our knowledge, only record of *M. regulus* for Guyana.

The Striped Manakin *Machaeropterus regulus* is an uncommon to locally fairly common bird of humid forest and mature secondary woodland in much of northern and northwestern South America; an isolated population occurs in eastern Brazil (Ridgely & Tudor 1994). The species has not been recorded in northeastern South America (e.g. no records from Guyana: Chubb 1921, Snyder 1966; Surinam: Haverschmidt & Mees 1994; French Guiana: Tostain *et al.* 1992). Apart from the isolated Brazilian population, the previous easternmost record was from Río Surukún (La Faisca) at the headwaters of the Río Caroní in southern Bolívar, Venezuela (Phelps & Phelps 1950).

The specimen (ANSP 51442) is a female collected by Henry Whitely Jr. (1844–1893) on 10 October 1890 near Ourumee in what was then British Guiana. Ourumee is another name for the Merumé Mountains, 5°48′N; 60°6′W (Stephens & Taylor 1985). Based on range, we have tentatively assigned this specimen to *M. r. aureopectus*, a subspecies described by Phelps Gillard (1941) on the basis of a single male from Kabadiscaña in southern Bolívar, Venezuela.

Although *M. regulus* is difficult to see, it should be easily detected in the field by its calls. A number of observers (RSR, Mark, B. Robbins, Tristan J. Davis, Davis Finch), who are familiar with these calls, have visited potentially suitable areas for *M. regulus* in Guyana over the past five years without reporting this species. This suggests that *M. regulus* is local and rare in Guyana, but observers should be aware that it could occur elsewhere in the Guianas.

This observation was made in connection with our recent fieldwork in Guyana for the Iwokrama Faunal Survey made possible through the support of the Government of Guyana, the Iwokrama International Centre for Rain Forest Conservation and Development, the United Nations Development Programme, and the University of Guyana. We thank Graham G. Watkins for his help in coordinating the Academy's field activities in Guyana, Vicki Funk and the Smithsonian Institution's Biodiversity of the Guianas Program for its support in Georgetown, and Sally B. Conyne and Leo Joseph for their suggestions in preparing the manuscript.

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The first documented nest and eggs of *Merops muelleri mentalis*

by Michael F. Carter & Robert W. Dickerman

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Gatter (1988) noted that the Blue-headed Bee-eater *Merops muelleri mentalis* is a resident breeder of Liberia. That status was assumed since the nests or eggs of the Upper Guinea subspecies had never been found. Gatter (1988) also listed *M. m. mentalis* in a category for which all possible information about the species in Liberia is needed.

Nests and eggs of the Lower Guinea subspecies, *M. m. muelleri*, have been found on three occasions (Bannerman 1955, Fry 1984, Fry *et al.* 1992). These nests were described as 55–60 cm deep burrows with terminal, oval, unlined egg chambers. Nests were found in a roadside bank, in the wall of a sawyer pit in Cameroon, and along a forest path in Gabon. One nest from Cameroon contained eggs in January, and nestlings in February (Fry *et al.* 1992). In Gabon, nest building began in October and young fledged in February. Eggs from Cameroon were described as white and subspherical, measuring 23.2 × 20.1 and 23.7 × 20.0 mm (Fry *et al.* 1988).

M. m. mentalis was first recorded in Liberia at Mount Nimba by Colston & Curry-Lindahl (1965). During their studies 10 specimens were obtained, none were in breeding condition, but females in August and September with ovaries measuring 7 mm might have been approaching breeding condition. Birds captured in July were in the middle to late stages of wing moult, indicating they might have just finished nesting.

A nest of *Merops muelleri mentalis* was found on 8 March 1990 by MFC while walking along a shallow, mostly dry stream bed. The stream bank was *c.* 30 cm tall and was probably within 3 km of shallow running water but none was seen in the immediate area. The habitat was primary semi-deciduous rainforest with a canopy approaching 25 m in height and a dense growth of understory trees near the stream bed. The nest locality was *c.* 11 km north of Zigida (Lofa County) at 540 m in the Lofa Mountains of northern Liberia.

The nest burrow was in a gently sloping portion of a sandy bank *c.* 45 cm above a small pool of water. It was *c.* 40 cm deep with a 45 mm opening. A bird flew from the burrow and perched in the lower limbs of an understory tree allowing close observation and positive identification. The two eggs were subspherical, cream-white (speckled brown from earth), and both measured 22.5 × 18.0 mm; they were unincubated. They have been deposited in the American Museum of Natural History, New York.

Details accord closely with nests and eggs of the nominate race, but the Liberian nest was in a gently sloping (not steep) bank, and its burrow was shallower. Nests of most bee-eater species vary in burrow depth and site characteristics (Fry *et al.* 1992).

We thank Alexander Peal, head of Wildlife & National Parks of the Forestry Development Authority (Liberia), for assistance during the course of this work. Funding was provided by National Geographic Society and American Museum of Natural History.

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Addresses: M.F.C.—Colorado Bird Observatory, 13401 Piccadilly Road, Brighton, Colorado 80601, U.S.A. R.W.D.—Biology Department, Museum of Southwestern Biology, Albuquerque, New Mexico 87131, U.S.A.

Monotypy of *Francolinus griseostriatus*

by N. J. Collar

Received 20 June 1997

The Grey-striped Francolin *Francolinus griseostriatus* is one of a suite of species endemic to the escarpment zone of western Angola, where it occurs in two apparently disjunct populations, a northern one extending from Cuanza Norte and Malanje to Cuanza Sul, and a southern one confined (after a boundary extension that embraced northern Huila) to the province of Benguela (Hall 1961, 1963, Pinto 1983, Urban *et al.* 1986).

Pinto (1983) treated these two populations as racially distinct, based on eight specimens from Benguela (in the Instituto de Investigação Científica de Angola, Luanda) having generally darker underparts, with more cinnamon than buff ("fulvo-esbranquiçado") shading to the feather edges and broader, deeper brown feather centres, and with undertail coverts marked with darker spots and bars. He also detected a very slight increase in size in these birds, albeit with much overlap. However, he felt unable to give them a name for want of immediate comparative material.

Ironically, outside Angola it is the want of southern birds in collections that has delayed progress in this matter, but one was located in the Carnegie Museum of Natural History (CM), Pittsburgh, and another proves to exist in the series of six held by the American Museum of Natural History (AMNH), New York. In May 1997 the Carnegie bird, CM 108689, a female from Chingoroi, Benguela, 13°37′S 14°01′E, taken at 670 m in October 1930 by R. and L. Boulton, was sent to New York for examination alongside the five adult AMNH specimens (541414, female, Canhoca, 9°15′S 14°41′E, December 1903, by W. J. Ansorge; 348799, male, Ndala Tando, 9°18′S 14°54′E, undated, no collector; 541410, female, and 541411, male, Ndala Tando, September 1908, by W. J. Ansorge; 541413, male, Bongo River, Benguela, 13°25′S 14°40′E, August 1904, by W. J. Ansorge). All coordinates are from Traylor (1963).

From above, no differences in these six birds are apparent that would not be attributable to minor individual variation. From below, the two most distinct are AMNH 541414 and 348799, which have the tawny markings on the breast, flanks and belly reduced to fairly narrow streaking. By contrast, 541410 and 541411 possess substantially broader, blotch-like markings on the breast. However, the last three are from the same locality, and the first is from a site not far distant, suggesting that either individual or age-related factors are in play.

More significantly, 541410 and 541411 are little if at all different from 541413 and CM 108689. It is true that the tawny markings on the undersides of the CM bird appear very slightly broader and more extensive than on the other specimens, most notably 541410; but the differences between 541413 and 541411 are entirely negligible and militate heavily against any racial separation of the two populations they represent. Nothing in the shading of the markings on the underparts or on the undertail coverts on any of the specimens indicated any consistent differences between the representatives of the two populations. No measurements were taken, although wing-lengths were qualitatively compared and found to be very similar.

If heavier marking on the undersides is a sign of greater age, then the only way in which Pinto's view might yet prevail is if AMNH 541410 and 541411 are old birds showing the broadest feather blotching that representatives of the northern population ever achieve, while 541413 and CM 108689 are young birds yet to acquire the distinctiveness that Pinto recognised in the Luanda series. This seems rather improbable, however, and certainly for the time being *Francolinus griseostriatus* must remain monotypic.

Robin Panza at Carnegie Museum arranged the loan of the CM specimen to New York, and Paul Sweet and Christine Blake of the American Museum of Natural History respectively allowed access to material there and returned the loan; Pamela Rasmussen also examined the material and concurred with the judgement expressed above. Their kindness is deeply appreciated.

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Address: BirdLife International, Wellbrook Court, Girton Road, Cambridge CB3 0NA, U.K.

The correct citation of *Coragyps* (Cathartinae) and *Ardeotis* (Otididae)

by Steven M. S. Gregory

Received 2 October 1997

Coragyps (Cathartinae) and *Ardeotis* (Otididae) were first used and established in the same work, Le Maout (1853). *Coragyps* appears on pp. 57 (in key) and 66, *Ardeotis* on pp. 339 (in key) and 340. However, *Coragyps* is ascribed to Geoffroy Saint-Hilaire, by Gray (1855), Peters (1931) and Stresemann & Amadon (in Peters 1979), while *Ardeotis* is ascribed to Le Maout, by Meinertzhagen (1954) and Del Hoyo *et al.* (1996). Clearly, one of these citations is in error. *Coragyps* is a well established genus and it is unlikely that any recent author would question the usual citation. Stresemann & Amadon (in Peters 1979) appear not to have looked at the original reference, but relied on seemingly well-founded previous designations. Thus they refer to 'Geoffroy Saint-Hilaire' as being 'in Le Maout', which implies that Geoffroy Saint-Hilaire wrote that particular section of the book, whereas Le Maout was quoting from unpublished material. *Ardeotis*, on the other hand, is entirely absent from all of the standard references, and its replacement of *Choriotis* G. R. Gray (1855) is poorly documented.

It is therefore proposed that the citation for *Coragyps* should be in agreement with that for *Ardeotis* and that they should read:

Coragyps Le Maout, 1853, Histoire Naturelle des Oiseaux suivant la Classification de M. Isidore Geoffroy Saint-Hilaire, pp. 57 (in key), 66.

Type by monotypy, *Coragyps urubu* "Isid. Geoffroy" = *Vultur atratus* "Wilson" Bechstein.

Ardeotis Le Maout, 1853, Histoire Naturelle des Oiseaux suivant la Classification de M. Isidore Geoffroy Saint-Hilaire, pp. 339 (in key), 340. Type by monotypy, *Otis arabs* Linnaeus.

Acknowledgements

I should like to thank Michael Walters, NHM, Tring, Dr. Alan Knox and Dr. David Snow for their generous help.

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Stresemann, E. & Amadon, D. 1979. In *Check-list of Birds of the World*, vol. 1., 2nd edition. Museum of Comparative Zoology, Cambridge, Mass.

* = Examined by Michael Walters.

Address: 35 Monarch Road, Northampton, Northamptonshire NN2 6EH, U.K.

NOTICE TO CONTRIBUTORS

Papers are invited from Club Members or non-members, especially on taxonomic and distributional topics; descriptions of new species are especially welcome and may be accompanied by colour photographs. **Two copies** of manuscripts, typed on one side of the paper, **double spaced and with wide margins**, should be sent to the Editor, Prof. Chris Feare, 2 North View Cottages, Grayswood Common, Haslemere, Surrey GU27 2DN, UK. All contributions, **including *In Brief* articles**, should follow the style of main papers in this issue of the *Bulletin*.

A contributor is entitled to 10 free offprints (16 if 2 or more authors) of the pages of the *Bulletin* in which his contribution, if one page or more in length, appears. Additional offprints or offprints of contributions of less than one page may be ordered when the manuscript is submitted and will be charged for. Authors may be charged for proof corrections for which they are responsible.

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Only Members of the British Ornithologists' Union are eligible to join the Club, and to receive (postage free) four quarterly issues of the *Bulletin*, and the annual index, for an annual subscription of £12 (or U.S. $26). Applications, enclosing the annual subscription, should be made to the Hon. Secretary (address as below).

The 1998 List of Members, and addresses will not be published with the *Bulletin* this year, but copies are available, on application (with a remittance of **£1.00** to cover costs of production and postage), to the Hon. Secretary. Please advise the Hon. Secretary, without delay, of any address changes, or corrections, for despatch of the *Bulletin*.

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The *Bulletin* (for 1998 onwards), together with annual index, may be purchased (postage free) by Non-member Subscibers on payment of an annual subscription of £22 (or U.S. $45) on application to The Publications Officer, S. J. Farnsworth, Hammerkop, Frogmill, Hurley, Maidenhead, Berks SL6 5NL, U.K. Single issues, and runs of back numbers of the *Bulletin*, and also other BOC Publications may similarly be obtained, on request to him.

PAYMENTS

All amounts quoted are net and should be paid in £ sterling, if possible. Payments in other currencies must include a further £4 for UK bank charges (except for annual rates in U.S. dollars, which are inclusive). All cheques or drafts should be made payable to the British Ornithologists' Club. If preferred, remittances may be made by bank transfer direct to the Club's bank account—Barclays Prime Account, Dale House, Wavertree Boulevard, Liverpool L7 9PQ, U.K. (Sort Code 20-00-87 Account No. 10211540), with confirmation to the Hon. Treasurer, D. J. Montier, Eyebrook, Oldfield Road, Bickley, Bromley, Kent BR1 2LF.

CORRESPONDENCE

Correspondence on membership, changes of address and all other matters should be addressed to the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants GU31 5PA, U.K. For details of Club Meetings see inside front cover.

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Edited by
Prof CHRIS FEARE

Volume 118 No. 3 September 1998

FORTHCOMING MEETINGS

Advance notice of meeting dates for 1999. Eight meetings have been arranged for the following Tuesdays: **19 January** (K. F. Betton on "Birding by Ear"—see below), **16 March**, **20 April**, **4 May** (AGM and social evening—with informal "mini-talks"), **6 July**, **7 September**, **12 October** and **30 November**. Details of speakers on these dates will be published when finalised.

Tuesday 17 November 1998. Dr W. G. (Bill) Porteous will speak on **"Birds of the Humboldt Current"**. Bill was born and raised in Shetland, and may therefore be unique in having added Booted Warbler to his life list before he added Blue Tit. He subsequently qualified as a geologist, and this has given him the opportunity to pursue birds in various parts of the world, particularly in north and south America. He recently spent five years in Colombia, which provided some welcome exposure to the neotropics, which had long been a particular interest of his. The opportunity to participate in a voyage southwards along the coasts of Peru and Chile in late 1995 provided the material we are to see this evening.

Applications to the Hon. Secretary by ***3 November****, please.*

Tuesday 19 January 1999. Keith Betton will speak on **"Birding by ear—a look at the world of strange, and not so strange bird sounds"**. Keith was born and educated in London, where he quickly established a life-long interest in ornithology. He came to prominence when, at the early age of 12, he was appointed a member of the Department of Environment Committee on Bird Sanctuaries in Royal Parks, and was Official Observer for Bushy Park (1973–79). He has served on numerous ornithological committees, including Chairman Ornithology Section of London NHS (1984–92), President London NHS (1982–84), BTO Regional Representative Greater London (1981–93), and Council BTO (1987–91), also Committee BOC (1985–88). He is a prolific contributor to and editor of several journals. His high profile post as Head of Corporate Affairs, Association of British Travel Agents, involves travelling worldwide on business, but this now leaves him less time for these ornithological activities. His special interest is in Africa, and in sound recordings, of which he has accumulated a large library of his own.

Applications to the Hon. Secretary by ***5 January****, please.*

Meetings are held in the Sherfield Building of Imperial College, South Kensington, London SW7. The nearest Tube station is at South Kensington, and car parking facilities are available; a map of the area will be sent to members, on request. The cash bar is open from 6.15 p.m., and a buffet supper, of two courses followed by coffee, is served at 7.00 p.m. (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion, at about 8.00 p.m.

Overseas Members visiting Britain are particularly welcome at meetings. For details in advance, please contact the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants GU31 5PA.

Tel/Fax: 01730-825280 for late bookings and cancellations.

Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

Vol. 118 No. 3 Published September 23

ANNUAL GENERAL MEETING

The Annual General Meeting of the British Ornithologists' Club was held in the Ante-room of the Sherfield Building, Imperial College, London SW7 on Tuesday 19 May 1998 at 6 p.m. with The Reverend T. W. Gladwin in the Chair. Apologies had been received from R. E. F. Peal and S. J. Farnsworth. 23 Members were present.

The Minutes of the Annual General Meeting held on 20 May 1997, which had been published (*Bull. Brit. Orn. Cl.* 117: 153–156), were approved and signed by the Chairman.

Chairman's report. The Chairman opened by saying that, although not customary for the Chairman to make a separate report, there were a number of interesting areas of Club activity this year, worthy of mention on this occasion.

Last year, the Club had kindly elected him to succeed David Griffin as Chairman. Whilst recording his pleasure that the Committee could count on David's continued support and advice, as a member of the Committee, his name had been omitted in the minutes, as elected to replace Ronald Peal as Committee Member, in May 1997. He apologised to David for that oversight, which will be appropriately corrected in the record for this meeting.

One of David Griffin's many contributions, for which the Club is grateful, was to establish a journal in which he has set out details of all 867 meetings, from 1892, through the period of his Chairmanship. The numbered record of each meeting includes details of venue, attendance, subject(s) and speaker(s). He personally, and he hoped future Chairmen, will maintain that journal, which will pass into the archives, when a second volume becomes necessary.

The Club's archives, kindly stored in the Natural History Museum at Tring, continue to be maintained and catalogued by Francis Stone. The Committee was particularly pleased when he agreed that his role should be acknowledged by appointing him as the Club's first Archivist. It may be appropriate to identify and define this office in the Club's Rules, at the next revision. The Committee had agreed that it is important that the Club's transactions are properly recorded in the *Bulletin*, and have suggested that Francis should prepare an appropriate account of the archives.

It has been customary for the Chairman to be custodian of a complete bound set of the *Bulletins*. The Committee has agreed that this set, currently held by himself, should be placed in the archives.

By virtue of its encouragement and interest in systematics and taxonomy, the Club occupies an important niche in ornithology. In making our contribution we have an inherent responsibility for all seriously proposed systems of biological classification to receive consideration. Since the publication of the centenary Volume 112A *Avian Systematics and Taxonomy* (Monk, J. F. 1992), several commentators have expressed regret at the relatively little attention given to the cladistic method of systematic classification. The cladistic approach, proposed by Hennig (*Phylogenetic Systematics*, 1966), has a significant number of supporters and it should be interesting, as well as desirable, to invite a speaker or paper on this subject.

Whilst the *Bulletin* continues to attract a wealth of major papers, it is important that sufficient resources are made available for its continuing development, probably to include more colour plates, under the editorship of Prof. Chris Feare.

The Club is fortunate in being endowed and trusted to fund scientifically and historically important ornithological publications without, in every case, a primary concern for commercial viability. He believed that history will increasingly value the Club's publications. The value of museum material in diagnosing the cause of egg-shell thinning in Peregrines *Falco peregrinus*, for example, illustrates the potential value to conservation of *Avian Eggshells: an Atlas of Scanning Electron Micrographs* (Mikhailov, K. E. 1997), published as *BOC Occasional Publications* No. 2. The Club is grateful to Amberley Moore, who is handing the Chairmanship of the Publications Sub-Committee to Dr Robert Prŷs-Jones, to Prof. Chris Feare as Honorary Editor of the *Bulletin*, to John Farnsworth, Publications Officer, and to all other members of that Sub-Committee for the excellence and sales of Club publications.

The Club enjoys warm relations with the Sub-Dept. of Ornithology of the National History Museum at Tring, which provides the facilities for storing our archives and stock of *Bulletins*. We are grateful to Robert Prŷs-Jones and his staff for this and other kindnesses, and especially to Mrs 'Effie' Warr, who has maintained the inventory of, and processes orders for, back numbers of the *Bulletin*. The Club continues to support the Museum, in whatever way may, from time to time, be possible.

The Committee has started to think about how the Club might mark the Millennium, and would be pleased to receive suggestions from Members.

Several Members have questioned the authenticity of the Club's gavel, which is said to have been made from wood from H.M.S. *Beagle*. Out of interest, he had started enquiries of a number of naval historians, to obtain details of H.M.S. *Beagle*'s disposal.

Helen Baker, who now retires from the Committee, will continue to assist the Hon. Secretary with the membership records. The Club is grateful for her significant contribution.

Finally, the Chairman recorded his thanks to all others who have contributed in so many ways to the administration and life of the Club, over the past year; to those already mentioned, to Michael Casement (*Hon. Secretary*), David Montier (*Hon. Treasurer*), all other Members of the Committee, the Trustees of the Herbert Stevens Trust Fund, to

Imperial College for the provision of parking and meeting facilities and valued dinners, and to the Members who have supported the excellent programme of meetings.

The Annual Report of the Committee for 1997 had been published in *Bull. Brit. Orn. Cl.* 118(1): 1–3.

The *Bulletin*. Prof. Chris Feare (*Hon. Editor*) reported that he had received an encouraging flow of papers for publication, at an average of four per month and, after the June issue, 35 are undergoing the process of preparation for publication. Issue 118(2) should appear on time, and would contain the description and a colour plate of a new species of rail, and he hoped the September issue would also contain a description of a new species, illustrated by a colour plate. A paper on a nomenclatural issue, published in the March issue 118(1) had stimulated some controversy. This highlighted the complexity of the rules governing nomenclature, and the diminishing number of people professionally employed as taxonomists, and who understand these rules. He would therefore be publishing the comments received from Storrs Olson.

The Chairman thanked the Editor, on behalf of the Club, for his report, and his achievements, since taking over this post. This was enthusiastically endorsed by all present.

The Annual Accounts for 1997 were presented by David Montier (*Hon. Treasurer*), who drew attention to the following points:

Total assets at 31 December 1997 amounted to £258,173, which was some £32,000 higher than in the previous year. Most of this was attributable to a substantial increase in the value of the Herbert Stevens Trust fund investments, which rose by £29,300 over the year, reflecting a strong performance in stock markets, particularly in the U.K.

The statement of Financial Activities shows a surplus of £2,383 on Unrestricted Funds over the year. Income on Unrestricted Funds rose by £4,900, the main components being about £1,600 increase in Members' subscription income, £2,200 in investment income and £600 in sales of publications. The increase in subscription income was the result of the rise in the subscription rate, as from 1 January 1997.

Expenditure rose by almost £8,500. The major part of this was caused by the publication of two books in the same year: *Bird Manuscripts and Drawings*—(*Occasional Publications* No. 2), at the beginning of the year, and *Avian Eggshells*—(*Occasional Publications* No. 3) at the end. The sum of £500 was also paid towards the production costs of the *Uganda Atlas* out of the Club's general funds. Meeting costs had increased as a result of the introduction of a room hire charge by Imperial College.

Adoption of the Accounts was proposed by Mrs Mary Muller, seconded by Dr David Snow, and approved by all present.

The Chairman expressed the thanks of all to the Hon. Treasurer and the Trustees of the Herbert Stevens Trust Fund.

Publications Sub-Committee. Mrs Amberley Moore said that, as the Hon. Treasurer had just reported, two *Occasional Publications*, Nos 2 and 3, had been published, and work was in hand with two further projects:

(i) *A Bird Atlas of Uganda.* This was now being progressed as a joint project with the Union, the final arrangements for which are under active discussion. The Club was grateful for a grant from the RSPB towards the work of preparing the distributional maps which is being done at the University of Makere in Uganda, in association with the East Africa Natural History Society.

(ii) *Type Specimens of Birds in the University Museum of Zoology at Cambridge.* At the beginning of the year the Club was approached by the University Museum of Zoology at Cambridge with a request to publish the catalogue of bird skins prepared by the late C. W. Benson, Editor of the *Bulletin* 1969–74. Negotiations with the Museum are proceeding, and it is hoped the catalogue will appear in print later this year.

Further publication plans include the possibility of a monograph on some Mascarene birds by Storrs Olson *et al.*, and the Proceedings of the joint BOU/BOC/NHM/BirdLife conference on museums and avian archives to be held in November 1999. The meeting expressed great satisfaction at progress with recent and proposed publications, and thanked Mrs Amberley Moore and her Sub-Committee accordingly.

Election of Officers and Committee. The Chairman said that the Committee's proposals had been published in *Bulletin* 118(1): 3, and no other nominations had been received. He proposed that Michael Casement be re-elected as Hon. Secretary, and David Montier be re-elected as Hon. Treasurer. This proposal was seconded by Mrs Mary Muller and approved by all present.

He proposed that Mr R. E. Scott be elected to fill the vacancy on the Committee, on the retirement of Miss Helen Baker. This was seconded by Dr David Snow, and agreed by all.

Any other business. *Ibis* Editorial policy. Mr F. M. (Martin) Gauntlett had raised this subject, suggesting that the Club should make a representation to the Union that *Ibis* had become "unreadably boring and technically incomprehensible" to the average reader, and was primarily "aimed at professional biologists with a Ph.D. in statistics and mathematics". He would like to see *Ibis* become more of a mainstream journal, with statistical tables and citations relegated to an appendix.

The Chairman responded that it was not Club policy to comment on the editorial policy of the journals of others, and had invited a response from Dr Robert Prŷs-Jones, who had consulted with Dr Andy Gosler, Editor (designate) of *Ibis*.

Robert Prŷs-Jones read out a formal statement, dated 16 May, received from Andy Gosler, who welcomed the opportunity to outline his editorial vision for the future. He had taken note of these observations, and had some sympathy with the need to reduce the increasingly obtrusive presentation of statistics in *Ibis*, but some statistical validation was necessary if *Ibis* was to compete worldwide in the field of scientific ornithology and retain its position as one of the top three scientific journals, in a field of hundreds. A balance had to be struck between attracting the best scientific papers from the professional scientific community, and retaining the loyalty (and subscription income) of the average Membership.

Dr Gosler said he had been involved with editing *Ibis* for only a few months and he had already in mind a number of editorial changes to make it more generally readable, but there was a backlog of papers in press, and it would be some time before these could be put into effect.

No other items for discussion had been notified in accordance with Rule (12), and the meeting closed at 6.45 p.m.

CLUB NOTES

The eight hundred and seventy-fourth meeting of the Club was held on Tuesday, 17 March 1998 at 6.15 p.m. 28 Members and 11 guests attended.

Members present were: The Rev. T. W. GLADWIN (*Chairman*), Miss H. BAKER, P. J. BELMAN, P. J. BULL, D. R. CALDER, Cdr M. B. CASEMENT RN, Prof. R. J. CHANDLER, S. J. FARNSWORTH, A. GIBBS, D. GRIFFIN, G. P. JACKSON, J. A. JOBLING, R. H. KETTLE, I. T. LEWIS, Dr J. F. MONK, D. J. MONTIER, Mrs A. M. MOORE, R. G. MORGAN, Mrs M. N. MULLER, R. C. PRICE, Dr R. P. PRŶS-JONES, N. J. REDMAN, Dr R. C. SELF, P. J. SELLAR, N. H. F. STONE, C. W. R. STOREY, A. R. TANNER, Dr D. R. WELLS.

Guests attending were: Dr A. J. PRATER (*Speaker*), Mrs J. C. BULL, Mrs C. R. CASEMENT, Dr D. FOSKETT, Mrs J. M. GLADWIN, Ms C. HOFF, Mrs S. L. LEWIS, Mrs M. MONTIER, Ms A. NUSSEY, P. J. MOORE, D. WITHRINGTON.

On completion, Tony Prater presented an illustrated talk on "Waders", which was enthusiastically appreciated by all those present.

The eight hundred and seventy-fifth meeting of the Club was held on Tuesday, 21 April 1998 at 6.15 p.m. 36 Members and 20 guests attended.

Members present were: The Rev. T. W. GLADWIN (*Chairman*), Miss H. BAKER, Captain M. K. BARRITT RN, P. J. BELMAN, I. R. BISHOP, Mrs D. M. BRADLEY, P. J. BULL, W.O.2 P. CARR RN, Cdr M. B. CASEMENT RN, S. E. CHAPMAN, Prof. R. A. CHEKE, G. S. COWLES, N. J. CROCKER, R. C. DICKEY, A. GIBBS, D. GRIFFIN, G. P. JACKSON, Dr J. B. KERSLEY, Dr C. F. MANN, Dr P. J. OLIVER, L.A.(Met.), C. M. C. PATRICK RN, Dr R. P. PRŶS-JONES, N. J. REDMAN, S. J. RUMSEY, R. E. SCOTT, Dr R. C. SELF, P. J. SELLAR, N. H. F. STONE, Cdr F. S. WARD RN, Prof. W. E. WATERS.

Guests attending were: Ms G. BONHAM, Mrs S. BOURNE, M. BRADLEY, Mrs J. C. BULL, Mrs C. R. CASEMENT, Mrs P. A. CHAPMAN, Miss J. H. COOPER, Vice-Admiral Sir David DOBSON, Mrs B. GIBBS, Mrs J. M. GLADWIN, Ms C. HOFF, B. J. HUGHES, A. J. MARTIN, Mrs M. MONTIER, P. J. MOORE, P. MULLER, Cdr A. C. MURGATROYD RN, B. O'BRIEN, Mrs J. WATERS, M. WILSON.

On completion, Dr Bourne gave an illustrated talk on "Birds and Islands". Bill first became interested in islands when evacuated to Bermuda in 1940–44, then during student expeditions to Rhum and the Cape Verde Islands in 1950 and 1951, and finally when sent to Cyprus on national service with the RAF, in 1956–58. Since islands often provide scope to make useful observations in a short time, he subsequently visited a variety, notably Gough and Chatham Islands, and Juan Fernandez.

In general, islands fall into two classes—continental islands cut off from the main land-masses, with samples of their biota; and oceanic islands, mainly thrown up for a geologically limited period of a few million years by volcanic action at sea, and colonised by a less representative selection of organisms capable of crossing the water. The natural communities of islands in high latitudes were usually wiped clean by the glaciations, and there has been inadequate time in the 10,000 years since the last of them to show much variation. But those of islands in lower latitudes have often been able to respond to changes in climate by moving up and down hill, so that they often support ancient relicts, which have achieved such a high level of evolution that their nearest relatives are now doubtful.

Thus, while the northern Atlantic islands hold about 60 endemic forms, half in Britain and Ireland, they mainly show the extreme development of general geographical trends of variation and colour, and it seems doubtful if any really deserve recognition as endemic species. On the other hand, while the continental Mediterranean islands only hold about a third as many races, possibly because they are insufficiently isolated (whereas they used to hold many more endemic mammals), they do hold three highly distinct species (13%): the Corsican Nuthatch *Sitta whiteheadi*, Cyprus Wheatear *Oenanthe cypriaca* and Cyprus Warbler *Sylvia melanothorax*. The first is adapted for montane forest, and the other two for an extreme Mediterranean climate.

Compared with this meagre showing for the NW Palearctic continental islands, there is a remarkable concentration of endemic forms, apparently often of ancient and diverse origin, in the west African oceanic islands. These include, at a conservative estimate, some 48 endemic forms, of which eight (17%) rate as species, in the Canaries and Madeira, and 18, of which four (25%) rate as species in the Cape Verde Islands. The species moreover include some truly remarkable birds, such as the two Laurel Pigeons *Columba junoniae* and *C. trocaz*, which might be aberrant derivatives of the Woodpigeon *C. palumbus*, which have undergone further local evolution, or be left over from laurel forests in the Mediterranean area during the tertiary, and also early derivatives of ancestral swifts, larks, pipits, chats, warblers and sparrows.

The situation in the tropical archipelagoes becomes too complicated to summarise easily, and to study insular variation in its extreme form it is necessary to go further south to the more isolated sub-antarctic islands. Here, for example, all the seven landbirds of the Tristan–Gough group show such marked local evolution that they were formerly placed in five endemic genera of uncertain affinities thought to represent ancient relicts. It now seems obvious that the two gallinules *Porphyriornis nesiotis* and *P. comeri* are actually just large flightless Moorhens *Gallinula chloropus*, however, while the smaller flightless Inaccessible Rail *Atlantisia rogersi* sometimes has distinctive spots like those of the South American Spot-winged Crake *Porzana spiloptera*.

Similarly, the single Gough passerine *Rowettia goughensis* appears to be a South American finch *Melanodera* masquerading as a thrush, whereas on Tristan and its outliers, where there are three passerines, there is a thrush *Nesocichla eremita* which may be a South American Groundscraper *Turdus litsitsirupa* adapted to suck eggs, and large and small canaries *Nesospiza acunhae* and *N. wilkinsi*, both derived from small South American yellow-finches of the genus *Sicalis*.

There is a need for more study of these remarkable and often threatened birds, and it might be helpful if more attention could be devoted to their relationships and the reasons why they have come to differ from their allies, instead of unreal hypotheses about their phylology and island biogeography.

The eight hundred and seventy-sixth meeting of the Club was held, following the Annual General Meeting, on Tuesday, 19 May 1998 at 6.45 p.m. 23 Members and 7 guests attended.

Members present were: The Rev. T. W. Gladwin (*Chairman*), Miss H. Baker, I. R. Bishop, Cdr M. B. Casement rn, Prof. R. J. Chandler, D. J. Fisher, F. M. Gauntlett, D. Griffin, J. A. Jobling, K. J. Kazmierczak, M. B. Lancaster, Dr J. A. K. Meldrum, D. J. Montier, Mrs A. M. Moore, Mrs M. N. Muller, M. L. Paling, Dr R. P. Prŷs-Jones, N. J. Redman, R. E. Scott, P. J. Sellar, Dr D. W. Snow, N. H. F. Stone, C. W. R. Storey.

Guests attending were: Mrs G. Bonham, Mrs M. H. Gauntlett, Miss J. H. Cooper, Mrs J. M. Gladwin, Mrs M. Montier, P. J. Moore, Mrs P. Pon.

After dinner, Members gave a series of short talks on subjects of topical interest; the following is a brief synopsis.

"Hybrid Lapwings". Prof. Richard Chandler showed photographs of two different apparent hybrids between Blacksmith Plover *Vanellus armatus* and Spur-winged Plover *V. spinosus*. The two species are regarded by most authorities as being closely related.

Both individuals were seen at Lake Nakuru National Park, Kenya, in an area where the two species are sympatic, one by the speaker in 1990, the other by Dave Richards in 1997. Both appeared to be adults, and showed plumage patterns intermediate between the presumed parents, with buff-grey upperparts and wing coverts, black on the head (distributed differently in the two individuals), white hind-neck collar with black lower margin, and white underparts with a black band across the belly. Both had black bills; the first individual had black legs, the second grey.

"Duetting in the Gambia". Mr P. J. Sellar illustrated with slides and tape recordings the recent work undertaken by a St Andrews University field project in The Gambia to determine whether the lead songs in duetting are performed by the male or female in the Oriole Warbler *Hypergerus atriceps* and the Barbary Shrike *Laniarius barbarus*. In both cases the male was found to lead the duet.

Mr M. B. Lancaster showed a series of slides to illustrate the coloration of *Plain Swift* ***Apus unicolor*** seen in Tenerife during almost annual visits there since 1989. He had never knowingly seen Common Swift *A. apus* there, but the presence of several swifts with well marked throat patches had prompted closer attention, and he had taken a series of photographs. Plain Swifts had always appeared to the speaker as 'brown', especially towards dusk and dawn, and when viewed from below, whereas Common Swift is 'black'. Pallid Swift *A. pallidus* had been identified without difficulty—much paler with a large throat patch. T. Clarke (resident in Tenerife) had commented that Plain Swift may also show a pale throat, and that differentiation of the three *Apus* spp. was not easy. Comments from the audience suggested that slight over-exposure may have been the main contributory factor to the brown effect, while the pale areas could have been reflected light. The speaker commented that photographs of White-throated Swift *Aeronautes saxitalis*, taken in Canada under similar lighting conditions, and using the same film, produced a 'grey' image.

"*Cyanopica*—a mystery solved". Joanne Cooper said that the origin of the disjunct distribution of Azure-Winged Magpie *Cyanopica cyanus* has never been fully explained. The species is found in eastern Asia, across China, Japan and Korea, and in western Europe, in the Iberian Peninsula. Two main explanations have emerged to account for this pattern: firstly, that it developed during the last glacial period, as parts of a once continuous population were isolated in refugia and intervening populations became extinct; secondly, that the species was introduced into Iberia during the 16th Century by Portuguese sailors returning from the Far East. The recent identification of fossil remains of *Cyanopica cyanus* from Neanderthal occupied sites in Gibraltar reveal its presence in Iberia during the last glacial period. This evidence provides proof that the species was not introduced into Iberia in recent times, but is instead a refuge relict.

"El Niño". Mr R. E. (Bob) Scott reminded members that this is a phenomenon of extreme weather conditions that occurs over an ill-defined 5–7 year cycle. The effect is a rise in seawater surface temperature that can cause dramatic environment changes, of very variable intensity. He had visited three distinct geographical areas during the autumn/winter of 1997/98 and recorded 'abnormal' weather patterns, which had had a major effect on the numbers and bird species seen there.

In the Seychelles, Indian Ocean, the rains had started unusually early, in August, and the rains were still falling when he visited in October 1997. The heavy rainfall had caused serious damage to property, roads and loss of life. The rains do not normally start until November or December. On the Gulf coast of Texas, U.S.A., in November 1997, the weather was unseasonably cold, with snowfalls well south in the State. Strong, cold winds on the coast contrasted with the balmy weather normally to be expected at that time of the year. Finally, on the Caribbean coast of Costa Rica, Central America, in January 1998, the season was unusually dry with normally navigable rivers barely passable by boat. In all three examples local residents credited these extremes to El Niño.

Members of the audience commented that several localities visited recently seemed to be recording their 'wettest', 'coldest' or 'driest' seasons for several years.

Joint BOU/BOC/NHM/BirdLife Conference, 12–14 November 1999. Dr R. P. (Robert) Prŷs-Jones announced brief details of a two-day conference on the subject "Why Museums Matter; Avian Archives in the Age of Extinction", planned to take place at Green College, Aston Clinton, less than 3 miles from the NHM Bird Group, Tring. The aims of the conference will be to highlight the continuing and changing importance of museum specimens, and associated library resources, vocalisations etc., to bird research and conservation; and to discuss ways in which the information contained within this resource can best be made available to a wider public. It will comprise an array of invited talks intended to cover most of the main aspects of this museum resource, together with some offered talks which must relate closely to the conference them.

Directly following the conference, from the Sunday evening until the afternoon of Monday 15 November, there will be a one-day workshop at the Tring Museum site, open only to curators and managers of bird collections, on the subject of "Increased Co-operation between Museums, especially in Europe". It is very much hoped that representatives from most major bird collections will wish to attend both the workshop and conference, but space will be quite limited. A set of proceedings, comprising both the conference papers and a summary of the workshop discussions, is planned for the BOC *Occasional Papers* series, during the year 2000.

The eight hundred and seventy-seventh meeting of the Club was held on Tuesday, 14 July 1998 at 6.15 p.m. 26 Members and 14 guests attended.

Members present were: The Rev. T. W. GLADWIN (*Chairman*), Miss H. BAKER, P. J. BELMAN, I. R. BISHOP, Mrs D. M. BRADLEY, D. R. CALDER, Dr M. CARSWELL, Cdr M. B. CASEMENT RN, S. J. FARNSWORTH, D. J. FISHER, A. GIBBS, D. GRIFFIN, G. P. JACKSON, J. A. JOBLING, R. H. KETTLE, M. B. LANCASTER, D. J. MONTIER, R. G. MORGAN, Mrs M. N. MULLER, R. E. F. PEAL, Dr R. P. PRŶS-JONES, N. J. REDMAN, R. E. SCOTT (*Speaker*), Dr R. C. SELF, P. J. SELLAR, C. W. R. STOREY.

Guests attending were: Ms G BONHAM, Mr M. J. BRADLEY, Mrs J. B. CALDER, Mrs B. GIBBS, Mr R. GILBEY, Mrs J. M. GLADWIN, Ms C. HOFF, Mrs M. MONTIER, Mr C. A. MULLER, Mr B. O'BRIEN, Mr A. R. E. PEAL, Prof. D. E. POMEROY, Mr and Mrs B. SAGE.

After dinner, Mr R. E. Scott entertained Members with a lively talk, which amply fulfilled his title "Bird reminiscences in a lighter vein". It was filled with amusing personal anecdotes and his readings of extracts, including poems, from a wide range of sources.

Bob opened by recalling how his first knowledge of the countryside was when he was evacuated from London to Wiltshire, in the 1940s, and his lifelong interest in birds was triggered by his introduction to a tame Jackdaw. Treasured as his first bird books were the identification guides of F. B. Kirkman, James Fisher, T. A. Coward, Richard Fitter, and Peterson's *Field Guide*, which transformed birdwatching throughout Europe in the 1950s. The poem in Coward's Vol. 3 *Flying Machines by the Little Stint* was responsible for his first interest in bird migration.

His early work at the British Museum (Nat. Hist.) involved more time in the Bird Room than in *Platyhelminths* where he was employed! He abandoned this to work for the RSPB at their Dungeness Reserve and neighbouring Bird Observatory. There he became involved in studies sponsored by the Central Electricity Generating Board (CEGB) in support of conservation issues threatened by the construction of Dungeness A nuclear power station. That public enquiry lasted a mere one and a half days. He also took an active part assessing the mortality caused by power lines, and the effects on seabirds of the *Torrey Canyon* oil spillage disaster. Bob's reminiscences were spiced with hilarious accounts of the well-meaning, but disastrous, attempts by members of the public to assist with this work.

He subsequently moved to Sandy to become head of RSPB Reserves Management, where the predator/prey relationships of birds were a constant source of conflict between vested interests. In his retirement, he now travels widely as a leader and guide of bird tours, where bizarre and humorous situations continue to provide material for after-dinner talks.

British Ornithologists' Club
Financial statements for the year ended 31 December 1997

Trustees' Responsibilities

Under the Charities Act 1993, the Trustees are required to prepare a statement of accounts for each financial year which give a true and fair view of the state of affairs of the charity at the end of the financial year and of the incoming resources and application of resources in the year. In preparing the statement the Trustees are required to:

- select suitable accounting policies and then apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- state whether applicable accounting standards and statements of recommended practice have been followed, subject to any material departures disclosed and explained in the statement of accounts;
- prepare the financial accounts on the going concern basis unless it is inappropriate to presume that the charity will continue its operations.

The Trustees are responsible for keeping proper accounting records which disclose with reasonable accuracy at any time the financial position of the charity and to enable them to ensure that any statement of account prepared by them complies with the regulations under section 41(1) of the Charities Act 1993. They are also responsible for safeguarding the assets of the Trust and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

BRITISH ORNITHOLOGISTS' CLUB

Registered Charity No. 279583

Balance Sheet as at 31 December 1997

		1997		1996	
	Notes	£	£	£	£
Tangible Fixed Assets	2		40		50
Investments					
At market value	3		202,878		173,446
Current Assets					
Stock of publications		100		100	
Cash at bank and in hand		5,099		4,660	
Cash on deposit		56,536		56,788	
Prepayments		480		60	
Other debtors		2,462		81	
		64,677		61,689	
Current Liabilities					
Subscriptions in advance		(5,437)		(4,740)	
Creditors falling due within one year		(3,985)		(4,673)	
			55,255		52,276
TOTAL ASSETS			£258,173		£225,772

Funds

Unrestricted	4	251,123	219,308
Restricted	5	7,050	6,464
		£258,173	£225,772

Approved and signed on behalf of the Trustees
T. W. GLADWIN
Chairman
21 April 1998

Statement of Financial Activities Year Ended 31 December 1997

	Notes	Unrestricted Funds 1997 £	Restricted Funds 1997 £	Total 1997 £	Total 1996 £
INCOME					
Subscriptions					
Members		6,559	—	6,559	4,961
Non-member subscribers		3,135	—	3,135	3,313
Income tax recoverable under Deeds of Covenant		328	—	328	308
		10,022	—	10,022	8,582
Donations		50	165	215	385
Sponsorship received		—	—	—	2,488
Investment income					
Herbert Stevens Trust Fund		10,167	—	10,167	8,334
Income tax recovered in respect of prior year		1,426	—	1,426	1,578
		11,593		11,593	9,912
Barrington Trust Fund COIF Income Shares		39	—	39	38
Interest received		3,386	421	3,807	3,146
		15,018	421	15,439	13,096
Sales of Publications					
Bulletin		1,179	—	1,179	2,114
Other publications		3,010	—	3,010	1,458
		4,189	—	4,189	3,572
Meetings		3,726	—	3,726	3,131
Other income					
Club ties and brooches		107	—	107	77
Miscellaneous		—	—	—	13
TOTAL INCOME		33,112	586	33,698	31,344
EXPENDITURE					
Direct charitable expenditure					
Meetings					
Room hire, speakers' expenses, etc.		1,226	—	1,226	203
BOC Bulletin					
Production, printing and distribution		14,877	—	14,877	13,178
Other publications					
Production and publication		7,904	—	7,904	972
Future publications		500	—	500	—
Publicity, postage and packing		358	—	358	40
Other expenditure					
Meetings					
Restaurant		3,519	—	3,519	3,251
Administration	6	2,345	—	2,345	4,607
TOTAL EXPENDITURE		30,729	—	30,729	22,251

EXCESS OF INCOME OVER EXPENDITURE....	2,383	586	2,969	9,093
Appreciation in value of investments..........................	29,432	—	29,432	9,845
	31,815	586	32,401	18,938
TOTAL FUNDS brought forward at 1 January 1997..	219,308	6,464	225,772	206,601
Prior year adjustment to Barrington Trust Fund........	—	—	—	233
TOTAL FUNDS at 31 December 1997......................	£251,123	£7,050	£258,173	£225,772

NOTES TO THE ACCOUNTS
YEAR ENDED 31 DECEMBER 1997

1. ACCOUNTING POLICIES

(a) Basis of Accounts

The financial statements are prepared under the historical cost convention.

(b) Investments

Investments in the Herbert Stevens and Barrington Trust Funds are shown in the Balance Sheet at market valuation. This represents a change of policy in the case of the Barrington Trust Fund Income Shares previously stated at cost, being £577. The cumulative appreciation in value up to 1 January 1996 of £233 and for 1996 of £61 have been treated as prior year adjustments and comparative figures amended accordingly.

(c) Depreciation

Depreciation is calculated to write off fixed assets over their expected useful lives at an annual rate of 10% on cost.

(d) Publications

The cost of publications is written off in the Income and Expenditure Account as incurred except for a nominal stock value of £100 carried in the Balance Sheet.

2. TANGIBLE FIXED ASSETS

	Projection equipment £
Cost at 1 January and 31 December 1997...	100
Accumulated depreciation at 1 January 1997...	50
Charge for the year..	10
At 31 December 1997..	60
Net book value at 31 December 1997	£40
Net book value at 31 December 1996	£50

3. INVESTMENTS—at market value

	1997 £	1996 £
Herbert Stevens Trust Fund	201,854	172,575
Barrington Trust Fund..	1,024	871
	£202,878	£173,446

4. UNRESTRICTED FUNDS

	General fund £	Herbert Stevens Trust Fund £	Barrington Trust Fund £	Total £
Balance at 1 January 1997	45,862	172,575	577	219,014
Prior year increase in investment to market value (Note 1b)	—	—	294	294
	45,862	172,575	871	219,308
Appreciation in value of investments during year	—	29,279	153	29,432
Surplus of income over expenditure ...	2,383	—	—	2,383
	£48,245	£201,854	£1,024	£251,123

5. RESTRICTED FUNDS

	Publications Fund £	Bird Atlas of Uganda Fund £	Total £
Balance at 1 January 1997	3,867	2,597	6,464
Donations	165	—	165
Interest—gross	253	168	421
Balance at 31 December 1997	£4,285	£2,765	£7,050

6. ADMINISTRATION EXPENSES include:	1997 £	1996 £
Audit and Independent examination fees	550	1,059
Depreciation of tangible fixed assets	10	10

7. REIMBURSEMENT OF EXPENSES
Committee members are reimbursed for expenses incurred by them on behalf of the Club. The amount reimbursed during the year was £1,271 (1996 £1,112).

INDEPENDENT EXAMINERS' REPORT TO THE TRUSTEES OF THE BRITISH ORNITHOLOGISTS' CLUB

This is a report in respect of an examination carried out on the accounts set out on pages 137 to 140 under Section 43 of the Charities Act 1993 and in accordance with directions given by the Charity Commissioners under Sub-section 7(b) of that Section.

RESPECTIVE RESPONSIBILITIES OF TRUSTEES AND INDEPENDENT EXAMINERS
As described on page 137 the Trustees are responsible for the preparation of the accounts and they consider that Charities Act 1993 Section 43(2) (audit requirement) does not apply. It is our responsibility to carry out procedures designed to enable us to report our opinion.

BASIS OF OPINION
This report is in respect of an examination carried out under Section 43 of the Charities Act 1993 and in accordance with the directions given by the Charity Commissioners under Section 43(7)(b). An examination includes a review of the accounting records kept by the Charity Trustees and a comparison of the accounts presented with those records. It also includes a review of the accounts and making such enquiries as are necessary for the purposes of this report. The procedures undertaken do not constitute an audit.

OPINION
No matter has come to our attention in connection with our examination which gives us reasonable cause not to believe that in any material respect:
(i) accounting records have been kept in accordance with Section 41 of the Charities Act 1993; or
(ii) the accounts accord with those records; or
(iii) the statement of accounts complies with the accounting requirements of the Charities Act 1993.
No matter has come to our attention in connection with our examination to which, in our opinion, attention should be drawn to enable a proper understanding of these accounts.

Sevenoaks
Kent
TN13 1XR
30 April 1998

PORRITT RAINEY & CO.
Registered Auditors
Chartered Accountants

Errata

***Bull. Brit. Orn. Club* 117(1): 77–79 (1997).** Mariano Ordano and Andrea Bosisio have pointed out the following error in their paper *Historical records of threatened and near threatened Argentinian birds from Museo Provincial de Ciencias Naturales "Florentino Ameghino" of Santa Fe, Argentina*: "Specimens from Museo Provincial de Ciencias Naturales "Florentino Ameghino" collection's classified as *Coryphaspiza melanotis* (Black-Masked Finch), published in *Bull. B.O.C.* 117(1): 77–79, are *Donacospiza albifrons* (Long-Tailed Reed Finch), whose numbers are MFA-ZV-1670, 1359, 639 and 638. We acknowledge the mistake in the specimen's identification and apologise for the error."

***Bull. Brit. Orn. Club* 118(2), Plate 1.** Due to a printing error, the caption was omitted from Plate 1, which accompanied the report of Ian Burrows' talk to the 873rd meeting of the Club. This should read "Feline Owlet-nightjar *Aegotheles insignis*, Mount Robinson 1,600 m, Western Province, Papua New Guinea, 24 July 1994 (Ian Burrows)".

***Bull. Brit. Orn. Club* 118(2): 67–82.** In Frank Lambert's paper *A new species of* Amaurornis *from the Talaud Islands, Indonesia, and a review of taxonomy of bush hens occurring from the Philippines to Australasia*, on line 12 under "Diagnosis" (p. 74), "*A. moluccanus*" should be replaced with "*A. magnirostris*".

Plate 3. Top left—*Otus alius*, sp. nov., compared with the related taxa which it most closely resembles in plumage (all probably illustrated for the first time): top right—grey-morph *O. magicus tempestatis* (Wetar Island); bottom left—*O.* [*magicus*] *kalidupae* (Tukangbesi Islands); bottom right—*O.* [*m.*] *sulaensis* (Sula Islands). All other taxa are more dissimilar in aspect and hence are not illustrated. Irides of *alius* are assumed to be yellow based on iris colour of most related taxa. Original painting by Larry B. McQueen.

A new Scops-owl from Great Nicobar Island

by Pamela C. Rasmussen

Received 6 July 1998

A single red-morph Scops-owl collected on Camorta, central Nicobar Islands in 1873 formed the basis for the 1876 description of *Ephialtes nicobaricus* Hume, and a second, nearly uniform rufous specimen was obtained from the same island in 1874 (Gurney 1884). The taxon was treated as a racial synonym of *Otus sunia modestus* or *O. s. malayanus* by some, and by others as a subspecies of Stresemann's (1925, 1939) extremely varied, nearly worldwide *O. scops*. No further Scops-owls were reported from the Nicobars until one was collected on Great Nicobar in 1966 (see Plate 3, upper left). Ali & Ripley (1969: 265) footnoted this specimen as *O. s. nicobaricus*, observing that it was '. . . considerably larger than *modestus* . . . with which Peters (1940) would synonymize it.' Abdulali (1972: 106) noted it 'does not agree with the original description . . . The wing lacks the white edge common to the other races and the lower belly is also as profusely marked as the breast . . . Though required for all races of *O. scops* . . . the first primary is not longer than the eighth'. Its long wings led Marshall (1972) to believe the 1966 specimen was not *sunia*, and after a second specimen was collected on Great Nicobar in 1977, Abdulali (1978: 759) stated 'Marshall who has been studying this in detail is sure that it is an undescribed form but cannot decide of what species'.

Marshall's (1978) discovery that dissimilar taxa from widely disjunct islands had similar calls led him to postulate that *Otus magicus* (formerly restricted to Wallacea) is highly polytypic, with '. . . a history of long flights over oceans and recent colonizations'. He tentatively placed the Great Nicobar bird in an expanded *Otus magicus*, citing '. . . morphological similarity to *insularis* . . .' of the Seychelles. He stated that the unnamed taxon lacks eartufts, provided a brief partial description (but no name), and included it with '. . . taxa of unknown song . . . hence of unknown affinities . . . listed with a guess as to their possible allocation . . .' (Marshall 1978: 17, 32). It has subsequently been treated either as *O. s. nicobaricus* (Ali & Ripley 1981, Ripley 1981) or *O. magicus* (Marshall & King 1988), until it was recently listed as 'Nicobar Scops-Owl *Otus* sp.' (King 1997: 26).

In late 1996, I examined both Great Nicobar specimens, now at the Bombay Natural History Society (BNHS), and that same week both Camorta specimens at The Natural History Museum, Tring, U.K. (BMNH), realizing then that specimens from these two islands were very different. Subsequent comparison with all specimens of each taxon in the *manadensis* superspecies (Marshall 1978) in the museums listed in the Acknowledgements has led to confirmation that the unnamed *Otus* is distinct morphologically in a number of characters. Given this, its isolation (Fig. 1), and an emerging pattern of high geographic differentiation among island *Otus*, the Great Nicobar bird cannot be

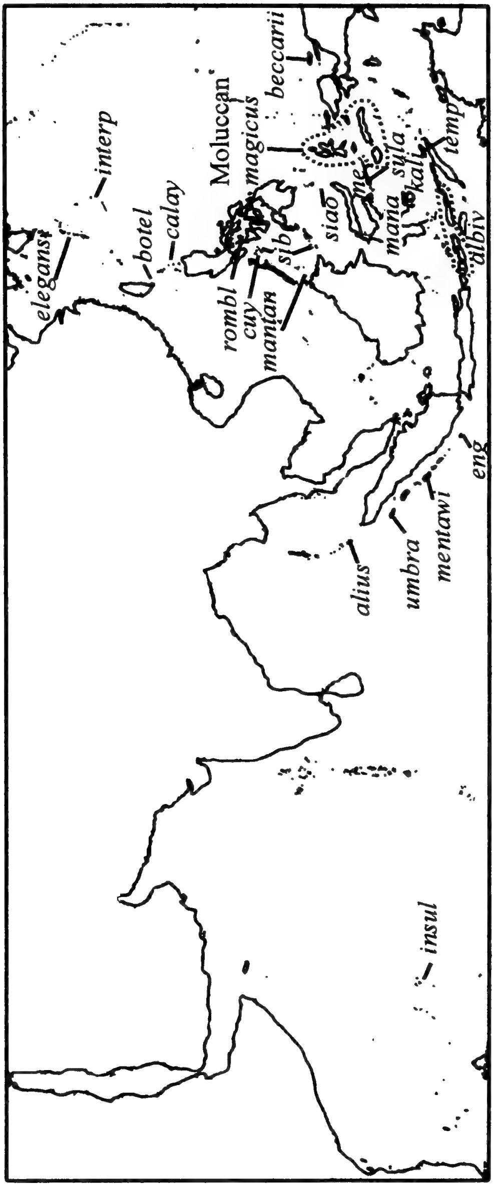

Figure 1. Map of islands supporting Asian taxa of *manadensis* superspecies. Abbreviations are: *siao(ensis)*; *albiv(enter)*; *me(ndeni)*; *mana(densis)*; *temp(estatis)*; *sula(ensis)*; *eng(anensis)*; *kali(dupae)*; *insul(aris)*; *bec(carii)*; *botel(ensis)*; *calay(ensis)*; *cuy(ensis)*; *romb(onis)*; *mantan(anensis)*; *sib(utuensis)*; and *interp(ositus)*.

specifically aligned with *magicus* or any other taxon, but requires recognition as a distinct species.

NICOBAR SCOPS OWL *Otus alius*, sp. nov.

Holotype. Bombay Natural History Society No. 22578, adult male (see Plate 3, upper left) from Campbell Bay, Great Nicobar Island, 7°00′N, 93°50′E, India; collected 3 March 1966 by Humayun Abdulali.

Diagnosis. A medium-sized *Otus* with predominantly warm brown, mostly unstreaked and finely barred plumage; ear tufts evenly and finely barred, rounded, and of medium length; facial disk indistinctly paler than rest of plumage, lightly barred at its lower edge; dark border to facial disk not prominent; bill medium-sized and mostly brownish; white scapular spots rounded, nearly restricted to outer web, with broad black tips; most distal portion and much of rear edge of tarsus bare; toes and claws relatively large.

Otus alius is closest in morphology to some members of the *manadensis* superspecies of Marshall (1978), from all of which it differs in possessing scapular spots that are bordered above and below by broad black bands, giving a rounded shape to the white centres. It differs additionally from adults of all Asian taxa in possessing a combination of finely barred overall plumage, entirely lacking streaks above, and having a marked reduction of ventral streaking, over which the heavy tricoloured barring predominates; and in having relatively large claws. Although sample size is insufficient for statistical testing, its wing formula differs from all taxa Marshall (1978) placed in *magicus* (but not *O. enganensis* or *O. umbra*) in that P3 (from outermost) is longer, while the inner secondaries are shorter (Table 1), and like the latter two only, the bill is mostly brownish. Additional differences are given in the 'Remarks' section.

Distribution. Both specimens were collected near sea level at Campbell Bay, Great Nicobar Island. There are no other published reports of Scops-owls from Great Nicobar.

Description of the holotype. Capitalized colours are from Smithe (1975); colour comparisons were made under weak fluorescent light, with diffused sunlight from an open window.

Sides of forehead above supercilium finely barred Cinnamon (39), whitish, and Burnt Umber (22); base of central crown feathers Clay Color (26), central streaks Fuscous (21); base of poorly-marked whitish supercilium feathers paler than Cinnamon, with narrow, widely-spaced Burnt Umber bars; base of ear tufts Cinnamon, narrowly barred Dark Grayish Brown (20); ear tufts rather short, prominent, with broad feather tips; bases of facial feathers at sides of bill more rufescent than Cream Color (54); bases of rictal bristles Buff-Yellow (53), at least tips blackish; short feathers below and in front of eye vaguely dark-barred with pale Cream Color bases; facial disk behind eye Cinnamon with whitish shafts and dusky mottling, rear and lower portion whitish with fine Dark Grayish Brown barring and mottling, narrow, indistinct disk rim Dark Grayish Brown on lower and rear edges; only slight extensions to rear auriculars despite fresh plumage; chin feathers coloured as feathers at bill sides; throat pale buff with fine dark barring near tips of longer chin feathers. Rest of crown, nape, and hindneck like central crown, but with streaking becoming obsolete and narrow dark bars prominent on rear crown.

Mantle through lower back close to Raw Umber (23) in aspect, dark bars ca. 2 mm wide, slightly paler than Fuscous, light bars ca. 1.7 mm wide, mostly Cinnamon but paler near bases. Scapular spots rounded, mainly white encircled by Dark Grayish Brown (blackish) bands, and surrounding base colour Amber (36), with fine Burnt Umber markings, scapulars Cinnamon near bases. Tertials have broad (ca. 4.1 mm) indistinct bands between Fuscous and Olive-Brown (28) and narrow (ca. 1.3 mm) Smoke Gray (45) bands; largest feathers of alula with bars ca. 2.5 mm, Cinnamon and paler, medium bars ca. 4.0 mm and stippled darker, narrow dark bars Fuscous; outer primary (P1) has lightest bands slightly paler than Cinnamon, medium bands slightly paler than Olive-Brown, and darkest bands Fuscous; light bands paler on inner primaries. Uppertail coverts closest to Raw Umber (23), with fine dark bars of Burnt Umber giving vermiculated aspect, uppertail surface with palest bands of Cinnamon, medium bands finely speckled with dark, giving Olive-Brown aspect, darkest bars Fuscous; banding pattern fairly strong on uppersides of rectrices.

Upper breast Cinnamon with ca. 1.5 mm distinct Fuscous bars distally, ca. 1.2 mm Fuscous shaft streaks; lower breast Cinnamon with narrow bars between Olive-Brown and Fuscous, on breast sides shaft streaks are Fuscous, a few as wide as 2.2 mm, some bars slightly paler than Cinnamon; centre of belly with more white, white bands ca. 4 mm broad, Cinnamon bands ca. 3 mm, blackish bars ca. 0.7 mm, narrow white shaft streaks; tips of bars on lower flanks deteriorate into vermiculations, otherwise they are broad Cinnamon bands with narrow white and fine blackish bars. Undertail coverts rufescent whitish for most of their length but with tips barred as is belly, although rufous bars are closer together. Tarsal feathers mostly Cinnamon with fine Fuscous bars; bare patch on upper hind tarsus, with a narrow bare strip along the upper third, feathering meeting ventrally on medial section; dorsally, feathering ends 8.6 mm short of joint formed by phalanges 1–2 of third digit.

Dried cere dull yellowish-brown; maxilla tip and distal half cutting edge blackish-brown, most of sides of maxilla dull yellowish-brown, base and culmen ridge paler and yellower; mandible dull yellow with cutting edge and base dark brown. Dried toes dark yellowish-brown, claws mostly dusky horn, black distally, grading near bases to paler yellowish-brown. Narrow ring of bare orbital skin blackish. No data on soft part colours of fresh specimens or living birds.

Description of the paratype. The female paratype is similar overall to the holotype, but is slightly larger, more boldly marked, with more white on lower underparts. Dark bands on forehead broader, facial disk slightly darker and more heavily marked behind eye; longest throat feathers with coarser and more widely spaced blackish barrings; mantle more coarsely barred, with larger, whiter spots basally; alula more contrasting; upper breast more strongly marked and lower breast more

TABLE 1

Summary statistics for measurements of *Otus* taxa presented as mean ± standard deviation, *n*. l=length, w=width, d=depth. Shortfalls of primary tips from wingpoint: P1 S (outermost), etc.; tarsal feathering measured to jont between first and second phalanges of the third digit

Variable	*insularis*	*alius*	*umbra*	*enganensis*	*albiventris*	*tempestatis*
Culmen (skull)	26.6 ± 1.6, 6	21.9 ± 0.3, 2	20.9 ± 0.6, 2	24.2 ± 1.6, 4	21.5 ± 1.1, 24	21.0 ± 1.3, 12
Culmen (cere)	15.5 ± 0.5, 3	13.7 ± 1.3, 2	13.7 ± 1.3, 2	15.1 ± 1.1, 4	13.2 ± 0.9, 24	13.2 ± 0.6, 12
Maxilla d	8.6 ± 0.4, 3	7.4 ± 0.3, 2	6.9 ± 0.5, 2	8.4 ± 0.4, 4	7.1 ± 0.4, 24	6.8 ± 0.5, 12
Maxilla w	8.9 ± 1.3, 3	6.7 ± 0.7, 2	6.8 ± 0.1, 2	8.0 ± 0.3, 4	6.6 ± 0.7, 25	6.2 ± 0.7, 12
Tuft 1	25.7 ± 2.1, 5	20.4	17.6 ± 2.4, 2	18.6 ± 0.6, 4	30.4 ± 3.1, 25	21.4 ± 2.9, 12
Wing 1	166.0 ± 4.0, 6	163.5 ± 3.5, 2	144.0 ± 1.4, 2	162.7 ± 2.5, 3	156.4 ± 6.0, 21	151.9 ± 4.4, 12
P1 S	37.2 ± 3.7, 6	36.6 ± 1.8, 2	28.9 ± 4.3, 2	42.9 ± 4.4, 2	36.1 ± 4.7, 20	38.7 ± 3.3, 12
P2 S	13.0 ± 1.5, 6	12.5 ± 1.5, 2	9.5 ± 0.7, 2	13.0 ± 1.1, 3	11.8 ± 2.0, 21	13.6 ± 1.9, 12
P3 S	3.3 ± 1.6, 6	1.6 ± 0.8, 2	1.5 ± 0.0, 2	2.6 ± 0.8, 3	2.7 ± 1.2, 21	3.9 ± 0.8, 12
P4 S	0.0 ± 0.0, 5	0.0 ± 0.0, 2	0.0 ± 0.0, 2	0.0 ± 0.0, 3	0.1 ± 0.4, 22	0.1 ± 0.3, 12
P5 S	1.4 ± 1.2, 5	2.7 ± 0.3, 2	3.6 ± 1.7, 2	3.1 ± 0.7, 3	1.0 ± 1.4, 20	0.5 ± 0.7, 11
P6 S	8.2 ± 2.8, 6	9.8 ± 1.4, 2	12.2 ± 0.3, 2	12.5 ± 1.8, 3	6.9 ± 1.6, 19	6.9 ± 1.8, 12
P7 S	15.1 ± 3.6, 6	19.4 ± 1.2, 2	19.4 ± 0.6, 2	20.5 ± 2.0, 3	15.0 ± 2.4, 19	14.1 ± 1.8, 12
P8 S	22.3 ± 2.2, 6	28.0	24.6 ± 0.8, 2	26.8 ± 3.7, 3	22.0 ± 2.6, 18	22.4 ± 2.0, 12
P9 S	26.6 ± 2.7, 6	33.6	29.9 ± 1.3, 2	33.1 ± 4.6, 3	29.1 ± 2.9, 17	30.1 ± 2.4, 12
P10 S	31.5 ± 2.7, 6	39.3	38.8 ± 6.8, 2	40.5 ± 3.2, 3	35.8 ± 3.2, 15	35.9 ± 2.1, 12
Tail 1	74.6 ± 5.3, 5	75.8 ± 2.0, 2	60.2 ± 0.6, 2	77.3 ± 3.6, 3	73.0 ± 3.6, 24	74.2 ± 3.0, 12
Central rectrix w	15.6 ± 0.8, 4	19.2 ± 0.2, 2	13.9 ± 1.8, 2	18.4 ± 1.3, 4	17.5 ± 2.0, 22	14.5 ± 1.8, 12
Tarsus 1	34.0 ± 1.3, 6	29.1 ± 0.7, 2	25.4 ± 0.6, 2	27.7 ± 2.6, 4	27.9 ± 1.7, 24	27.4 ± 1.7, 12
Midclaw l	12.3 ± 0.5, 6	12.2 ± 0.6, 2	10.1 ± 0.4, 2	11.7 ± 0.7, 4	10.3 ± 0.7, 25	9.0 ± 0.7, 11
Midclaw d	2.8 ± 0.2, 6	2.5 ± 0.0, 2	1.7	2.3 ± 0.1, 4	2.4 ± 0.3, 22	2.3 ± 0.3, 11
Midclaw w	3.1 ± 0.2, 6	2.6 ± 0.3, 2	1.8	2.7 ± 0.1, 4	2.4 ± 0.2, 22	2.2 ± 0.2, 11
Tarsal feathering	26.5 ± 1.9, 6	8.6 ± 0.7, 2	7.2 ± 0.6, 2	7.1 ± 3.3, 4	5.3 ± 1.6, 25	4.7 ± 1.3, 12

TABLE 1
Continued

Variable	*manadensis*	*staoensis*	*mendeni*	*kalidupae*	*sulaensis*	Moluccan *magicus*	*beccarii*
Culmen (skull)	20.0 ± 0.9, 45	19.9	21.2 ± 0.4, 3	23.9 ± 0.6, 2	24.6 ± 1.3, 2	24.4 ± 2.0, 100	26.7
Culmen (cere)	12.8 ± 0.7, 44	14.9	13.6 ± 0.2, 3	15.3 ± 1.9, 2	15.9 ± 0.7, 2	15.5 ± 1.6, 100	16.2
Maxilla d	6.7 ± 0.5, 47	6.6	7.0 ± 0.7, 3	8.7 ± 0.1, 2	8.3 ± 0.3, 2	8.3 ± 0.8, 103	8.4 ± 0.4, 2
Maxilla w	6.1 ± 0.6, 45	5.7	6.3 ± 0.7, 3	8.3 ± 0.1, 2	6.9 ± 0.1, 2	7.4 ± 0.8, 103	7.8 ± 0.6, 2
Tuft 1	24.5 ± 3.5, 45	18.2	23.3 ± 1.1, 3	23.4 ± 5.4, 2	23.8 ± 1.9, 2	26.6 ± 3.6, 102	25.5 ± 0.1, 2
Wing 1	151.0 ± 4.6, 47	127	146.5 ± 4.1, 3	168.0 ± 0.0, 2	167.0 ± 8.5, 2	171.6 ± 10.8, 98	172.0 ± 2.8, 2
P1 S	36.2 ± 3.9, 40	28.2	37.4 ± 2.5, 3	37.9 ± 2.2, 2	37.4 ± 2.2, 2	38.7 ± 4.2, 68	39.2
P2 S	12.3 ± 3.0, 43	14.3	14.7 ± 0.6, 3	13.2 ± 1.5, 2	14.5 ± 1.3, 2	14.2 ± 2.8, 71	12.7 ± 2.2, 2
P3 S	2.8 ± 1.4, 43	6.0	4.0 ± 0.4, 3	0.8 ± 1.1, 2	3.5 ± 0.2, 2	3.9 ± 1.4, 69	2.9 ± 0.6, 2
P4 S	0.1 ± 0.3, 44	0.0	0.6 ± 1.0, 3	0.3 ± 0.5, 2	0.0 ± 0.0, 2	0.1 ± 0.4, 71	0.0 ± 0.0, 2
P5 S	2.0 ± 1.7, 38	—	0.2 ± 0.3, 3	1.3 ± 0.3, 2	1.3 ± 0.1, 2	1.1 ± 1.4, 66	1.3 ± 1.9, 2
P6 S	8.2 ± 2.6, 36	8.5	5.0 ± 0.1, 3	6.5 ± 1.2, 2	6.3 ± 1.7, 2	6.8 ± 2.1, 61	5.4 ± 0.8, 2
P7 S	14.8 ± 2.8, 39	15.1	11.9 ± 1.4, 3	14.1 ± 2.0, 2	14.7	14.3 ± 2.6, 58	12.2 ± 0.1, 2
P8 S	23.1 ± 2.8, 35	20.3	18.0 ± 0.7, 3	21.8 ± 2.7, 2	21.4	22.2 ± 2.7, 58	20.6 ± 0.8, 2
P9 S	29.3 ± 2.9, 33	27.3	24.3 ± 1.6, 3	28.0 ± 1.8, 2	29.0	29.6 ± 3.2, 55	—
P10 S	35.9 ± 2.9, 33	36.9	29.6 ± 0.6, 3	33.2 ± 3.8, 2	34.2	36.8 ± 3.5, 50	—
Tail 1	70.7 ± 3.9, 41	57.1	65.0 ± 1.3, 3	82.0 ± 0.4, 2	75.8 ± 2.0, 2	80.7 ± 6.4, 95	81.8 ± 2.6, 2
Central rectrix w	15.0 ± 2.3, 39	13.0	14.4 ± 0.7, 3	18.5 ± 1.4, 2	19.2 ± 0.2, 2	18.0 ± 1.8, 79	18.4 ± 0.8, 2
Tarsus 1	26.8 ± 1.7, 45	26.8	26.7 ± 1.2, 3	33.2 ± 0.0, 2	29.1 ± 0.7, 2	31.6 ± 2.8, 97	33.8 ± 0.1, 2
Midclaw 1	10.4 ± 0.5, 43	10.1	10.9 ± 1.1, 3	11.5 ± 0.8, 2	12.2 ± 0.6, 2	11.9 ± 1.2, 97	12.0 ± 0.0, 2
Midclaw d	2.1 ± 0.2, 46	1.9	2.2 ± 0.1, 3	2.5 ± 0.1, 2	2.5 ± 0.0, 2	2.6 ± 0.2, 90	2.5 ± 0.2, 2
Midclaw w	2.3 ± 0.2, 46	2.1	2.3 ± 0.1, 3	2.6 ± 0.1, 2	2.6 ± 0.3, 2	2.7 ± 0.3, 96	2.7 ± 0.1, 2
Tarsal feathering	5.4 ± 2.0, 42	4.5	14.9 ± 1.4, 3	5.1 ± 1.8, 2	17.2 ± 1.8, 2	8.8 ± 3.7, 94	8.8 ± 4.6, 2

variegated; flanks have white bands broadest and blackish bands heavier; upper tail more coarsely speckled, less banded; primaries with pale bands lighter; tarsal feathering paler and more speckled. Both types resemble each other more closely than either does any specimen examined of other taxa.

Measurements of the holotype (mm). Wing, flattened and straightened (161.0); central rectrix (74.4); tarsus (28.6); culmen from skull (21.7); culmen, from anterior edge of cere (12.8). For additional measurements and those of related species, see Table 1; sample sizes are insufficient for statistical testing.

Specimens. Great Nicobar: BNHS (holotype); BNHS 24411 (♀; paratype) from type locality (formerly Zoological Survey of India [ZSI] No. 33171, collected 2 April 1977 by S. S. Saha for K. K. Tiwari).

Etymology. The name *alius*, which is Latin for 'other' (this being another Scops-owl from the Nicobar Islands), encapsulates the family name of Mr Humayun Abdulali, who first collected this species, and contributed a great deal to Indian ornithology, and in particular that of the Andaman and Nicobar islands. The common name 'Nicobar Scops-Owl' is appropriate and already in use solely for this taxon (King 1997: 26).

Remarks

Additional differences

From *O. beccarii* (*n*=2 specimens examined and measured, and photographs of type; Biak I.), *alius* differs greatly by its less contrasting, paler, browner, less fluffy plumage; mantle more definitely barred; more slender bill; streaked forecrown; more definite eartufts; less distinct facial disk; somewhat streaked below; primary coverts and alula not dark and unmarked; and shorter, more prominently banded tail. The highly isolated *Otus beccarii* is so distinct in plumage that even Stresemann (1925) and Mayr & Meyer de Schauensee (1939) gave it specific status, while Marshall (1978) lumped it in *magicus* without examining specimens until his manuscript was in proof.

From *Otus insularis* (Seychelles, *n*=6; colour plate of type, Tristram 1880), *alius* differs markedly in its much smaller size, especially skull and bill (Table 1); less prominent dark eye patch; eartufts not mainly buffy and blotched; less rufflike head feathers; less prominent facial disk edge; lack of buff-spotted hindcollar; scapular spots not narrowly black-edged and lined; relatively longer wings; much shorter, slighter, more extensively feathered tarsi; and relatively longer tail with broader central rectrices (Table 1). *Otus insularis* diverges most from *alius* of any of the taxa considered here in its very heavy streaking below and heavy blotching above. All adult specimens and photos of three live birds are similar, but differ from other '*magicus*' taxa, and *insularis* is separated by so great a distance (Fig. 1) that others regard it as distinct (Watson 1980, Collar & Stuart 1985). Originally described in a monotypic genus (Tristram 1880), it has even been considered a '*bakkamoena* offshoot' (Peters 1940: 97).

Otus alius differs from *O.* [*magicus*] *sulaensis* (see Plate 3, lower right; Sula Islands, *n*=2) in its much more extensively feathered tarsus; less prominent dark eye patch; less heavily barred auriculars and spotted lower throat; shorter bill (Table 1); more uniformly barred brown dorsum lacking spots and streaks; more evenly spaced bands on outer webs, and light banding on inner webs of outer primaries; scapular spots lacking large black central patches; more prominently banded tertials and upper tail, and smaller size. Judging from its highly distinctive vocalizations and morphology, *sulaensis* is probably a separate species (Hartert 1898, Finsch 1898, Coates & Bishop 1997, King 1997) but only two adult specimens exist.

For three other taxa from islands off Sulawesi (for which the combined world total of adult specimens is only six!), vocalisations are unknown and the taxonomy unsettled. From *O.* [*m.*] *kalidupae* (see Plate 3, lower left, Tukangbesi; *n*=2), *alius* differs in its darker brown colouration; less extensive tarsal feathering; less vermiculated venter; less finely patterned eartufts; more prominently banded upper tail; very different scapular spots; less strongly banded undersides of primaries, but stronger banding of uppersides; and smaller overall size (Table 1). From *O.* [*m.*] *mendeni* (Peleng I.; *n*=3; Eck 1976), *alius* differs in its less vermiculated and unspeckled dorsum (in grey morph); much longer tail and especially wing; less streaked and more barred venter; and much more extensive tarsal feathering (Table 1). From the unique specimen of *O.* [*m.*] *siaoensis* (Siau I. in Sangihe Is.; Schlegel 1873), *alius* differs in its much larger size, especially wings and tail; its lack of a conspicuous pale ochre collar; its much broader tail banding (Table 1); and its less richly coloured, more regularly barred venter.

Otus magicus sensu latu

Additionally to the characters listed above and below, *Otus alius* differs from most of the remaining races of *magicus* in having the tertials less broadly and prominently banded. It is about the size of the two small Lesser Sundas taxa (*albiventris* and *tempestatis*—grey morph of the latter is shown top right, Plate 3) and smaller than the remaining (Moluccan) taxa, samples of which were combined herein, but its feet and claws are relatively large for its size (Table 1). From *albiventris* (Lombok to Lomblen; *n*=25), *alius* differs in its much shorter, more rounded, unstreaked eartufts; shorter, less profuse rictal bristles; and breast more uniform with rest of venter. *Contra* Sibley & Monroe 1993, *O. alfredi* (Flores; *n*=3) is not the red morph of *albiventris*, but belongs to the *O. spilocephalus* group (Hartert 1925, Stresemann 1925, Widodo *et al.* unpublished). From grey-morph *tempestatis* (see Plate, upper right, Wetar I.; *n*=6), *alius* has venter less mealy; less dark above the eye; and more coarsely barred eartufts; and from the red morph of *tempestatis* (*n*=6), it has narrower pale cinnamon (less orange) barring more prominently black-edged below.

From *O. m. magicus* (Amboina and Scram; *n*=24) *alius* differs greatly in having the dorsum much less heavily spotted pale, and the venter with greatly reduced streaks and much less speckled, lacking bold black markings; scapulars lack irregular black marks. From *Otus m. bouruensis* (Buru; *n*=9), *alius* is darker above, lacks whitish hindcollar, has more regular barring on primaries; less narrowly barred tail; paler eyepatch;

eartufts more barred; scapular spots smaller; and underparts browner, lacking strong, sharp streaks. From *O. m. leucospilos* (Halmahera and Bacan, *n*=23), *alius* has a less pronounced facial disk; less white spotting and more even patterning below, without strong contrast between breast and belly; less uniform dorsum, lacking streaks; shorter eartufts; and rather different scapular spots; *O. m. obira* (Obi, *n*=1 specimen examined and photos of type seen) resembles a rather dark *leucospilos*. From *O. m. morotensis* (Ternate and Morotai, off Halmahera; *n*=21), *alius* differs essentially as from *leucospilos* but is also paler. Another form attributed to *magicus* (Wolters 1970; not mentioned by Marshall 1978), *O. m. obsti* Eck 1973, is probably a mislabelled *manadensis* (Lambert & Rasmussen unpublished).

Eastern Indian Ocean endemics

Otus alius differs greatly from *O. enganensis* (Enggano Island; *n*=4 specimens examined, and photos of 3 others) in being less rufous and more barred, with less streaking below and less vermiculation above; scapular spots smaller with larger, blacker tips; eartufts less finely barred; tertials and tail more banded; bill smaller; toes heavier; and tarsi less thickly feathered. The rather distinctive calls of *enganensis* suggest it is a separate species (van Marle & Voous 1988, King 1997), and this is here considered warranted as its plumage is very unlike *magicus*. *Otus alius* differs from the much smaller (but geographically nearest) *O. umbra* (Simeulue I.; *n*=2) in its less rufescent plumage overall; paler facial disk; barred eartufts; larger black tips to whiter scapular spots; broader pale bands on upper tail surface; and proportionately much larger feet and claws. The vocalisations of *umbra* are very distinct (Marshall 1978) so that, despite its similarity in plumage (but not size and proportions) to *enganensis*, its specific status is not in doubt. A closer relationship of *alius* with *enganensis* and *umbra* than with *magicus* is suggested by their shared wing formulae (Table 1; unpubl. data) and bill colouration, qualitatively unlike those of all Wallacean *magicus* subspecies, as well as *sulaensis*, *beccarii*, and *insularis*. Although *O. mentawi* (Mentawai Is.; *n*=7 specimens examined, photos of another) has been thought a member of the *magicus* group (Neumann 1939, Eck & Busse 1977), it is much closer to *O. bakkamoena* (Riley 1929, Deignan 1950) and is treated as a separate species by most on the basis of its highly distinctive vocalizations.

Marshall (pers. comm. 1997) thought the Nicobar Scops-Owl must be the same taxon as a pair of owls that apparently bred in 1976 on Pulo Perak, off N.E. Sumatra, and the latter were listed in *Otus magicus* in Marshall & King (1988), and as 'Small-Island Scops Owl *Otus* sp.' (Wells 1983). However, photos of two of the Perak owls taken by M. Avery (no specimens exist) show them to be very different from all these taxa, differing from *alius* in their long, pointed, speckled eartufts; heavily streaked forehead and underparts; much white on lower underparts; both webs of scapulars largely white with small triangular black tips; white feathering on thin legs, with distal third bare; and relatively much smaller feet and claws.

The Pulo Perak birds show no salient differences in plumage from the type of *Otus sunia nicobaricus*.

Other taxa

From the variable *O. manadensis* (Sulawesi; *n*=47), *alius* differs by the same plumage and proportional characters as those by which it differs from the Lesser Sundas *magicus* forms, except that the banding of the tertials is similar; *alius* has the breast more similar to the lower underparts; lacks black spotting and pale rufous bases to eartufts; has auriculars paler; usually broader pale tail bands; paler central forecrown; larger claws; and smaller rounded white scapular spots. Sangihe Island *Otus* (*n*=3) have been thought identical to *manadensis* (Sharpe 1875, Meyer 1884, Finsch 1898), and differ essentially from *alius* as does *manadensis*; they will be dealt with elsewhere (Lambert & Rasmussen unpublished).

From Japanese and Taiwanese taxa (*O. e. elegans*, Ryukyu and Amami Is.; *n*=15; *botelensis*, Lan Hsü I.; *n*=1 specimen, photos of 6 additional specimens and one living bird examined; and *interpositus*, Borodino Is.; no specimens examined but photos of 6 specimens seen) *alius* differs greatly in its wing formula; shorter wings; less finely vermiculated but more uniformly coloured plumage; shorter, barred eartufts lacking rufous inner webs; broader pale tail bands; and lack of small black markings in scapular spots. From *O.* [*elegans*] *calayensis* (Batanes and Calayan, Philippines; *n*=4), a few individuals of which *alius* somewhat resembles due to their barred mantles, it differs in being browner; with barred eartufts lacking rufous edges; less heavy, less finely barred tarsal feathering; less conspicuous streaking and more tricoloured barring below; less uniform uppertail surface and tertials; tail shorter; and less uniform, less ochraceous facial disk. From the Philippine taxa of *O. mantananensis* (*cuyensis*, *n*=3; *romblonis*, 5; *sibutuensis*, 13; *steerei*, 1; and *mantananensis*, 2 specimens examined and photos of another), *alius* has narrower breast streaking; more tricoloured barring of venter; unstreaked lower throat; and prominently banded upper tail and tertials (similar to the nominate form); there are additional differences from each individual taxon as well. None of the African taxa in the *manadensis* superspecies are as similar to *alius* as are some of the taxa treated above, and hence they are not dealt with here, although all were examined for this study.

Life history data

The holotype had greatly enlarged testes (26 × 14 mm) when collected on 3 March. The paratype was noted to have the 'ovary granular' but an accompanying drawing showed it to be approaching breeding condition (ca. 10 mm long, largest follicle ca. 1 mm) on 2 April, although it was moulting the inner primaries (P8–P10) at the time. The holotype, collected as it flew over a clearing, had eaten 'a spider and a beetle (*Apogonia ferruginea* F.)' (Abdulali 1967: 172). The paratype 'was found perching singly on a tree, ca. 50 ft above the ground in the coastal forest, ca. 1 km away from the water line . . .'

(B. Biswas *in litt.* to J. T. Marshall, 24 April 1979); its stomach 'contained a mangled 4 inch gecko' (Abdulali 1978: 759).

Voice

The call of the female was rendered by S. S. Saha as 'ooo-m' (Abdulali 1978: 759) or as 'rising long drawn (lasting for 2 to 2.5 s), single syllable melancholic moan, repeated after 3 to 5 s, 'oün' . . . pouring out its steady moaning note continuously for more than 30 minutes or so . . . at about 2000 hrs . . .' (B. Biswas *in litt.* to J. T. Marshall, 24 April 1979). Territorial calls of the male (those used as taxonomic characters by Marshall 1978) are unknown.

Conservation

Since only two specimens are known, from the same place on one island, it may be that *alius* is at some degree of risk. Its possible restriction to Great Nicobar is suggested by the fact that it was not encountered on the more northerly Nicobars despite the more extensive collecting done there (Hume 1873, Butler 1899–1900, Richmond 1902).

Prior to collection of the first *alius*, the only collecting on Great Nicobar was apparently 2–3 days by A. O. Hume's party (Hume 1873) and under a month by W. L. Abbott (Richmond 1902). However, the Great Nicobar group includes the nearby Little Nicobar (Stattersfield *et al.* 1998), which is also little-known, so *alius* may occur there, and surveys are urgently needed to establish the status of *alius*. In any case, now that this well-marked, highly isolated taxon has finally received a name, the process of studying and conserving it can commence.

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A case of 'song-capture': Rufous-naped Lark uses nightjar song in place of its own song

by Jennifer F. M. Horne & Lester L. Short

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Cases of mimicry involving song are common in birds. These usually involve the learning and incorporation into its own song by one species of part or all of the song of another species; sometimes the mimicked song is taken as one of several songs in a species' repertory, as in some emberizine finches (Baptista *et al.* 1981, Petrinovich & Baptista 1987, Baptista 1988). Often these finches improvise and can acquire and employ parts of the songs of other finches, as of part of a Strawberry Finch *Amandava amandava* song and modified Lincoln's Sparrow *Melospiza lincolnii* songs by White-crowned Sparrows *Zonotrichia leucophrys* (Baptista & Morton 1988). Less frequent is the acquisition by one species of the full song of another that is then used exclusively as if it were the singer's own song. A captive Gouldian Finch *Chloebia gouldiae* learned and mimicked all but a terminal element of the song of an adjacently caged Strawberry Finch (Baptista 1973) as its sole song. Short (1966) documented the singing by a wild Field Sparrow *Spizella pusilla* of the typical trill song of a Chipping Sparrow *S. passerina* as the sole song of the Field Sparrow. All known examples involve related con-familial species, or species of the same order. We here document a case of such 'song-capture' involving the widespread African Rufous-naped Lark *Mirafra africana.* This lark typically has a relatively simple song uttered from the ground, or a perch (on a rock, fence or tree), and an aerial song that is more complex; the latter, but not the former, often contains mimicked bits from vocalisations of other birds. In some areas, such as our honeyguide study site in central

Kenya, the aerial song is rarely employed by the Rufous-naped Lark, perhaps due to sympatry with its more common congeners the Flappet Lark *M. rufocinnamomea* and especially the abundant Fawn-coloured Lark *M. africanoides*, both favouring repetitive aerial songs heard for many months of the year. The Rufous-naped Lark song involved here is its ground or perch song; and the song captured, that is, learned and sung consistently, exclusively and almost perfectly copied, is that of the common Montane Nightjar *Caprimulgus poliocephalus*.

The site is a degraded hilly woodland at 1,850 m just north of the equator and 25 km east of Lake Baringo (thus in highlands just east of the Rift Valley) on Ol ari Nyiro Ranch. At the site, that of our permanent camp, Montane Nightjars had sung nightly during late April 1994, and in parts of all preceding years back to 1983. As in all nightjars of the genus *Caprimulgus* known to us, the Montane Nightjar sings only in hours of darkness, and the short periods of near darkness about dusk and dawn. The Rufous-naped Lark occurs only sporadically about the site, which could be a factor in acquisition of an allospecific song. Males sing from the ground or a perch at intervals throughout the day, but not so early or so late as we hear aerial songs of the Fawn-coloured and Flappet larks.

At 13.51 hrs on 30 April 1994 we heard 7 or 8 Montane Nightjar songs from the slope above camp. The sun shone at the time, although the sky was partly overcast with some nimbus clouds in view. From 14.07 to 14.14 hrs we again heard these songs at *c.* 3 per minute. This continued off and on to 14.30 hrs, when they came from close at hand, ceasing at the onset of rain at 14.43 hrs. Other chores kept us from seeking the diurnally singing "nightjar" that day, although we recognised the unusual occurrence of diurnal singing (in East Africa we have not heard Montane Nightjars sing after 06.15 hrs or before 18.25 hrs). Prior to the rain we had sent an assistant to seek the singer, but he reported that the songs ceased when the bird was approached. At 16.13 hrs, following the rain, the nightjar songs commenced, continuing to 16.47 hrs at some distance, and from 16.48 to 16.52 hrs from closer to us. Joining the search we flushed a Yellow-necked Spurfowl *Francolinus leucoscepus* that landed at a point near the singing nightjar, but no nightjar or other bird flew up. Further songs came from upslope to the northwest at 16.54, 17.01 and 17.08 hrs, then sporadically to 17.50 hrs. There were three more of the songs between 18.00 and 18.13 hrs, and another three to 18.30 hrs. They ceased at that time. By 19.05 hrs it was totally dark. Then from 19.30 to 20.00 hrs the apparently identical song emanated from farther upslope.

Diurnal 'Montane Nightjar songs' (Fig. 1; rendered variously by us as *peea-leeur* or *feea-feeurr*, and by Fry *et al.* 1988 as *pee-yay-yoh, pee-yarrh*) thereafter were heard sporadically when we were at camp during the day (mainly afternoons when, after visiting one or another of our 16 honeyguide study sites, we were back for chores and note-writing). On 1 May JH was able to seek the singer, going upslope behind camp at 11.00 hrs; she tape-recorded several of the songs, played back what she had recorded, and verified that a Rufous-naped Lark was the source of the 'nightjar' songs. The rest of us (LS, assistant

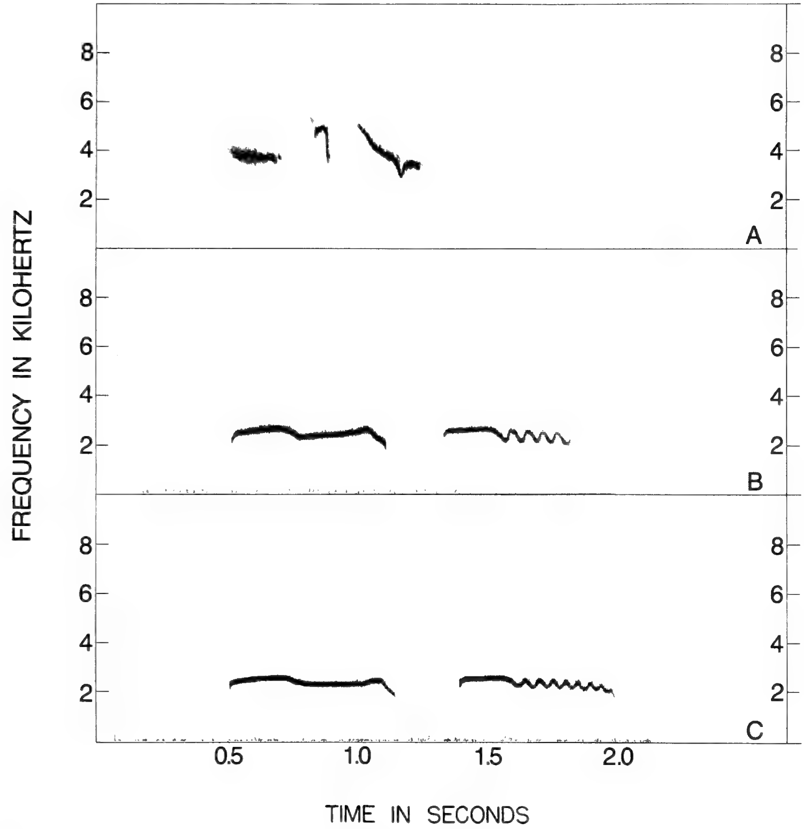

Figure 1. Sonograms of: (A) song of Rufous-naped Lark; (B) nightjar-like song of a Rufous-naped Lark; (C) song of Montane Nightjar (all from central Kenya, last one courtesy of Library of Natural Sounds, Laboratory of Ornithology, Ithaca, New York).

Stephen Njagi and technician the late Dickson Chepus) confirmed that the lark responded to the playback of 'its' song with more 'nightjar' songs. We continued to hear the diurnal 'nightjar' songs thereafter on: 2 May after 14.20 hrs, 3 May in mid-afternoon, 4 May in the morning, 5 May in the afternoon, 7 May in the afternoon (by this time, when and as we could, we put nets up about small bushes from which it had sung), and 8 May in the afternoon, when assistant Njagi observed it for a half hour, and assured us that all of the nightjar songs emanated from the lark. We then verified that the singer indeed was a Rufous-naped Lark, which by now we referred to as the 'nightjar lark'. We heard no further diurnal nightjar songs during May, and were busy with the honeyguides in their main breeding period. LS then returned to New York, and JH continued the studies through June. On 24 June the assistant reported a 'nightjar lark' singing near another honeyguide site 3 km northeast of the site at camp, on a degraded, formerly wooded slope (now grassy after April and May rains) with scattered bushes and small trees. JH verified that the singer of the nightjar-like song was a Rufous-naped Lark, presumably the same male (or, conceivably, a brother, or, assuming reproduction of such a singer, a son, or its father), and that it sang only the 'nightjar' song. On subsequent days at this site the Rufous-naped Lark continued incessantly, singing only 'nightjar' songs (25, 26, 28 June). When LS returned in early July plans were made to record again the voice of the lark, and to collect it.

Meanwhile, nocturnal Montane Nightjar songs had ceased in May, whereas a few Rufous-naped Larks still sang at several localities, all using the typical 'sweet Mary' song (sonogram in Fig. 1; rendered variously by Keith *et al.* 1992 as *tseep-tseeoo*, *tiree-tiroo* and *teeoo-teewee*, by us as *feet-be*, *pee-oh*) at about double the pitch of the Montane Nightjar's song, slightly shorter than that song and with a somewhat greater frequency range, but nonetheless a simple, whistled song remarkably like that of the Montane Nightjar both structurally and to our ears. Montane Nightjars have no other commonly heard, loud vocalisations, but Rufous-naped Larks also employ: the complex aerial song mentioned above, heard only rarely in our area (and heard not at all from the 'nightjar lark'); a single or double-noted, ventriloquial whistle uttered from a perch, that we have not heard from the lark in question; and a so-called 'alarm' call *pee-wit* or *tweekiree* that we frequently hear (*pee-wit* version; Keith *et al.* 1992), and heard from the 'nightjar lark'.

On 6 July we found the lark still singing 'nightjar' songs (and exclusively nightjar songs repeatedly) at that second site, singing from bushtop perches in a 1-ha area on a slope. We recorded its voice as it consistently sang the nightjar-like song at 2 to 5 per min, and we also recorded several of its *pee-wit* calls as we followed it about for over an hour. We collected it as it sang the 'nightjar' song from a dead bushtop located in a ring of bushes barely marking an old 'boma' (a temporary night camp and protective stock pen, probably from an earlier period of the Ranch, but possibly dating back 110 years to the occupation of the region by the now extinct Laikipiak clan of the Maasai). The habitat is degraded bushed grassland with a 20% coverage of a few trees, mostly long-dead *Olea europaea*, but mainly of bushes, especially *Carissa edulis*, *Euclea divinorum* and *Rhus* spp. The lark proved to be a male *M. africana athi* with testes to 8 mm; it weighed 47.5 g and had insect remains including fragments of ants in the ventriculus. The specimen is in the collection of the National Museums of Kenya.

The singing rates for Rufous-naped Larks given by Keith *et al.* (1992) are misleadingly rapid. We found that the rate of delivery varies greatly from 1 or 2 to up to 10 times a minute. Nor are the two parts of this lark's song always included; the first half, *swee-ee*, is uttered sporadically among series of full songs. The lark that sang the nightjar-like song occasionally rendered only this first part, and indeed Montane Nightjars often interject such a partial song among their songs.

The only additional datum from the field is that our assistant heard 'Montane Nightjar' songs during one day in mid-August 1994, while we were away, at a site 2 km from our camp and 2.5 km from the site of the 'nightjar lark' in July, and over a small hill from both. On his own he sought and located the singer, found to be another Rufous-naped Lark, singing from a bush in badly degraded bushed grassland about a water tank heavily used by elephants, buffaloes, elands, zebra and other 'game', as well as cattle. When we returned in September we could not find this lark (possibly a brother of the lark collected; our assistant is a totally reliable observer and keen naturalist with 15 years of experience on the Ranch), and in the intervening period up to the present we have heard no other diurnal nightjar songs.

There are no studies of song learning or mimesis in larks of the genus *Mirafra*. Other larks have various songs, some involving complex mimicry and incorporation of various sounds (including several whistled commands of a shepherd to his dogs) into songs (e.g., Crested Lark *Galerida cristata*; Cramp *et al.* 1988, Tretzel 1965). We note that the Rufous-naped Lark's non-aerial song is relatively simple, without mimicked portions, and seems to be readily recognisable as such throughout its considerable distribution, even though it may be learned. Presumably, during its sensitive period, the 'nightjar lark' that is the subject of this report completely captured or acquired the full Montane Nightjar's song in or near its natal area, and the song underwent no elaboration or modification. It is perfectly possible that a male Montane Nightjar had a song post very close to the nest or roosting site of the lark when it was young; the nightjar's habitat includes bushed grassland (though it is more in 'bush' and more wooded sites than usually is the precise habitat of the lark), and a Montane Nightjar sings from the same perch, an olive stub, in our camp as does the more common Dusky Nightjar *Caprimulgus fraenatus*, but not at the same time.

Structurally the songs (Fig. 1) are very similar, basically whistles with some shifts in pitch. The Montane Nightjar's song is well below the range of frequency of the song of Rufous-naped Larks, but congeners of that lark such as the Monotonous Lark *M. passerina* (and others, see sonograms in Maclean 1985) regularly sing lower-pitched songs, suggesting that various species in the genus have this capability. The exactness of the match is remarkable, as attested by our inability to distinguish the lark's song from the nightjar's. The lark matched all the rises and falls of the song at the appropriate times, and correctly shifted to the trilled ending at the time when a nightjar would do so (the trill itself is shorter than the comparable trill portion of the nightjar's, and indeed both parts of the song are slightly shorter than in the nightjar, but this does not detract from the closeness of the match).

One certainty is that the nightjar's song was learned at night. Thus, within the lark's sensitive period the template for learning is open night and day. Experimenters thus have the night hours as well as daytime for use of playback in learning experiments with at least some larks, and doubtless other birds.

A moot point is whether or not the nightjar's song employed by the lark could have attracted a potential mate for the lark. Probably this is unlikely, given the differences between the songs of the two species. Perhaps the movement of the lark from our camp site to the other site between May and June represented a shift in locale due to the failure of the lark to attract a female lark? Certainly no other Rufous-naped Lark of either sex was heard or seen at either site. Of course the singers possibly were different individuals, as it seems quite likely that two (or even 3) males could have been brothers exposed to the same nightjar tutor at the same time in their lives.

The paucity of reports of song capture (as opposed to acquisition of parts of a song for incorporation into the imitator's song, or the taking of another, even wholly unrelated species' song as one element in the mimicker's repertory) suggests that it is an unusual if not remarkable event in a few avian species.

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Birds of Pacaya-Samiria National Reserve with a new population (*Myrmotherula longicauda*) and new record for Peru (*Hylophilus semicinereus*)

by Alfredo J. Begazo & Thomas H. Valqui

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The Peruvian Amazon encompasses a variety of forest ecosystems. A relatively small but significant part of these ecosystems is the flooded forest. This unique formation has a variety of endemic plants and animals (Ayres 1993). In addition, the flooded forest represents an important component for the life cycle of fish and a source of food for local inhabitants (Padoch 1988). However, this ecosystem is among the most vulnerable in Amazonia because of its accessibility for resource extraction by water transport.

The Pacaya-Samiria National Reserve (PSNR) covers approximately 2,080,000 ha, being the largest protected area in the Amazon basin. The overall topography is dominated by a flat terrain subject to inundation to varying extents, except for a small area in the southwestern part of the reserve. Its strategic location between two major rivers and the predominantly flat terrain result in a peculiar mosaic of forest formations. As much as 51% of the total area is composed of flooded forest, 34% constitutes seasonally flooded forest, and 1% lakes and rivers; 13% of the forest is high enough to escape inundation (Malleux 1975). Seasonally flooded forest and high forest show a similar floristic composition (Encarnación 1985), whereas forest with permanent or near-permanent water shows remarkable differences in floristic composition and structure.

As the reserve's strategic location results in a great variety of forest formations, its position also entails being surrounded by a particularly high density of people. The second largest human concentration in the state of Loreto (after the city of Iquitos) is found along large rivers. Such rivers, for the most part, run across prime agricultural land, the result of seasonal sedimentation along their banks that make them particularly attractive to human settlement. In addition, large rivers represent the only means of transport for people and local products. Consequently, PSNR is subject to pressure from extractive activities of local inhabitants settled on the periphery. These extractive activities selectively affect animal species of large size which, despite being under hunting pressure, maintain relatively healthy populations within the reserve as opposed to extremely low densities or near local extinction in the surrounding unprotected areas (Begazo & Bodmer in press). Large cracids, psittacids, herons, ducks and tinamous are the groups most heavily hunted within the reserve.

The present manuscript is the result of 6 months of field work between 1992 and 1996. Extensive mist-netting and tape-recording

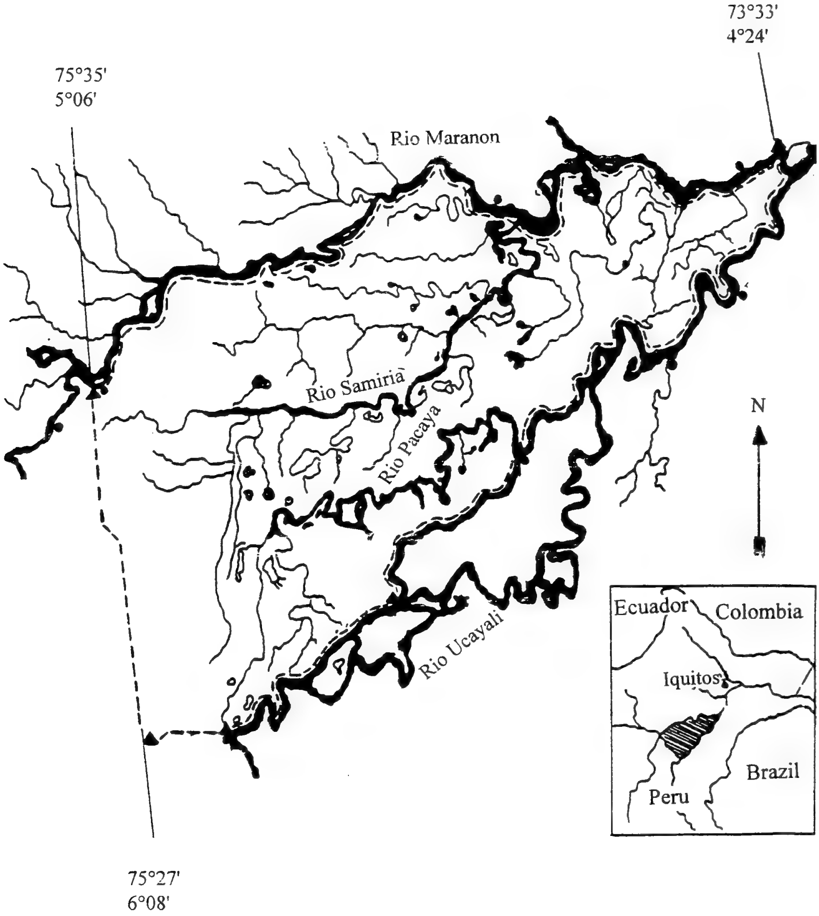

Figure 1. The Pacaya-Samiria National Reserve.

were carried out by the authors throughout the reserve at a total of 35 surveying stations, of which 14 were situated along the Yanayacu river, 6 on the Pacaya river, 13 along the Samiria river, 5 along a transect between the Marañon river and Yanayacu river, and 6 along the Marañon river including river islands (Fig. 1). At each surveying station, mist-nets were placed along freshly cut trails, and observations and tape-recordings were made in the vicinity of the mist-net lines and along previously existing trails. Transects were located randomly in a vertical fashion along the rivers within the reserve and had a varying length. Transects had a double purpose; in some cases they were used for general recording of vertebrates and plants, and in others for censusing game animals. Transects of the first kind measured 1 or

2 km from the river towards the interior of the forest; censusing transects measured 4 to 5 km. Altogether, an estimated 400 km were covered in surveys within the forest and along rivers throughout the reserve.

We follow the sequence and taxonomy suggested by Parker *et al.* (1996). In addition to our own records, we have drawn on data from previous ornithological surveys conducted within the limits of the reserve. We do not include all records from other lists. Species not observed by us were included only in cases where we obtained confirmatory evidence of their presence in the reserve, e.g. from personal communication with the author or authors of such works or from local inhabitants. A complete, annotated list of all species recorded in the reserve can be obtained from the authors on request.

Species accounts

ZIGZAG HERON *Zebrilus undulatus*

This elusive heron was recorded on three separate occasions. THV observed an individual under overhanging vegetation at the edge of slow-flowing black waters of the Pacaya river. AJB observed the species on two occasions in a slow-flowing shallow stream in the interior of the forest. The habitat agrees with that described by Davis *et al.* (1980). The birds observed by AJB were at the same place and could have been the same individual. On a separate occasion, AJB tape-recorded two individuals calling at dawn from a small body of water nearly covered by surrounding tangled vegetation at 4°24′S, 73°06′W, just outside the limits of the reserve. The birds called for about half an hour only, between 5.00 and 5.30 a.m. Given the abundance of water and the swampy nature of the predominant habitats in Pacaya-Samiria, the species should be favoured with abundant habitat. With its cryptic coloration and shy behaviour it is very easily overlooked.

SLENDER-BILLED KITE *Rostrhamus hamatus*

We frequently saw this species, mostly birds soaring at various altitudes. The typical silhouette consists of broad wings with the short tail well spread, giving the impression of a continuation of the secondary wing feathers. One individual was observed incubating eggs for three consecutive days between 6 and 9 July. The nest was placed on a horizontal limb of an isolated tree (*Pseudobombax munguuba*) at about 18 m from the ground.

WATTLED CURASSOW *Crax globulosa*

This species has not been reported in Peru in the last 35 years. It was known to inhabit riparian vegetation and river islands, which happen to be the areas where the fastest human growth has taken place. Interviews with local people on the banks of the Marañon suggested that the species still exists on the north bank. Two birds were shot in August 1996 by a local hunter near the village of Nueva Esperanza (4°51′S, 75°06′W). In addition, two birds kept in captivity were photographed and their vocalisations tape-recorded. Thorough field work is needed to determine the status of this species in Peru.

RAZOR-BILLED CURASSOW *Crax mitu*

This large game bird has been extirpated from most areas surrounding human settlements, but in PSNR there are still healthy populations (Begazo 1995). A total of 11 birds were observed in the census transects. Razor-billed Curassows seemed to be associated with forest with damp soil, especially along stream edges, where they scratch the ground in search of food. Analysis of the stomach contents of a bird shot by a local hunter showed a variety of vegetable matter including seeds and tender shoots, as well as small snails. The generalist diet of this terrestrial species (Delacour & Amadon 1973) may help explain its preference for moist soil.

SPIX'S GUAN *Penelope jaquacu*

Like the above species, Spix's Guan is much sought after by hunters. Within the reserve it is subject to sporadic hunting pressure; near human settlements on the periphery it is virtually extinct. Although Amadon & Delacour (1973) suggest that this species makes little use of the forest floor, 68% of the birds sighted (n=23) were flushed from the ground. Information obtained from local people suggests that the species breeds during the months December–March. Stomach contents of two birds contained seeds of the Huasai palm *Euterpe precatoria*.

COMMON PIPING GUAN *Pipile pipile*

Like other large Cracids, this species suffers from human persecution. Preliminary studies in three human settlements show that this is the species shot in the largest numbers. Although little is known about its natural history and movements, we suspect that the seemingly high encounter rate with hunters is due to the fact that the species is highly frugivorous and must keep moving in search of patchily distributing fruiting trees. In contrast, the lower encounter rate with territorial species such as *Crax mitu* may be explained by the fact that the latter, once hunted, take a long time to replace empty territories. A total of 21 Common Piping Guans were observed along water courses and in line transects.

PALE-WINGED TRUMPETER *Psophia leucoptera*

Groups of 3 to 11 individuals were registered on 9 occasions during the census line transects, in forest subject to seasonal flooding. The species is still common in the reserve and, to judge from their tame behaviour, they are not being hunted. On 23 February, in a location outside the limits of the reserve, a group of 6 adult trumpeters was accompanied by two young of about three weeks old and at least one juvenile, suggesting that the dominant breeding pairs may make consecutive breeding attempts in one season.

BAND-TAILED NIGHTHAWK *Nyctiprogne leucopyga*

On 8 June 1995 THV tape-recorded this species at an oxbow lake with abundant grass along the edges (5°09′S, 75°06′W). Later, the recording was compared with one of the same species from Brazil (Hardy *et al.* 1986). The species is known from the Guianas, Venezuela, the extreme east Colombia, and Brazil from Rio Negro and Madeira (Meyer de Schauensee 1970). It has also been reported from the Javari River, on the border of Peru and Brazil, about 150 km from our study site (Hilty & Brown 1986).

RUFOUS-NECKED PUFFBIRD *Malacoptila rufa*

A total of 5 individuals of this little known species were seen by both authors separately. Three birds were seen near Santa Elena check point (5°14'S, 74°50'W) and one each at surveying stations on the Samiria and Yanayacu rivers (5°13'S, 74°13'W; 5°01'S, 74°13'W). Birds observed at Santa Elena were flushed from perches about 50 cm from the ground. After flushing, they perched at about 3 m above the ground uttering a continuous high-pitched but mellow *piiiiu*. One of the birds flew back to a perch near the ground to resume foraging. It spent long periods (2–11 minutes) watching its surroundings before changing perch or performing a sally in typical *Malacoptila* fashion. Once it made a sally to take an insect from the ground.

STRIPE-CHESTED ANTWREN *Myrmotherula longicauda*

This report represents a new and disjunct population of this species found along the foothills of the Andes between 600–1,200 m (Parker *et al.* 1996). This species is fairly common at 4°56'S, 75°05'W, in an area of short vegetation (5–6 m) in which one or two plant species are predominant. Such a plant community is found in permanently flooded country with stagnant bodies of black water. It was also seen regularly accompanying flocks composed of *Myrmotherula brachyura*, *M. minitriesii* and occasionally *M. surinamensis*, which occur in a similar habitat along lake or river edges with flowing water. Other members of such flocks were *Thamnophilus amazonicus*, *Sakesphorus canadensis* and *Hylophilus semicinereus*. A manuscript on the taxonomic status and ecology of this population is in preparation by the same authors.

ASH-BREASTED ANTBIRD *Myrmoborus lugubris*

Pairs of this species are fairly common on river islands along the Marañon river. The habitat agrees with that given for the species by Ridgely & Tudor (1994); our records represent a range extension to the locality of Maipuco on the Marañon (4°49'S, 75°07'W).

BLACK-TAILED ANTBIRD *Myrmoborus melanurus*

This very local antbird was found on two occasions within the reserve. THV found it on the margin of lake Pastococha (5°10'S, 75°05'W), and AJB at Quebrada Chiric (4°56'S, 75°05'W), a small affluent of the Yanayacu river. As suggested by Ridgely & Tudor (1996), the species may have been overlooked. During extensive work along Quebrada Chiric AJB did not hear or see it during high water in early May, but in the following year during the driest month, late July, had several encounters with pairs and individuals of this species. Since *M. melanurus* seems to be associated with damp soil found at water edges, fluctuations in water levels may force birds to the interior of the forest where they are less likely to be seen by people who for the most part travel by water. As the species was only known to occur east of the Ucayali river, these records represent a significant range extension.

ASH-THROATED GNATEATER *Conopophaga peruviana*

The first recorded nest of this species was found on 30 July. While a trail was being cut in mature primary forest (5°02′S, 74°59′W), a bird was flushed from a nest 84 cm above the ground in a sapling with spreading branches. Careful inspection showed that the cup-shaped nest was placed in an already existing accumulation of dead leaves. The inner lining was of fibres, and dead leaves were carefully tucked around the exterior of the cup. When found, the nest contained two pearly white eggs with brown spots, denser at the wide end. The nest was kept under observation for 7 days, the male being found on it in the mornings and the female in the late afternoon. While incubating, they adopted a peculiar cryptic position with the head lowered, so that the cap and scapular feathers looked like a dead leaf with the bill as the petiole.

GRAY ELAENIA *Myiopagis caniceps*

A species that is probably often overlooked, as it forages high up in the forest canopy (Ridgely & Tudor 1994). We found it to be fairly common (heard or seen daily in small numbers). It frequently follows mixed-species canopy flocks where it constantly utters a characteristic call: *tuii tuii tuiiii*, sometimes followed by high-pitched trill (recordings at LNS). Birds perched somewhat horizontally on branches; two were observed regularly to flap the left wing before sally-gleaning insects from leaves.

YELLOW TYRANNULET *Capsiempis flaveola*

This distinctive tyrannulet was found in the same place (4°56′S, 75°05′W) in 1995 and 1996. The habitat is the same as that described for the Stripe-chested Antwren. Existing information on its geographical distribution shows only scattered records in southern and western Amazonia (Ridgely & Tudor 1994). AJB made tape-recordings of the typical and sometimes persistent contact vocalisations of foraging pairs as well as the trill given by individual birds. On 12–15 July 1996 a pair was observed repeatedly visiting what appeared to be an unfinished nest placed about 3.5 m from the ground in a tall shrub, in a man-made opening about 5 m from forest edge.

JOHANNES'S TODY-TYRANT *Hemitriccus iohannis*

A single individual was heard and seen within the limits of the reserve at 5°00′S, 74°58′W. The bird was foraging at about 7 m in viny but light vegetation. The same species was tape-recorded outside the limits of the reserve along the Tahuayo river, an affluent of the Amazon at 4°20′S, 71°52′W. This species seems to be rare in areas outside its known geographical range. Jose Alvarez (pers. comm.) reports the species for Rio Tigre, near the village of Intuto (specimen collected).

These records may suggest a continuous but rare occurrence of the species in the area between the main geographical distribution and the population of southeastern Colombia (Ridgely & Tudor 1994).

THREE-STRIPED FLYCATCHER *Conopias trivirgata*

Between 21 and 29 June 1995, a group of 5 individuals appeared near our house at Nueva Esperanza (4°51′S, 75°06′W), on the south bank of the Marañon river. They were identified as *C. trivirgata* on the basis of their small size, and the dark wings in contrast to the colour of their backs. The group was vocally so conspicuous that we doubt that the birds were there for the previous month that we had been at the site. A peculiar behaviour consisted of frequent chases among themselves, accompanied by loud and persistent calls both from the birds involved in the chase and from other members of the group. After 9 days of continuous observation, the group was never seen again. While the birds were around, they foraged in old second growth of *varzea* forest and frequently flew across agricultural land to reach isolated trees. This observation, and the wide scatter of isolated records of the species in Amazonia (Ridgely & Tudor 1994), may suggest some type of nomadism or even migration.

TROPICAL GNATCATCHER *Polioptila plumbea*

This widespread but uncommon gnatcatcher was seen following canopy mixed-species flocks. The purpose of mentioning this species on this account is to highlight the remarkable differences in vocalisations between birds in this locality and those of the upper Marañon river valley (Hacienda Limon) and west side of the Andes in the Department of Piura (pers. obs.). This supports Ridgely & Tudor's (1989) suggestion that two species may be involved. Recordings of these vocalisations are deposited at Cornell LNS.

GRAY-CHESTED GREENLET *Hylophilus semicinereus*

The Gray-chested Greenlet's hitherto known geographical distribution includes southern Venezuela, French Guiana (Ridgely & Tudor 1989), and extreme northwest Bolivia (Parker *et al.* 1996). We found it to be common but localised in the Pacaya-Samiria reserve. Birds were found in forest edge and in short plant communities growing in permanently flooded areas. Our evidence consists of extensive tape-recordings and a male collected and deposited in the bird division of Peru's Museo Nacional de Historia Natural Javier Prado. This is the first record of the species for Peru.

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New bird records for Unguja (Zanzibar Island)

by A. L. Archer & D. B. Iles

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In his foreword to R. H. W. Pakenham's "The Birds of Zanzibar and Pemba" (1979), Dr J. F. Monk remarks "Tourism, and the limited opportunity this offers for scientific observation, is beginning to be encouraged and it is possible that in the next decade new data will be collected which may revise the status of some species given here". This indeed has proved to be the case; with former restrictions on human movement among and within the islands having been lifted, comparatively easy access to all habitats is now possible.

Pakenham (1979) lists 183 species known from Zanzibar. Of these, 109 were known to breed on Zanzibar or outlying islets, the remainder being migrants or vagrants. The status of many of these species has now been revised with the new knowledge obtained over the past five and a half years and a further 34 species have been added to the list. Of these 14 are palaearctic migrants, 12 African mainland species, seven oceanic and one intra-African migrant.

Besides the two authors, Peter and Ursula Koehler contributed new records to the avifauna, their work concentrating mainly on Chumbe island, 12 km SSW of Zanzibar town, where they spent time during January of 1993 and 1994. ALA has visited Zanzibar on over thirty occasions between June 1990 and March 1996, spending 14 months on the island. DBI worked in Zanzibar between October 1993 and April 1995.

This paper deals with new records for Unguja and the surrounding islets. Unguja, the correct name for Zanzibar island, together with Pemba island 45 km to the north, makes up the former Zanzibar Republic, now part of Tanzania. 'Zanzibar', in this paper, refers to both Pemba and Unguja. Prior to about 1,900 bird records and specimens from the mainland coast nearby were often labelled 'Zanzibar', thus causing some confusion. Stone town is part of Zanzibar town, situated on the west coast of Unguja.

Species previously unrecorded

SHY ALBATROSS *Diomedea cauta*

One was killed by fisherman off Matemwe beach, north east Unguja, 23 November 1994. The head was brought to ALA by Ali A. Mwinyi, Conservation Officer, and is now preserved in the Zanzibar Museum.

MASKED BOOBY *Sula dactylatra*

Although known from Latham island, an uninhabited island 120 km south east of Unguja, the first record for Unguja was made by DBI on 22 July 1995 when an immature was seen being harassed by a Fish Eagle *Haliaeetus vocifer* over the shore of Chumbe island, 12 km southwest of Stone town. Two others were seen moving south on the same day, and another, also near Chumbe, was observed on 3 February 1995.

On 26 November 1995 ALA identified an adult with a broken wing tip, caught on Mnemba island, off the north east coast of Unguja. The bird was later released after recovery.

FRIGATEBIRD *Fregata* sp.

A single bird observed near Bawe island, Zanzibar bay, by DBI on 17 December 1994, was immature and could have been either a Greater *F. minor* or Lesser Frigatebird *F. ariel.*

BLACK-HEADED HERON *Ardea melanocephala*

ALA observed a single bird in breeding plumage on Bawe island on 23 January 1993. Subsequently on 8 July 1993 he saw two near

Ngomani and three others near Jongowe, both villages on Tumbatu island lying off the north west coast of Unguja.

OPEN-BILLED STORK *Anastomus lamelligerus*

Apart from six seen at Msuka Bay, Pemba, in January 1922, there were no other records for the islands until one was seen by ALA on 10 June 1991, flying near Kibandiko island towards the Unguja coast; it was being pursued and mobbed by several Indian House Crows *Corvus splendens*. On 27 January 1992 he recorded another flying 2 km north of Bububu, Unguja. DBI saw one flying low along the north coast of Chumbe island towards Unguja 2 April 1995 and another was seen at Bwawani swamp, Stone town, on 5 November 1995.

CROWNED CRANE *Balearica regulorum*

On 26 June 1992 one with a broken leg was brought to the aviary at the Zanzibar Museum. It was one of four which had arrived in a rice field east of Masingini forest. Local hunters had been quickly alerted and all four were shot, the one survivor being taken to the museum aviary where it died a month later.

HOTTENTOT TEAL *Anas hottentota*

This duck has only been recorded from Bwawani swamp. First observed by ALA on 23 June 1990 when a pair was seen; then four on 3 November 1990. Subsequently both authors encountered these ducks on nearly every visit to the swamp, with a maximum of 16 on 3 October 1993. Successful breeding was recorded in July and August with five, six and seven ducklings observed. The increase in numbers and the presence of well-grown ducklings could be the result of the major reduction in the number of Indian House Crows which used to infest the swamp area. Despite careful inspection of numerous other ponds on the island, no others have been seen.

EURASIAN MARSH HARRIER *Circus aeruginosus*

A male seen soaring near Charawe, east of Jozani forest by ALA and D. A. Turner on 4 November 1991 was the first record for Unguja. On 5 November 1993 DBI saw a female at Bwawani swamp.

AFRICAN HOBBY *Falco cuvieri*

Several sightings of this falcon have been made by both authors, the first on 1 November 1990 by ALA at Bwawani swamp. Subsequent sightings have been made at Pangeni Ranch, Chumbe island and Unguja Ukuu, a village south east of Stone town. A pair was seen in flight display by DBI near Unguja Ukuu, indicating possible breeding.

PURPLE GALLINULE *Porphyrio porphyrio*

First observed on Unguja, 3 November 1991 when two were observed by ALA, at Bwawani swamp, where they were seen for the next four days. Further sightings of one or two were made by both authors up to 8 February 1995. An adult, with a partially grown chick, were observed on 14 July 1992 and again on 25 September 1992 when the immature was about full grown.

STRIPED CRAKE *Porzana marginalis*

A single female or possibly immature seen at Bwawani swamp by ALA and D. A. Turner on 5 and 7 November 1991.

LITTLE RINGED PLOVER *Charadrius dubius*

A flock of *c.* 15 was observed at rest on open ground alongside the Dongwe/Michamvi road, east of Stone town, by ALA on the evening of 21 March 1995.

LESSER (PACIFIC) GOLDEN PLOVER *Pluvialis fulva*

Two coming into breeding plumage seen by ALA on 10 April 1993 on Bawe island.

MARSH SANDPIPER *Tringa stagnatilis*

A single was seen by ALA at Bwawani swamp on 23 August 1991 and again at the same locality on 6 November 1991. Alan Tye (pers. comm.) recorded one on tidal flats at Mbweni, 4 km south of Stone town, on 21 January 1995.

RUFF *Philomachus stagnatilis*

ALA and D. A. Turner observed a single bird at a "fresh water" drain flowing into the creek near Livingstone House, Stone town on 5 November 1991.

ARCTIC SKUA *Stercorarius parasiticus*

A subadult light or barred morph was washed ashore at Chumbe island following a heavy storm on 14 March 1993. It was released after being photographed (Koehler & Koehler 1994).

POMARINE SKUA *Stercorarius pomarinus*

A second winter light morph was captured on the shore of Chumbe island on 18 January 1993, again after a heavy storm. It was photographed and released only to be killed by a cat (Koehler & Koehler 1994). DBI observed an immature chasing terns off Chumbe island on 3 January 1994.

BLACK-HEADED GULL *Larus ridibundus*

ALA recorded 11 on 23 January 1992 at the abandoned fresh water swimming pool adjacent to Bwawani swamp, Stone town. On 3 February, the same observer counted 60 on, or flying over, the tidal mudflats close by. DBI noted a single immature which frequented Stone town harbour between 17 December 1993 and 17 February 1994.

It is surprising that there are no other records of this gull which has expanded its range in eastern Africa dramatically since 1971 (Britton *et al.* 1980).

COMMON NODDY *Anous stolidus*

Although known from Latham island in thousands, no records existed for Unguja until Peter and Ursula Koehler observed one, two, one and four between 9 and 25 January 1993, together with mixed flocks of terns off Chumbe island. DBI recorded *c.* 500 among a concentration of *c.* 3,000 terns seen from the ferry while crossing between Dar es Salaam and Zanzibar on 17 December 1994.

LITTLE/SAUNDERS'S TERN *Sterna albifrons/saundersi*

With the lack of specimen material it is possible both species occur. Because of their great similarity in non-breeding plumage and their overlap in range, we have combined the two for the purpose of this paper. In their present numbers it is inconceivable that R. H. W. Pakenham, J. H. Vaughan, D. A. Baird and other observers would have missed these distinct small terns. Although Pakenham's (1979) references extend to 1977, little ornithological work was done on the islands after the 1964 revolution. It therefore seems safe to assume that the terns are a comparatively recent addition to the island's avifauna. The first record by ALA was of *c* 10 on Bawe island on 6 February 1991, followed by *c.* 45 and *c.* 90 on 23 January and 6 November 1993 respectively at the same place, *c.* 100 on Mnemba island on 6 April 1994, and *c.* 80 near Jambiani on the east coast of Unguja on 22 March 1995. DBI recorded large numbers resting on the beach at Paje, east Unguja, on 10 December 1994.

SOOTY TERN *Sterna fuscata*

This species breeds in tens of thousands at Latham island but was unrecorded in Unguja until 9 and 11 September 1994 when DBI and ALA saw two over a Roseate Tern *S. dougallii* breeding colony off Chumbe island. DBI had a further sighting of six among mixed tern flocks on 10 November 1994.

EURASIAN CUCKOO *Cuculus canorus*

Two cuckoos believed to be of this species were seen by ALA near Kizimkazi on 12 April 1993. On 7 April 1994 two or three were seen near Kijini, north Unguja. One observed at close range showed narrow black bars on the underside of the tail and lacked a yellow base to mandible, separating it from the African Cuckoo *C. gularis*. On 9 April 1995 DBI saw a grey cuckoo in flight near the seashore at Chukwani, south of Stone town, which was thought to be this species.

EURASIAN NIGHTJAR *Caprimulgus europaeus*

Although not listed by Pakenham (1979), he noted that Cabanis recorded one taken in Zanzibar town in February 1876 and clearly identified. DBI netted and ringed a male on Chumbe island on 28 February 1994.

EURASIAN SWIFT *Apus apus*

At least 2,000 were observed passing Chumbe island on 16 January 1993 (Koehler & Koehler 1993). On 23 January 1993 ALA and N. E.

Baker saw 40–50 swifts, which were probably this species, overflying Bawe island.

MOTTLED-THROATED SPINETAIL *Telecanthura ussheri*

Only recently recorded from Pemba (Archer & Turner 1993), this species has now been found to occur on Unguja. On 13 June 1995 a pair was seen by ALA at Fumba and on the same day one was observed at Bweleo, both sites on the Fumba peninsula, south of Stone town. DBI recorded one over Chumbe island on 3 August 1995 in association with Little Swifts *Apus affinis* and two over Jozani forest tree nursery, Unguja, on 15 August 1995. ALA saw two birds there on 2 September 1995.

CARMINE BEE-EATER *Merops nubicus*

The only record for Unguja is of a single bird photographed perched in a *Casuarina* tree outside Jozani forest by Mrs Becky Browning in January 1991.

SAND MARTIN *Riparia riparia*

One observed by ALA and D. A. Turner flying over Bwawani swamp on 5 November 1991. Peter and Ursula Koehler (pers. comm.) recorded one on Chumbe island on 17 January 1993, and DBI saw a single bird among Eurasian Swallows *Hirundo rustica* over Bwawani swamp on 11 November 1993.

EAST COAST AKALAT *Sheppardia gunningi*

A single sight record, believed to be of this species, was made by H. J. Beentje in December 1989 in Jozani forest. Subsequently ALA netted and ringed an adult on 27 January 1991 and DBI netted and ringed four individuals between 13 November 1994 and 4 April 1995, all in Jozani forest.

SEDGE WARBLER *Acrocephalus schoenobaenus*

DBI recorded three in reeds at Bwawani swamp on 2 April 1994 and at least six with Lesser Swamp Warblers *A. gracilirostris* between 17 and 30 April 1994.

OLIVACEOUS WARBLER *Hippolais pallida*

A single bird well observed and identified by Peter and Ursula Koehler (pers. comm.) at Chumbe island on 13 January 1994.

WOOD WARBLER *Phylloscopus sibilatrix*

This scarce palaearctic migrant to Eastern Africa was identified by DBI on Chumbe island 21 March 1995; a single bird feeding in a *Casuarina* tree observed at close quarters for an hour.

WILLOW WARBLER *Phylloscopus trochilus*

Two sightings, made by DBI, of single birds in the People's Garden, Stone town, on 6 and 20 April 1994.

STRAW-TAILED WHYDAH *Vidua fischeri*

A male was seen at Fukuchani ruins by ALA and Andrew Browning on 2 May 1992 with Pin-tailed Whydahs *V. macroura* and Orange-winged Pytelias *Pytelia afra* in the vicinity. A second sighting, by DBI, was made near Bwawani swamp on 6 April 1994. It is possible that these were escaped cage birds but the species is recorded from Dar es Salaam.

EASTERN PARADISE WHYDAH *Vidua paradisaea*

Two wardens on Chumbe island watched a male at close range as it fed near the west cliff, in March 1994. Their detailed description was clearly of this species.

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Natal pterylosis of tanagers II: *Tachyphonus, Ramphocelus* and *Tangara*

by Charles T. Collins & Tamara A. Araya

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Although the natal pterylosis of Neotropical passerine birds has been given some attention (Collins 1963, 1973, Collins & Bender 1977, Wimer & Collins 1994) there still remain wide gaps in our knowledge. Often, generalizations about large and diverse families (i.e. Furnariidae) can only be made on the basis of a few specimens representing a small number of species and genera (Collins *et al.* 1991). Our knowledge of the natal pterylosis of tanagers (Thraupidae; 235 species in 58 genera, Paynter & Storer 1970) is currently limited to studies of 6 species in 4 genera (Collins 1963, 1973, Ingels 1979, Wetherbee 1958). In this paper we present data on 3 additional species in 3 additional genera (*Tachyphonus*, *Ramphocelus*, and *Tangara*) of this diverse assemblage of largely Neotropical birds. We also present supplementary data on two species of *Thraupis* considered earlier (Collins 1963, Ingels 1979).

Counts of natal downs were made from 26 specimens examined under a binocular dissecting microscope. The number and distribution of natal downs (neossoptiles) were recorded (Table 2, 3) using the terminology for neossoptile tracts and regions within tracts proposed by Wetherbee (1957) and Collins & Keane (1991).

Six specimens of *Tachyphonus rufus* (all Stage A, Wetherbee 1957: 356) were examined: two collected from each of 2 nests on 19 June 1963 and 26 July 1964 in Arima Valley, Trinidad, and 2 from one nest on 22 July 1976 in Los Anaucos, Est. Miranda, Venezuela. Six specimens of *Ramphocelus carbo* (4 Stage A, 2 Stage C) were examined: 3 were collected from one nest in 1963 (date not recorded), 2 from a nest on 22 July 1964 and one from a nest on 22 September 1964, all from the vicinity of Arima or Arima Valley, Trinidad. Two specimens of *Tangara mexicana* were examined; both were collected from one nest on 19 May 1964 at Waller Field, Trinidad. Three new specimens of *Thraupis palmarum* (Stage A) were examined: one collected on 6 May 1963, and two from one nest on 3 and 4 August 1964, all in Arima Valley, Trinidad. Two additional specimens (Stage A) collected at the same site in 1962 (Collins 1963), were re-examined in this study. Seven specimens of *Thraupis episcopus* were examined: a single chick was collected on 18 June 1964 (Stage B), and 2 from each of three nests on 20 June 1963 (Stage A), 18 June 1964 (Stage A), and 19 July 1964 (Stage C) all in the vicinity of Arima, Trinidad.

The total neossoptile counts in these tanagers, all of which build a typically open cup type of nest, ranged from 64 in *Ramphocelus carbo* to 238 in *Thraupis palmarum* (Table 1), with substantially greater similarity within species and genera (Tables 2 & 3). Only *R. carbo* seemed uniformly lower in total neossoptiles than the other species. Two specimens, including the one with the lowest total neossoptile count (64), were somewhat older (Stage C) when loss of some downs is quite likely; the total for this species (Table 1) may be artificially low. Even so, *R. carbo* has appreciably more neossoptiles than the total of 32 reported for *Euphonia violacea* (Table 1), the only closed-nest tanager species examined to date. The total for *R. carbo* is more similar to that of *Tersina viridis* (77–107 total neossoptiles; Collins 1973), a unique fruit-eating tanager which builds its open nest within cavities and burrows (Schaefer 1953, Collins pers. obs.). As previously documented for the Tyrannidae (Collins & McDaniel 1989), closed-nest species typically have few or no neossoptiles while open cup nesting species may have 154–607 neossoptiles (Wetherbee 1957, Collins unpublished). The one specimen of a temperate zone tanager examined to date, *Piranga olivacea* (Wetherbee 1958), had a total of 227 neossoptiles. This is only marginally less than the largest totals reported here (Table 1) for these tropical species. Intrageneric comparisons have shown temperate species to have more neossoptiles

TABLE 1
Total neossoptile counts in tanagers (Thraupidae). n=no. of specimens

Species	Total number of neossoptiles average	(range)	*n*	Source
Tachyphonus rufus	132	(111–147)	6	This study
Ramphocelus carbo	81	(64–108)	6	This study
Tangara mexicana	160	(152–167)	2	This study
Thraupis episcopus	164	(114–215)	7	This study
Thraupis episcopus	171	(162–175)	5	Ingels 1979
Thraupis palmarum	209	(192–222)	3	This study
Thraupis palmarum	175	(173–177)	2	Ingels 1979
Thraupis palmarum	204	(184–224)	2	Collins 1963
	205	(172–238)	2	Re-examined here
Thraupis sayaca	151	—	1	Ingels 1979
Tersina viridis	102	(77–107)	8	Collins 1973
Euphonia violacea	32	—	1	Collins 1963
Piranga olivacea	227	—	2	Wetherbee 1958

than tropical congeners (Collins & Minsky 1982, Wimer & Collins 1994); intergeneric comparisons, as those in this study, do not show this pattern as clearly.

Partial data are available for two additional species of Tangara: *T. cayana* and *T. arthus* (Table 2). However, these specimens were examined with a hand lens under field conditions and the very small pale neossoptiles of the primaries, secondaries and abdominal region may have been missed; hence the total number of neossoptiles for these species could not be determined. However, for those tracts and regions which could be examined, there is a general agreement with the neossoptile counts recorded for *T. mexicana* (Table 2), suggesting an overall intrageneric similarity. This same problem was noted for thrushes which were examined in the field as part of growth studies (Wimer & Collins 1994). Only detailed study of preserved specimens is likely to produce accurate neossoptile counts.

Two specimens of *T. palmarum* examined earlier (Collins 1963) were restudied here. The total neossoptile counts were different from the totals reported earlier, mostly due to documented losses of downs. However, in one specimen some of the very short downs on the primaries and secondaries were not included in the earlier counts. These omissions led to a higher observed total neossoptile count for one of the restudied specimens (Table 1).

In four specimens of *T. episcopus* and three of *T. palmarum*, 1–5 unpaired neossoptiles were noted in a medial row bordered by the 6–11 paired downs, lateral to the midline, in the mid-dorsal region of the spinal tract. This is similar to the more posterior medial pelvic row, bordered by the lateral pelvic rows (Collins & Bender 1977), and the recently described interscapular region (Collins & Keane 1991), an unpaired medial row which overlaps the anteriormost pairs of mid-dorsal neossoptiles. The unique unpaired medial row noted here

TABLE 2

Neossoptiles present in *Tachyphonus*, *Ramphocelus*, and *Tangara* tanagers

Tract (region)	*Tachyphonus rufus*						*Ramphocelus carbo*						*Tangara mexicana*		*Tangara cayana*		*Tangara arthus*	
Capital																		
(coronal)	11/9	9/11	10/9	8/8	10/10	8/7	11/9	7/8	9/9	10/10	8/8	6/7	11/11	11/11	8/10	9/10	12/12	13/12
(occipital)	5/6	7/6	7/7	6/6	5/6	5/5	5/5	2/2	4/4	3/3	2/3	2/3	5/6	4/5	1/0	3/3	6/8	5/5
Spinal																		
(mid-dorsal)	6/7	7/8	7/7	6/6	7/7	6/7	6/8	6/5	2/2	5/6	5/5	6/6	8/8	10/9	6/5	6/7	7/6	8/11
(pelvic)*	7	10	10	9	10	7	9	7	9	10	8	11	10	12	8	8	14	10
(lateral pelvic)	–	–	–	0/1	–	1/5	1/1	1/1	0/0	0/0	0/0	0/0	1/1	1/1	–	–	3/3	1/1
(spinal)*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Scapular	9/7	8/6	6/7	7/7	6/8	7/7	6/6	3/4	4/3	5/4	5/6	3/3	9/9	9/9	8/7	8/9	7/8	6/6
Femoral	9/7	8/9	8/8	5/6	8/7	8/5	6/5	6/6	9/8	4/5	4/4	6/0	9/9	11/11	8/8	9/8	5/4	4/4
Ventral																		
(abdominal)	–	2/4	–	–	0/5	1/0	–	–	–	–	–	–	1/2	8/9	?	?	?	?
(axillar)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Crural	–	2/1	–	–	–	7/7	–	–	–	–	–	–	–	–	–	–	–	–
Caudal	6/6	6/6	5/5	5/5	6/6	6/6	0/0	0/0	0/1	6/6	5/5	6/6	6/6	6/6	6/6	6/5	6/6	6/6
Alar																		
(primaries)	–	–	–	–	–	–	–	–	–	3/10	1/1	3/4	3/3	5/6	?	?	?	?
(greater primary coverts)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
(secondaries)	2/2	2/2	2/2	–	2/2	2/2	–	–	–	3/3	–	–	2/2	2/2	?	?	?	?
(greater secondary coverts)	9/9	9/9	9/9	7/7	8/9	8/8	–	–	0/5	3/4	2/2	3/2	9/9	9/8	9/8	8/8	8/8	8/8
(mid sec. cov)	6/7	7/7	7/7	6/6	6/6	7/7	6/6	4/2	2/3	2/3	–	–	8/7	9/10	6/5	5/6	6/6	6/6
(carpal remex)	0/1	0/1	–	–	–	–	–	–	–	–	–	–	–	1/1	?	?	?	?
(patagial coverts)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	131	147	132	111	132	139	90	64	74	108	74	77	155	186	?	?	?	?

*Unpaired medial row; all others paired (right/left).

TABLE 3
Neossoptiles present in *Thraupis* tanagers

Tract (region)	*Thraupis episcopus*							*Thraupis palmarum*				
Capital												
(coronal)	7/8	15/14	12/11	12/13	8/8	14/13	7/9	18/16	13/16	16/15	13/17	17/16
(occipital)	3/4	9/11	9/8	7/8	3/3	8/7	4/5	5/5	5/5	5/5	0/1	4/4
Spinal												
(mid-dorsal)	6/6	9/11	10/11	9/9	6/6	6/5	3/7	12/11	10/11	7/9	7/6	5/6
(pelvic)*	8	11	10	13	9	8	8	12	13	11	11	12
(lateral pelvic)	0/0	7/5	6/7	4/4	0/0	3/9	5/6	3/2	3/4	1/1	3/1	1/0
(spinal)*	0	5	3	1	0	2	0	0	1	0	2	1
Scapular	5/6	9/9	9/9	10/10	5/5	10/8	8/8	9/9	9/9	10/10	10/9	10/10
Femoral	7/6	17/17	16/16	18/18	6/6	16/14	10/8	16/17	11/13	19/25	23/21	17/15
Ventral												
(abdominal)	0/0	0/0	3/1	3/0	0/0	4/5	2/1	15/13	11/9	12/10	15/1	12/1
(axillar)	–	–	–	–	–	–	–	–	–	–	2/2	1/0
Crural	–	–	–	2/3	–	–	–	2/4	–	3/5	4/3	1/0
Caudal	6/6	6/6	6/6	5/6	6/5	2/4	2/3	6/6	6/6	6/6	6/6	6/6
Alar												
(primaries)	9/9	2/0	6/5	9/9	4/0	–	–	2/4	2/2	5/5	10/10	–
(greater primary coverts)	–	–	–	–	–	–	–	–	–	7/7	–	–
(secondaries)	8/8	1/0	3/2	3/3	2/2	2/2	2/0	–	–	8/8	7/7	–
(greater secondary coverts)	2/3	9/9	9/9	10/10	3/5	8/6	8/8	9/9	9/9	9/9	10/10	9/6
(middle secondary coverts)	3/4	8/8	8/8	8/8	7/9	3/5	6/6	6/6	8/7	8/8	8/8	6/6
(carpal remex)	–	–	1/1	–	1/1	–	–	1/0	–	1/1	–	–
(patagial coverts)	–	–	–	–	–	–	–	–	–	–	2/3	–
Total	124	198	205	215	114	164	126	213	192	222	238	172

*Unpaired medial row; all others paired (right/left).

appears to represent an additional undescribed region of the spinal tract which we propose to call the spinal region. However, examination of additional species, in this or other passerine families, may show this spinal region to be at times contiguous with either the interscapular or midpelvic region and not the distinct region it appears here. The previous studies of *Thraupis* tanagers (Collins 1963, Ingels 1979) did not differentiate any regions within the spinal tract.

Current evidence indicates that most neossoptiles are fully developed at hatching (Wetherbee 1957: 356). However, as noted by Ilyashenko (1984), in a few cases some neossoptiles only appear 2–3 days post-hatching. In one specimen of *Thraupis palmarum* 7 primary covert and 8 secondary neossoptiles were present only as largely unerupted dark streaks, 1–2 mm long, under the skin. The tips of 2–3 of these protruded for less than 1 mm through the skin; all would have fully erupted within a day or two of hatching. At this stage no contour pin feathers were observable so these streaks were clearly unerupted neossoptiles and not incoming teleoptiles. Such unerupted neossoptiles should not be equated with the dense coat of whitish "secondary down" which erupts 5–7 after hatching in *Elaenia* flycatchers (Skutch 1960: 303). These "secondary downs" are located in "regions *between* the tracts of natal down" (Skutch 1960). They are not associated with incoming teleoptiles and thus cannot be true neossoptiles. They are probably early-appearing down or semiplume portions of the juvenal (teleoptile) plumage as previously reported for *Notiochelidon cyanoleuca* (Hirundinidae; Arnold *et al.* 1983). Other reports of second coats of natal down in passerines (*Erithacus*, *Lucinia*; Cramp 1988) should be critically reexamined.

The great diversity in latitudinal range and nesting habits of the tanagers makes them an appropriate group in which to examine in more detail some of the ecological correlations previously noted in other families. However, as pointed out earlier (Collins 1990), more specimen material will have to be collected before such studies are possible.

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New and noteworthy bird records from Honduras

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From an ornithological standpoint, Honduras remains one of the least studied countries in Central America. Little has been published since Monroe's survey in 1968. This paper is based on over 25 cumulative years of residence in Honduras (DA 3.5, MB 3.5, PT 20), during which the observation of birds was a central aspect of our work. We report here significant information on 17 species, including 8 previously unreported for Honduras. We also update information for some species already recorded in Honduras, but whose status is poorly substantiated in the literature or which have not been reported since Monroe.

The majority of our sightings originated from fieldwork in two main areas: Las Marias, in the Río Plátano watershed 25 km south of the Caribbean coast, Dpto. Gracias a Dios; and the Sierra de Agalta mountain range and surrounding communities, principally Gualaco, El Boquerón, and La Venta, in Dpto. Olancho. Las Marias is situated in the Río Plátano Biosphere Reserve of the Honduran Mosquitia region in the midst of more than 250,000 ha of lowland rain forest with few human inhabitants and scant disturbance. The Sierra de Agalta retains mixed pine-oak woodlands, cloud forests, and lower montane wet forests, with the surrounding valleys dominated by agriculture. It is contiguous with the lowland forests of the Mosquitia.

WHITE PELICAN *Pelecanus erythrorhynchos*

Although not previously reported for Honduras, PT has observed this species on both the Pacific and Caribbean coasts. In March 1993 three individuals were observed with eight Brown Pelicans as they rested on a beach of Laguna de Los Micos, 10 km west of Tela, Dpto. Atlántida. Local residents told her that these birds had been appearing at the same beach for the last 2–3 years. PT first heard reports of White Pelicans in the Bay of Fonseca in 1993 and on 28 June 1997 personally observed more than 30 near San Bernardo, Choluteca Department.

SEMIPLUMBEOUS HAWK *Leucopternis semiplumbea*

This species was previously reported only twice in Honduras, and but once this century (Monroe 1968, Marcus 1983). DA made observations of 6 different individuals of this species from 25 January to 27 May 1996 while working in the vicinity of Las Marias. One observation (8 March) included a prey transfer of an unknown lizard species to a bird that may have been immature, based on faint white streaking on the face. Five of the sightings were in primary, lowland rain forest, and the remaining one in regenerating forest surrounded by primary forest and agricultural plots. They were distinguished from the similar *Leptodon cayenensis*, which was also present locally, by their shorter tail, yellow eye, orange cere and legs, and smaller size.

HARRIS' HAWK *Parabuteo unicinctus*

DA observed one adult at close range on 16 January 1993 near Monjarás, Dpto. Choluteca. The bird was flying 6 m high over arid thorn scrub habitat. PT has also seen individuals in this vicinity. The sooty brown plumage with rufous thighs and wing coverts made the birds unmistakable. This species has not been previously reported from Honduras. The nearest published observations were in Dpto. La Paz and Usulatan, in El Salvador (Thurber *et al.* 1987).

HARPY EAGLE *Harpia harpyja*

DA photographed a Harpy Eagle on 12 April 1996, 12 km southwest of Las Marias at a site known as Walpulbantara Petroglyphs along the Río Plátano. The bird was observed for 24 min, and appeared to be perch hunting (flying from tree to tree and actively scanning the vicinity). Massive yellow tarsi, fine black barring on the thighs, white underparts, black breast, and gray double crest clearly separated this species from *Morphnus guianensis*. The scapulars were an ashy gray, indicating the bird was not a full adult. The habitat was primary rain forest. Additionally, two adults were photographed together in the

Valle Sutawala, Dpto. Gracias a Dios in October 1991 (V. Murphy pers. comm.). Together these observations suggest a breeding population in Honduras.

BLACK-AND-WHITE HAWK-EAGLE *Spizastur melanoleucus*

Other than a decapitated head of this species reported by Howell & Webb (1992) in Tela, Dpto. Atlántida, there have been no published records since 1950 (Monroe 1968). DA observed an adult flying over Cerro Uhjuri, 4 km northeast of Las Marias on 2 April 1996, and another adult both perched and flying in the Quebrada Wahawala drainage 6 km southwest of Las Marias on 1 and 3 April 1997. They were distinguished from other white raptors by the presence of a red cere, black lores, small black crest, completely white underparts including the tarsi, and blackish upperparts with white wing coverts. Both birds were observed in primary rain forest.

WHITE-THROATED CRAKE *Laterallus albigularis*

Monroe (1968) only knew of one record for this species in Honduras and its range in relation to that of the Ruddy Crake *L. ruber* is poorly known (Howell & Webb 1995). DA found this species to be ubiquitous in tall grasses along the Río Plátano. Two separate family groups (one with a single chick and one with two) were observed on 25 April 1997 and the long trilling calls were heard throughout the months January–June. No calls of *L. ruber*, with which DA is also familiar, were heard.

BLACK-AND-WHITE OWL *Ciccaba nigrolineata*

There have been only two reports for this species in Honduras including a specimen collected in 1891 (Monroe 1968, Howell & Webb 1992). Both observations were from the Caribbean coast. We found another specimen preserved as a live mount in the collection of the Universidad Nacional Autónoma de Honduras in Tegucigalpa. The bird was collected in October 1979 near San Marcos de Colón, Dpto. Choluteca, in southern Honduras. San Marcos is the site of some still intact, but rapidly dwindling, dry forests. MB also observed a Black-and-white Owl at close range in the Sierra de Agalta on 2 February 1996. This species is apparently well-distributed in the country, and the paucity of sightings most likely the result of its nocturnal habits.

STRIPED OWL *Asio clamator*

This species is apparently rare north of Panama and was previously known from Honduras by a single specimen (Monroe 1968). DA skinned a second bird collected in 1993 in the vicinity of Comayagua in Dpto. Comayagua; the specimen was deposited in the Louisana State University Museum of Natural Science collection (LSUMZ# 161,378). The bird had died after being captured as a nestling in grassy swales near the city.

OCELLATED POORWILL *Nyctiphrynus ocellatus*

There is only one confirmed record of this species north of Costa Rica (Eisenmann 1955), and in Costa Rica it is known from a single breeding population near Brasilia (Stiles & Skutch 1989). DA found a female incubating two eggs on 16 May 1997, 2 km southwest of Las Marias (photographs deposited in the WFVZ and LSUMZ collections) and heard the calls of this species frequently at night in 1996 and 1997.

BRONZY HERMIT *Glaucis aenea*

This species is one of the most common hummingbirds in *Heliconia* thickets in the Río Plátano watershed. On 16 February 1996 an individual flew into a window in Las Marias. When caught and released it dropped several tail feathers which have been deposited in the Western Foundation of Vertebrate Zoology (WFVZ, 53-181). This is the first report of this species for Honduras.

HONDURAN EMERALD *Amazilia lucia*

On 2 January 1996, MB confirmed the existence of a population of this species 30 km northeast of Gualaco in the Agalta Valley. Upon return visits by MB and DA (31 January 1996, 21 June 1997) it was the most common hummingbird at this locality. The available habitat of thorn forest consists of less than 100 ha, all on private land, at an elevation of 500 m above sea level. This forest is rapidly being cleared for conversion to rice fields and cattle pastures. MB has searched extensively in the Guayape Valley where the species was collected in 1937 (Monroe 1968) but was unable to locate any remaining suitable habitat. Conservation programmes for this species are urgently needed. This record establishes only the second known remaining area of occurrence (combining "Coyoles" and "Olanchito"; Howell & Webb 1989).

GREEN-AND-RUFOUS KINGFISHER *Chloroceryle inda*

On 2 June 1997 DA observed a male of this species as it flew up a densely wooded stream 2 km northwest of Las Marias and perched nearby for 5 min. The bird was distinguishable by its glittering green back, buff throat, and deep rufus breast and undertail coverts. It was clearly larger than the Pygmy Kingfisher *Chloroceryle aenea*, also present in the area, and lacked white on its underparts. This is the first record of this species for Honduras.

FULVOUS-BELLIED ANTPITTA *Hylopezus fulviventris*

Although recently considered of doubtful occurrence in Honduras (Howell & Webb 1995), DA found this species to be common in successional habitats along the Plátano River, especially where land cleared for agriculture has been left fallow and allowed to regenerate into dense thickets. Three males with enlarged testes were collected while singing and have been deposited in the WFVZ collection (52-988–52-990). This represents a 450 km northward extension of the known range of this species (Monroe 1968).

THREE-WATTLED BELLBIRD *Procnias tricarunculata*

Although previously reported from the Sierra de Agalta (Monroe 1968), recent accounts of this species state that it does not breed there

(Howell & Webb 1995, Wege & Long 1995). We have found calling males exceedingly common in May and June in montane wet forests from 600 to 2,100 m elevation, and have recorded them in most other months of the year (March, April, July, August, November). We have also frequently heard the raspy, wavering calls of birds we suspect to be immature males. We feel that this information strongly indicates the presence of a breeding population in Honduras.

WHITE-VENTED EUPHONIA *Euphonia minuta*

MB made repeated observations of a male in January 1996 in La Venta, Dpto. Olancho in bottomland habitats along the Río Mataderos. The bird was seen feeding in mixed flocks of other *Euphonia* species (*E. affinis* and *E. hirundinacea*) and was identified by its clearly white undertail coverts. This is the first record for Honduras, although the species has been recorded from Guatemala and Nicaragua.

NORTHERN CARDINAL *Cardinalis cardinalis*

PT first discovered Northern Cardinals on the Swan Islands, 200 km north of the Honduran mainland, in June 1996 when 2–3 males were observed singing. The species has been seen there in subsequent visits, with 4–10 birds observed on any given visit. Given the distance from the nearest known breeding population (Belize) and the isolation of the islands from the mainland, we suspect that these birds are escapees, a view corroborated by local residents. We are unsure of the current population trend. This is the first report of this species for Honduras.

WHITE-EARED GROUND-SPARROW *Melozone leucotis*

MB has made repeated observations of White-eared Ground Sparrows at 1150 m on Cerro Agua Buena in the El Boquerón National Monument, Dpto. Olancho since 11 February 1993. An adult was flushed from a nest containing one egg and one nestling on 27 May 1997 in the same vicinity, and one adult and a nest were photographed on 31 July 1997 (photographs deposited in LSUMZ). The birds are typically found in the thick undergrowth of 7 m tall regenerating forest. The species is known from the highlands of Chiapas, Guatemala, El Salvador, and Nicaragua, but this is the first record for Honduras (Ridgely & Gwynne 1989).

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A new plumage of the White-winged Nightjar *Caprimulgus candicans* (Aves: Caprimulgidae)

by Bernabé López Lanús, Robert P. Clay &
James C. Lowen

Received 30 September 1997

The White-winged Nightjar *Caprimulgus candicans* is one of the least known caprimulgids in the Americas (Collar *et al.*, 1992, Lowen *et al.*, 1996b) and is considered Critically Endangered (Collar *et al.*, 1994). It is known from two specimens collected in the *cerrado* of central Brazil: one at Irisinga, São Paulo, on 6 January 1823 (not February as in Collar *et al.*, 1992), and the other at Cuyoba, Mato Grosso, in either December 1823 or June 1825 (both dates on label; N. Cleere *in litt.* 1997). There is older evidence from Paraguay (de Azara 1802–05), but without details of date or locality. Subsequent records have come from only three widely spaced sites: Emas National Park, Goiás state, Brazil (Collar *et al.*, 1992), Beni Biological Station, Yucuma province, Bolivia (Davis & Flores 1994), and Reserva Natural del Bosque Mbaracayú (RNBM), Canindeyú department, Paraguay (Lowen *et al.*, 1996b, 1997).

During fieldwork at RNBM in September and December 1995, we (principally BLL) captured six male *C. candicans* in presumed definitive plumage and a seventh *C. candicans* of a previously undescribed plumage. This seventh individual lacked any white in the wings and tail, but on the basis of structure, head pattern and overall plumage tones, was clearly *C. candicans*. In addition, the biometrics of this bird fall within the range of that now known for *C. candicans* (see Appendix). The bird was caught in a small area of *campo sucio*—grassland with scattered shrubs and trees, the most common being dwarf palms *Butia paraguayensis*—with many anthills. All male *C. candicans* in definitive plumage caught and seen frequented this same area. No other caprimulgids were observed here.

The Paraguay observations revealed the extent of white in the wing of male *C. candicans* to be variable. Variation in the wing and tail patches of nightjars has been rarely considered (Forero & Tella 1997; although see Cramp 1985, Ingels & Ribot 1982, Jackson 1984), but, for one species (Red-necked Nightjar *Caprimulgus ruficollis*), has been shown to be age-related (Forero *et al.*, 1995). Male *C. candicans* exhibiting the maximum extent of white in the wing were assumed to be in definitive plumage.

Such males have blackish primary tips; white primary bases, secondaries, primary coverts and greater coverts (all fringed blackish); wholly white underwing except for blackish primary tips; white undertail and uppertail save for the central pair of rectrices; and white lower breast and belly. The species has a distinctive head pattern with pale greyish-brown forehead, crown and nape very finely barred and vermiculated dark brown. The central crown feathers are dark brown to blackish, barred with tawny, whilst the extreme sides of the crown are cinnamon finely barred brown. Extending from the base of the bill above the eye and just beyond is a fine whitish stripe, bordered on either side by cinnamon. The lores and ear coverts are dark chestnut barred blackish, forming a distinct dark eye patch. A distinctive feature is a broad whitish submoustachial stripe. In-hand photographs of a male in definitive plumage were published in Lowen *et al.* (1996a) and Tobias & Lowen (1996), with a field photograph in Lowen (1997).

Description of the new plumage

The seventh (non-definitive male) individual was captured by BLL on 8 December 1995. It was considered unwise to collect the bird given uncertainty as to the species' local and global status. Feather samples were taken and have been deposited at the Museo Nacional de Historia Natural del Paraguay (Asunción). A full description was taken at the time of capture, and feather samples were subsequently compared to a table of colours (Smithe 1975). Colours mentioned in uppercase (e.g. "Burnt Umber") refer to feather samples compared directly to Smithe; colours in lowercase (e.g. "blackish") pertain to the original description. A description of the bird is as follows:

Bare part coloration as the captured males in definitive plumage: iris chestnut; periocular membrane cinnamon; upper and lower mandibles blackish with their bases flesh coloured; nostril protruberances also flesh coloured; legs and feet flesh with a grey tone; nails blackish.

Head pattern also much as the males captured, with centre of crown Burnt Umber, sides of crown greyish with indistinct fine black and white markings. Ocular region dark cinnamon-rufous with whitish submoustachial line. Hindneck, mantle, back and wing-coverts Light Clay to Cinnamon with Drab fine spotting, barring and vermiculations. Base of scapular feathers similar, but towards tip Cinnamon with Dusky Brown spots along shaft and small white apical spot. Outermost primary Dark Greyish Brown. Second primary (numbered ascendantly) Dark Greyish Brown with six equally spaced Cinnamon spots on each web, forming transverse bars, a pattern repeated over the remaining primaries and all the secondaries and tertials. The four outermost primaries with inconspicuous small white terminal spots. Prominent emarginations to second, third and fourth primaries. Central rectrices Drab and with slight Dark Raw Umber bars. Outer rectrices with equally spaced Dusky Brown and Cinnamon bars. Undertail similar in pattern but paler. Throat dark cinnamon-rufous contrasting with the rest of the underparts. Foreneck and flanks Cinnamon with fine Dark Greyish Brown bars. Breast similar but with feathers tipped white, thus forming small whitish spots. Belly, vent and undertail coverts white. Thighs light cinnamon contrasting with the rest of the lower underparts.

The bird showed signs of neither moult nor feather wear, appearing to be in very fresh plumage. Given that it was caught at what is likely to be towards the end of the breeding season in Paraguay (López Lanús *et al.* in prep.), the bird would thus appear to be an immature. The exact shape of the outer primaries and rectrices of caprimulgids is a reliable indicator of their age, with adults exhibiting broad feathers with rounded tips whilst those of immatures are narrow and pointed, often with pale tips to the primaries (N. Cleere *in litt.* 1996, RPC pers. obs.). Sample outer rectrices and primaries were relatively narrow and pointed, indicating the bird to be an immature. The small white terminal spots to the outer four primaries (a feature not shown by males in definitive plumage) support this diagnosis.

The all dark outer primary (albeit with terminal white spot), contrasting with barred remaining primaries, is intriguing, since the remiges of immature Caprimulgids are generally uniform prior to moult (Cleere in press). However, since Caprimulgids (including the type specimen of *C. candicans*) moult primaries descendantly (Cleere in press), it seems unlikely that the bird was in moult, exhibiting new, adult-type outermost primaries among otherwise immature remiges on both wings. The all dark outer primary of this bird thus appears to be typical of immature male *C. candicans*. The outer primary of males in definitive plumage is noticeably modified, apparently to aid production of the mechanical sounds that accompany display (López Lanús *et al.* in prep.). In this context, it is less surprising that the outer primary of immature males differs so markedly.

The plumage of adult female *C. candicans* has yet to be formally described, but apparent females have been discovered during 1997 fieldwork at RNBM (J. Mazar Barnett, D. Capper & R. Pople verbally 1997, RPC pers. obs.). Neither these birds, nor the immature collected in the mid 1820s (sex unknown, but possibly female; Cleere in press), show white underparts, and cinnamon bands extend across all the primaries in both (J. Mazar Barnett, D. Capper & R. Pople verbally 1997, RPC pers. obs., Cleere in press). The largely white underparts and dark outer primary—characteristics common to males in definitive plumage and to the 1995 individual described here—would indicate this new plumage to be that of an immature male.

Conclusions

On the basis of head pattern, overall plumage tones, bare part coloration, structure and biometrics, this plumage clearly corresponds to *C. candicans*. Several factors allow the diagnosis of this plumage as that of an immature bird, perhaps most likely an immature male. Surveys in what remains of the optimal habitat of the species (apparently relatively open *campo sucio*) throughout its range are urgently needed to assess its true status.

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APPENDIX

Measurements of *Caprimulgus candicans* at RNBM, September/December 1995 & July 1997.

Mean, followed in parentheses by range, standard deviation (SD) and sample size (n); and separated by a comma from data for the immatured plumage described in this note. The measurements of this bird are excluded from the mean, range and standard deviation calculations. All measurements are in millimetres, apart from weight in grams.

Weight 49.3 (52–46, SD 2.66, *n*=6), 45; Wing chord 148 (145–150, SD 1.94, *n*=6), 149; Maximum flattened wing 151 (146–154, SD 2.19, *n*=7), 150; Tail (from base of central rectrices) 104 (98–107, SD 3.69, *n*=6), 93, Tarsus (to extreme rear of joint) 24.9 (24.1–25.8, SD 0.6, *n*=6), 25; Culmen (from anterior of nostrils to tip of bill) 6.5 (6.3–6.6, SD 0.1, *n*=5), 5.7; Bill width (at posterior edge of nostrils) 5.7 (5.3–6.0, SD 0.25, *n*=5), 5.4.

IN BRIEF

The eggs of the Pink-headed Duck

by Michael Walters

Received 7 July 1997

In his paper on the phylogeny of the pochards, Livezey (1996) uses a large number of morphological characters to create a new phylogeny which, among other things, regards the extinct Pink-headed Duck *Rhodonessa caryophyllacea* as forming a duotypic genus with the Red-crested Pochard *Netta rufina*. Among the related characters considered, Livezey includes nest site and clutch size, but not egg shape, size or colour. Shape and size are readily available from Schönwetter (1960). Egg colour has had a bad press since Lack's (1958) paper on this character in the Turdidae, but in fact the Turdidae are in many ways aberrant in this respect, and what is true for that family should not be assumed to be true for the entire class Aves.

It is, perhaps, not well-known that the eggs of *Rhodonessa caryophyllacea* are extraordinary, being quite unlike those of any other member of the Anseriformes. They are stone-white in colour (though sometimes nest-stained), almost spherical in shape, and with a matt surface or a slight gloss, but lack the "soapy" surface texture characteristic of most duck eggs. By contrast, the rest of the Aythyini (as defined by Livezey) have eggs of the usual duck shape, varying from creamy to dark olive green but never white. Because of its rather limited range, egg colour is more useful in indicating differences than relationships (unrelated birds can produce similar eggs), but given the general uniformity of duck eggs, the bizarre appearance of the eggs of *Rhodonessa caryophyllacea* seems not insignificant.

For convenience, I here give a breakdown of the sizes and colours of eggs of the species covered by Livezey, the former from Schönwetter, the latter from my observations of eggs in The Natural History Museum at Tring (Table 1). The latter may hold the only known eggs of *Rhodonessa caryophyllacea*, including those seen and measured by Schönwetter; he states that he saw the eggs from the "British Museum" (i.e. Hume collection) and the Stuart Baker collection. Although the Pink-headed Duck was kept in captivity in a number of places in Europe, it never made any attempt to breed in captivity (Delacour 1956, p. 199). Average measurements are in parentheses, sample sizes in brackets. Egg colours are given in layman's terms rather than colour-coding owing to the large number of variations in shade which occur, but are not relevant here.

The nest of the Pink-headed Duck was probably also unusual. F. A. Shillingford (in Baker 1908, p. 50–56) was the only person who described the nest, on which Baker commented and bemoaned that the finder did not give more details. The nest was concealed in the middle of big tufts of grass with a few feathers but, unlike most duck's nests, was not lined. As doubt has been expressed (L. F. Kiff *in litt*) regarding the identity of the known eggs of the Pink-headed Duck, it may be as well to comment on this point. Although lacking the "soapy" surface texture of most duck eggs they have a faintly oily translucence and I am satisfied that they are anatid eggs. They are totally unlike the opaque eggs of owls, raptors, or any other egg that I have ever seen.

Details of the eggs in the collection of The Natural History Museum are as follows (see also Knox & Walters 1994):

1891.3.20.6019-22. 4 eggs out of a clutch of 9, collected by T. Hill on 3 July 1880, at Purneah, India. The clutch was well incubated. These eggs were obtained by F. A. Shillingford from Hill, and passed to the Hume collection. There is no reason to suppose from Hume & Marshall (1879–81) that any more of this clutch still exists. The eggs have large side-blown holes, and the others may well have broken in blowing. Measurements: 6019: 45.5 × 41.0. 6020: 44.95 × 42.26. 6021: 43.35 × 42.24. 6022: 46.3 × 40.95 mm.

TABLE 1

Egg size and colour of species of duck reviewed by Livezey (1996)

Species	Egg length × breadth; range (mean)	Colour	Sample size
Marmaronetta angustirostris	42.4–50.6 × 31.5–36 (46.3 × 34.4)	Creamy	100
Rhodonessa caryophyllacea	43.3–47.0 × 40.6–44.2 (45.9 × 42.0)	White	6
Netta rufina	53–62.3 × 39.0–45.1(57.8 × 41.5)	Creamy to pale olive green	150
Netta peposaca	52–64 × 39–44.5 (58.0 × 42.8)	Pale olive-buff	34
Netta erythrophthalma	50.6–58.9 × 41.0–45.4 (55.2 × 43.6	Pale olive-buff	19
Aythya valisineria	56.5–66.8 × 38.8–46.5 (62.4 × 43.8)	Olive green	95
Aythya ferina	56–68 × 39–47 (61.8 × 43.8)	Stone-buff/dark olive-buff/olive brown	300
Aythya americana	54–66.8 × 41.2–45.5 (60.6 × 43.4)	Stone-buff	90
Aythya australis	54.8–62.4 × 40.8–47.7 (58.6 × 42.9)	Not seen	12
Aythya innotata	55 × 40	Not seen	1
Aythya nyroca	48–60 × 35–43 (52.5 × 38.2)	Creamy to olive-buff	160
Aythya baeri	51–55 × 36.5–39.0 (52.0 × 38.2)	Pale olive green	12
Aythya novaeseelandiae	57–65 × 38–45.5 (62.0 × 42.5)	Stone-buff	6
Aythya collaris	53.5–60.5 × 38–42.2 (57.5 × 39.8)	Pale olive green	80
Aythya fuligula	53–66 × 38–46 (59.0 × 41.0)	Stone-buff to pale olive green	300
Aythya marila	54.5–68.1 × 40.7–48 (62.3 × 43.4)	Olive-buff	182
Aythya affinis	50–63.3 × 35.5–42.5 (57.1 × 39.7)	Olive-buff	95

NB: measurements without decimal points are as given by Schönwetter.

1891.3.20.6018. One egg, collected by F. A. Shillingford; Hume collection (no date) at Zillah, Purneah, India. Measurements: 46.0 × 44.06 mm.

1925.12.25.5391. One egg, obtained by Lt. H. E. Barnes from the Indian Museum, Calcutta, and passed to the J. Davidson collection. It is without locality or date, but has the name Reilly on it in pencil—presumably the collector. There is no reason to believe that this egg was in any way associated with any of the other known specimens. Measurements: 47.0 × 44.9 mm.

1925.12.25.5392. One egg, without date or locality. Davidson's MS catalogue states: "Sent to me by Mr. Irwin. It is one of the clutch mentioned in Hume & Marshall's 'Game Birds of India' as taken by Mr. Hill in either Malda or Purnesh [sic]." The Mr. Irwin is probably Valentine Irwin (1838–73) who was in the Indian Civil Service 1862–73. Davidson would not have seen the eggs to which he refers, but it is certain that Irwin's statement is incorrect, as this egg differs from those in being end-blown, and was evidently not from a well-incubated clutch. However, the statement of Davidson misled a previous curator, the late Shane Parker, into believing that all known eggs of the species were from the same clutch. Measurements: 50.2 × 49.8 mm.

1973.32.1. One egg in the Stuart Baker collection, collected at Maldah, East Bengal, in June 1898, by "J. Shillingford" (?error). Measurements: 46.95 × 44.6 mm

Hume (in Hume & Marshall 1879–81, p. 173–180) expressed the opinion that *Rhodonessa* was very closely related to *Anas*, and that he would have merged it but for the very extraordinary eggs. However, Johnsgard (1961) believed the species to be closely related to the pochards, while Wolfenden (1961) and Brush (1976) supported this view from examination of the osteology and feather protein analysis respectively. Its remarkable eggs would suggest that it was not closely related to any other duck and possibly represented a relic of an old line that had died out elsewhere. While it is not suggested that the nidification is preeminent, it is surely a factor which should at least be taken into consideration.

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'Dark-morph' Sharp-shinned Hawk reported from California is normal juvenile female of race *perobscurus*

by William S. Clark & Brian K. Wheeler

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Patten and Wilson (1996) report an alleged dark-morph Sharp-shinned Hawk *Accipiter striatus* from California. The hawk described and depicted is, however, a perfect example of a darker juvenile female of the race *perobscurus*, fitting Friedmann's (1950) description, and identical to three juvenile female specimens of hawks of this race from the American Museum of Natural History (Fig. 1). The authors state that their dark hawk was not an individual of this race, but they provide no supporting arguments. Further reasons why the hawk described and depicted in Patten & Wilson (1996) is not a dark morph of the Sharp-shinned Hawk are enumerated below.

Neither dark-morph nor melanistic (see below for differences) individuals would show pale superciliaries, as shown clearly in the hawk in question.

Dark-morph individuals of *Accipiter (striatus) ventralis* from the Andes are quite different from both the photograph and the description of this bird. They have dark grey underparts with a variable amount of rufous and lack pale supercilia.

Dark-morph individuals in two African species, *A. tachiro* and *A. ovampensis*, are uniformly dark: black in adults and uniformly dark brown in juveniles, with perhaps some rufous streaking (as shown in del Hoyo *et al.* (1994) and Zimmerman *et al.* (1996)). They lack pale superciliaries.

A dark colour morph has not been described for this species. To be valid, such a morph should be described in more detail and should include many photographs of a bird in hand or a collected specimen.

Figure 1. Three female and one male *Accipiter striatus perobscurus*, all juveniles.

Dark-morph individuals usually show all dark underwing coverts and lack pale supercilia.

We have no arguments with the interesting discussion of dichromatism in raptors that follows the brief description of the hawk in question.

According to Terres (1980), 'dark morph' is a regularly occurring colour morph, whereas 'melanistic' is an abnormal plumage. As this species does not have a described dark morph, the hawk referred to in this article is therefore an alleged melanistic.

The specimens of *A. s. perobscurus* shown in Figure 1 were collected in the breeding range of this race, the humid temperate forests of coastal Washington and British Columbia, to the north of the California location of the hawk in question. This darker coloration, no doubt a perfect example of Gloger's Rule, is shown on several other raptor species in this range, e.g. Merlin *Falco columbarius suckleyi* and Northern Goshawk *Accipiter gentilis laingi*. Dark Merlins are regularly recorded in California.

It is not clear why there are no official records of *A. s. perobscurus* from California, as a juvenile of this race, found dead in southern California, was prepared as a specimen and deposited in the collection of Rio Hondo College in Whittier by John Schmitt (pers. comm.), and a specimen of a juvenile male of this race in the National Museum of Natural History was collected in Lassen Park, California, in 1908.

In summary, it is most likely that the hawk reported in Patten & Wilson (1996) is a darker female of the race *Accipiter striatus* *perobscurus*, which has occurred at least twice in California. It is most certainly **not** melanistic.

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The identity of *Eos histrio challengeri* Salvadori 1891

by Jon Riley, Damien Hicks & James C. Wardill

Received 21 August 1997

The Red-and-blue Lory *Eos histrio* is endemic to the Sangihe and Talaud islands, north of Sulawesi, Indonesia, and according to the literature there are three subspecies, the nominate, *talautensis* and *challengeri*. The distinction between them has been based on the extent of black in the wings, differences in the blue breast band, and size. *E. h. histrio* (Statius Muller, 1776) is endemic to the Sangihe islands, where it is historically known from Sangihe, Siau and Ruang (White & Bruce 1986) and Tagulandang (Meyer & Wiglesworth 1898). The nominate subspecies has more black on the wings in comparison to *talautensis*; the secondaries are red with black terminal edging, 7 to 12 mm wide in adults; the greater wing coverts are tipped black, forming a bar, with a second black bar on the median wing coverts, and the first 3 external primaries are black (Meyer & Wiglesworth 1894).

E. h. talautensis Meyer & Wiglesworth 1894 is endemic to the Talaud islands, where it is historically known from Karakelang, Salibabu and Kabaruan (White & Bruce 1986). This subspecies has more red on the wings in comparison to the nominate; the secondaries are red with black terminal edging 2 to 5 mm wide in adults, the wing coverts are almost entirely red, and the first and third external primaries are edged broadly with red (Meyer & Wiglesworth 1894).

E. h. challengeri Salvadori 1891 was reported to be from the Nenusa islands, located approximately 35 km to the north-east of Karakelang, or the Miangas islands, located approximately 100 km to the north of Karakelang (Meyer & Wiglesworth 1898). Meyer & Wiglesworth (1898) discussed this form, having examined one of the three type specimens. The specimen was smaller and with the blue breast band less extensive and more or less mingled with red.

During the course of research arising from Action Sampiri, a conservation project based on the Sangihe and Talaud islands (Riley 1997), we have investigated the identity of *challengeri* and it is our conclusion that it is not a valid subspecies. It is apparently only known from the type specimens, although there are claims that the subspecies was observed in 1993 on Talaud (Nash 1993). The type specimens were obtained by the *Challenger* expedition on 10 February 1875: ". . . between the Meangis and Tulur or Talaur [Talaud] Islands, south of the Philippines. The ship was nearest to the Island of Kakarutan, of the Meangis group. The large hilly island of the Talaur Group, Karakelang, was seen in the distance, covered with forest, but with numerous patches of cultivation. A canoe, sharp at both ends and without outriggers, of the Ke Island build, manned by 22 men and boys, came off to the ship . . . brought mats and very pretty blue and red Lories for sale. The birds were secured to sticks by means of rings made of cocoa-nut shells as at Amboina . . . " (Moseley 1879).

Much confusion has arisen in the literature as to exactly which group of islands the type specimens are allegedly from. In the above quote, Moseley misnames the Nenusa islands as the Meangis islands, and this error has been perpetuated e.g. White & Bruce (1986), Forshaw (1989), Nash (1993), who all state *challengeri* is from the Miangas islands.

The Nenusa islands should be the purported type locality: Kakarutan is an island in the Nenusa islands and Karakelang would not be visible from any island in the Miangas, but would be seen clearly from Nenusa.

However, because the type specimens were brought to HMS *Challenger* by local fishermen from the island, and no lories were observed in the wild on the Nenusa group, there is no direct evidence that the birds were native to Kakarutan. These circumstancs therefore cast serious doubt on the Nenusa islands being the type locality.

It is our opinion that the specimens described as *challengeri* are in fact immature or sub-adult *talautensis*. The two key characteristics on which the subspecies is described, its small size and plumage variations, can be shown not to exclude entirely either *histrio* or *talautensis* subspecies.

The measurements presented in White & Bruce (1986) and Forshaw (1989) are misleading, as immature and adult *histrio* and immature *talautensis* have measurements overlapping or approaching those of *challengeri* (Meyer & Wiglesworth 1898, see Table below). Therefore size alone cannot be used to separate *challengeri*.

Immature *talautensis* are very similar in size and colouration to *challengeri*, particularly in having the blue breast band mixed with red; this fact was noted by Mivart and depicted in his Plate VII (1896). Whether the type specimens are adult has been questioned by other authors (Meyer & Wiglesworth 1898). Recent observations by the

TABLE 1
Measurements of specimens of *Eos histrio* showing subspecific size overlap

Subspecies	Age	Number	Wing length (mm)	Reference
histrio	Adult	14	154–178	Meyer & Wiglesworth 1898
histrio	Adult	14	160–181	Forshaw 1989
histrio	Immature	1	154	Meyer & Wiglesworth 1898
talautensis	Adult	17	163–171	Meyer & Wiglesworth 1898
talautensis	Adult	18	160–173	Forshaw 1989
talautensis	Immature	1	157	Meyer & Wiglesworth 1898
"*challengeri*"	"Adult"	1	152	Meyer & Wiglesworth 1898
"*challengeri*"	"Adult"	3	152–156	Forshaw 1989

authors, of captive birds on Talaud, suggest that immature birds vary considerably in the extent and intensity of blue on the breast and the amount of blue on the crown. Some birds have been observed with an ill-defined blue breast band mixed with red and only traces of blue on the crown. In the case of some individuals, much of the blue breast band is lost altogether; the reported sightings of captive *challengeri* on Talaud in 1993 are thought to relate to such birds.

Red-and-blue Lories are extremely common cage birds on Sangihe and Talaud. This has probably been the case for a long time, and it is our opinion that the "*challengeri*" specimens were brought to Kakarutan from Karakelang as cage birds, and then traded to HMS *Challenger*. It is perhaps significant that there is no record of the ship having docked in the Talaud islands (Moseley 1879), where further lory specimens would undoubtedly have been available.

The Nenusa islands are located less than 40 km offshore of Karakelang. We question if this narrow strait is a sufficient barrier to the movement of *Eos histrio* between the two island groups. It has been reported that large flocks of *Eos histrio* used to roost on the small Sara islands (Hickson 1889) and movements of lories between the Talaud islands are still reported by local people (Riley 1995).

Residents of Nenusa (and the Miangas islands) interviewed by us in 1995 and 1997, reported never having seen, or heard of *E. histrio* occurring on their islands. In all other locations within the Talaud islands, local residents have a sound knowledge of the birds of their environs and in particular the Red-and-blue Lory, which is an attractive and easily identified species. If the birds had ever occurred on Nenusa, an oral record would surely survive within the knowledge of native islanders.

No ornithological fieldwork has been undertaken by us on Nenusa or Miangas, and surveys have not been encouraged due to the inaccessibility of both island groups. The islands are reported to be now almost entirely covered in agricultural plantations and scrub and there are no extensive areas of forest. It is thought likely that there is little or no suitable habitat to support populations of *E. histrio*, but brief surveys are needed.

Acknowledgements

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Clarification of the type locality of the Golden-shouldered Parrot *Psephotus chrysopterygius*

by Stephen Garnett

Received 3 September 1997

The Golden-shouldered Parrot *Psephotus chrysopterygius* was first mentioned by Gould in November 1857 (Anon. 1857; see Bruce & McAllan 1990) on the basis of three specimens collected by J. R. Elsey, surgeon and naturalist with an expedition across northern Australia led by A. C. Gregory. Inconsistencies between the locality and date published on the specimen labels in the British Museum, in a letter from Elsey to Gould in September 1857 (McDonald & Colston 1965), in the original description by Gould (Gould 1857, see Schodde & Mason 1997) and in the official account of the expedition by the Gregory brothers (Gregory & Gregory 1884), have led to confusion about the type locality. Some publications have suggested that the type locality was on the Norman River south of Normanton (Chisholm 1964, Condon 1975), others that it is southeast of Normanton in the vicinity of Haydon (Mathews 1916–17) and one that it was at both (Schodde & Mason 1997). This note aims to clarify the type locality.

Elsey's specimen labels (1857.9.18.51/52/53), as described by McDonald & Colston (1965), list two collection sites and dates: No. 52. Labelled as female, actually an immature male: Lat. 18°S, long. 141°E: 14th Sept. 1856. No. 53. Female: Lat. 18°S, long. 141°30′E: 15th Sept. 1856. No. 51. The male, and type specimen of the species, lacks its original label.

In his original description Gould (1857) referred to the same date and location but in a new combination:

> "Mr Elsey states that they were procured on the 14th September, 1856, in lat. 18°S. and long 141°30′E., that their crops contained some monocotyledonous seeds, . . .".

His description of the three specimens together implies he thought they were all collected on the same occasion. Curiously Mathews (1916–17), quoting the same notes, is more precise, describing the locality as 18°S and 141°33′E.

Excerpts from Elsey's letter (McDonald & Colston 1965) mention 15 and 16 September, but not the 14th, and give more detail of the circumstances under which at least one of the parrots was collected:

> "In the same way I nearly lost the beautiful *Euphemia*. It settled in a tree close to me while two of our party were out after horses, and I watched it for an hour, with finger on the trigger until their return, expecting it to fly any moment. [It was a recognised signal that a shot fired at camp recalled all members of the party.] At last I got three specimens, popped them into my coat and set off, and it was 12 hours after, 7 p.m., before I had time by firelight to skin them."

And in another part of the letter:

> "I saw it for two days only, Sept. 15 and 16, lat 18°N [=S], long 141°E, and procured three specimens."

As background to the movements of the exploratory party during this period, the Gregorys' (1884) journal describes the three days as follows:

> "14th September (Sunday)—At 5.50 proceeded down the creek on a nearly west course, searching the channel in its winding course for water, but without success, till 10.0, when we found a pool of good water fifty yards long and two feet deep, at which we encamped. Some blacks had been camped at this pool, and their fires were still burning. The country on the creek is very poor, with patches of open melaleuca scrub, box, bloodwood, leguminous ironbark, terminalia, white gum, and a few pandanus, triodia, and a little very dry grass. The soil sandstone, with ironstone gravel. The native bee appears to be very numerous, and great numbers of trees have been cut by the blacks to obtain honey.
> Lat. by α Aquilae, 17 degrees. 59 mins. 26 secs.

> 15th September—At 8.15 a.m. resumed our journey north 10 degrees mag., over very level country thinly wooded with box, bloodwood, melaleuca, terminalia, grevillea, and cotton-trees, also a small tree which we recognised as Leichhardt's 'little bread-tree', the fruit of which, when ripe, is mealy and acid, but made some of the party, who ate it, sick. Several dry watercourses trending west were crossed, and 2.5 p.m. camped at a small waterhole in a sandy creek, fifteen yards wide. By enlarging the hole we obtained, though with difficulty, a sufficient supply of water for our horses. On the flats near the creek the grass was good, but very dry.
> Lat. by α Aquilae, 17 degrees. 46 mins. 11 sec.
> 16th September—Although our horses required a day's rest, none of our camps for some days had afforded a sufficient supply of water and grass for a second night; we therefore continued a north 20 degrees east course at 6.25 a.m.; at 7.30 a.m. came to a creek which we followed east an hour and a half, when it was reduced to a small gully, and again steered north-north-east, passing over much poor country with patches of melaleuca scrub, the country perfectly level; at 2.0 p.m. came to a sandy creek which we followed to the west till 6.5 p.m. without any water; camped in an open grassy box flat; I then walked down the creek and was fortunate in finding a pool of water half-a-mile distant, and as soon as the moon rose we drove the horses to the water and filled our saddle bags. Few parts of our journey have been through country so destitute of animal life as the level plain we have traversed since leaving the Flinders River—no kangaroo or even their track; emu tracks very rare, and very few birds were at the waterholes. Many of the sleeping frames of the blacks have been observed, and thousands of deep impressions of their feet in the now dry and sun-baked clay show that during the rainy season the extremely level nature of the country causes it to be extensively inundated.
> Lat. by Capella, 17 degrees. 34 mins. 5 secs.; var. compass 4 degs. 50 mins east."

During September Golden-shouldered Parrots feed in the early morning and late afternoon, spending the first hour after dawn and most of the middle of the day perching quietly in trees from which they are reluctant to move. During September elsewhere in the species' range, the morning feeding session usually takes place between about 7.00 and 8.00 a.m., after which the birds may not move from their daytime roost until after 4.00 p.m. (pers. obs.). From Elsey's description, the first bird he collected is unlikely to have started feeding. The other two birds appear to have arrived at the waterhole later than the first and, from the presence of seed in the crop of at least one specimen, were probably coming in to drink after they had finished feeding. The only day when this could have happened was 15 September.

At that time on the expedition the party usually set out before 6.30 a.m. On the morning of the 15th, however, it evidently took at least an hour for the horses to be found and brought back to camp. Although Elsey implies he left at 7.00 a.m., whereas the Gregorys put the time at 8.15 a.m., it is more likely that Elsey shot the first specimen at 7.00 a.m. This is consistent with a bird perching for an hour in the early morning before starting to feed. By the time the expedition actually started travelling at 8.15 a.m. Elsey had shot two more birds which had finished feeding. Although the party stopped travelling in the early afternoon, Elsey may not have had the opportunity to skin the birds before the evening because of his duties as expedition doctor, possibly tending those who became sick after eating the fruit of the 'little breadfruit tree' (*Parinari nonda*).

Of the alternative dates, 14 September is unlikely because on that day the expedition set out long before 7.00 a.m. and, while Elsey might have found birds at their daytime roost after they reached the waterhole, no more travelling was undertaken that day. Birds may have been labelled as having been collected on the 14th because they were collected at the campsite of the night of the 14th, not because they were actually procured on that day (I. A. W. McAllan pers. comm.). The 16th is also unlikely because the party again started too early. Furthermore the gibbous moon rose that evening at 8.00 p.m. (R. Allen pers. comm.). From the Gregorys' description, therefore, the party would have been driving their horses to water only an hour after the time Elsey stated he began skinning out the parrots. Also, while a 6.30 a.m. starting time of the 16th fits better with the starting time of 7.00 a.m. suggested by Elsey, it is highly unlikely that a Golden-shouldered Parrot would have had seed in its crop so early in the day or have left the roost site for long enough for Elsey to have watched it for an hour.

On this basis the type locality matches a waterhole called Dingo Hole at 17°59′26″S, 141°32′57″E on Clarina Creek near the northern boundary of Gum Creek Station, which corresponds almost exactly with the locality quoted by Mathews (1916-17). It is not known whether Mathews' accuracy was a serendipitous slip or was derived from other information since mislaid. This site was visited in November 1992 and found to be a small waterhole 20 × 20 m, surrounded by vegetation that still fits well the description provided by the Gregorys. Two months earlier the waterhole would have been larger and fitted even more closely the 50 yard length described for September 1856. At the time it was visited there were no other places along Clarina Creek known to hold water through the dry season. The location of 18°S, 141°E, which is near the Norman River, appears to have been a generalisation on the part of Elsey and it should not be inferred that the birds were collected on the Norman River south of Normanton.

The type locality of the Golden-shouldered Parrot is of particular interest for three reasons. First, the nearest place where the species has been recorded since 1856 is over 200 km away. Secondly, Elsey's remark that he saw the birds over two days suggests that the three birds he shot were not an isolated group but part of a larger population, now, apparently, extirpated. Thirdly, the suggestion that the birds were collected further west has led to potential errors in biogeographic analysis of the distribution of tropical granivores in Australia (D. Franklin pers. comm.).

Acknowledgements

I am grateful to John Woodburn for his hospitality during our stay in Normanton in 1992, to the owners of the Gum Creek and Hereford pastoral leases for allowing me entry to their properties, to Norman Wettenhall for access to his peerless library, to Ian McAllan for commenting on the manuscript, to Les Christidis for help with determining the time of moonrise on Cape York Peninsula 142 years ago and to Hugo Phillipps for retrieving final references.

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BOOK RECEIVED

Gatter, Wulf 1997. *Birds of Liberia.* Pp. 320, 36 plates in colour, 8 monochrome plates, maps and text figures. Pica Press. ISBN 1-873403-63-1. £40. 225 × 290 mm.

This is the fifth book to provide a detailed checklist of the birds of a West African country, the previous four all being in the BOU Checklist series. It is a beautifully produced book such as we have come to expect from Pica Press and is exceptionally well illustrated with painted portraits of 29 species, and coloured photographs of 56 species. In addition there is an invaluable collection of 30 coloured photographs of habitats, most half page, and 21 assorted monochrome photographs.

The checklist comprises 77 pages of introductory text, a systematic list (pp. 91–246) of 615 accepted species and bracketed entries for a further 14 species of doubtful validity, followed by six appendices in 20 pages, a two page gazetteer, four pages of references and an index of scientific and English names. Gatter's checklist covers the history of ornithology in Liberia, geology and topography, climate, vegetation zones and habitats of importance to birds. Then follow detailed essays of breeding seasons, moult, migration and ecology of forest birds, including mixed species flocks. The introduction finishes with short accounts of biogeography and conservation. Liberia is the only West African country located almost entirely within the forest zone. Gatter, a professional forester, gives a very clear account of the forest vegetation and makes a major contribution to our knowledge of the ecology of forest birds, with a wealth of information on foraging heights and membership of mixes species flocks. However, the chapter on migration is not so convincing, with too much made of limited data in some cases.

Each checklist entry has the scientific and English name of the bird mainly from *Birds of Africa*, abbreviated status as in the BOU checklists, and the number used in the two volumes of Mackworth-Praed & Grant (1970 and 1973). Then follows a general statement on abundance, status, habitat and distribution within Liberia, and migration relative to Liberia. Habits, ecology and annual cycle are then treated in more detail where data allow and for most resident breeders and suspected breeders there is a distribution map. The accounts of forest species in particular are good, often providing numerical details to back statements on seasonality etc. Most of these data come from Gatter's own studies at Zwedru during 1981–84.

References seem particularly thorough for German literature but perhaps less so for English publications. Some references cited in the text are missing from the bibliography (e.g. Bremer 1989, Pearson & Backhurst 1986), whilst others in the bibliography are not cited in the text (e.g. Walsh & Walsh 1976). The index of scientific and English names covers only the checklist entries.

This is an important contribution to the ornithology of West Africa which will also be of considerable interest to all students of tropical forest birds.

J. Frank Walsh

NOTICE TO CONTRIBUTORS

Papers are invited from Club Members or non-members, especially on taxonomic and distributional topics; descriptions of new species are especially welcome and may be accompanied by colour photographs. **Two copies** of manuscripts, typed on one side of the paper, **double spaced and with wide margins**, should be sent to the Editor, Prof. Chris Feare, 2 North View Cottages, Grayswood Common, Haslemere, Surrey GU27 2DN, UK. All contributions, **including *In Brief* articles**, should follow the style of main papers in this issue of the *Bulletin*.

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FORTHCOMING MEETINGS

Advance notice of meeting dates for 1999. Eight meetings have been arranged for the following Tuesdays: **19 January**, **16 March** and **20 April**—for details see below, **4 May** (AGM and social evening—with informal "mini-talks"), **6 July**, **7 September** (Alex Randall MP on "Bird conservation matters, as viewed from Westminster"), **12 October** and **30 November** (Richard ffrench on "Dickcissels in Trinidad"). Details of speakers on 6 July and 12 October will be published when finalised.

Tuesday 19 January 1999. Keith Betton will speak on **"Birding by ear—a look at the world of strange, and not so strange bird sounds"**. Keith was born and educated in London, where he quickly established a life-long interest in ornithology. At the early age of 12, he was appointed a member of the Department of Environment Committee on Bird Sanctuaries in Royal Parks, and was Official Observer for Bushy Park (1973–79). He has served on numerous ornithological committees, including Chairman Ornithology Section of London NHS (1984–92), President London NHS (1982–84), BTO Regional Representative Greater London (1981–93), and Council BTO (1987–91), also Committee BOC (1985–88). He is a prolific contributor to and editor of several journals. His high profile post as Head of Corporate Affairs, Association of British Travel Agents, involves travelling worldwide on business, but this now leaves him less time for these ornithological activities. His special interest is in Africa, and in sound recordings, of which he has accumulated a large library of his own.

*Applications to the Hon. Secretary by **5 January**, please.*

Tuesday 16 March 1999. Nathalie Seddon will speak on **"Birds of Madagascar"**. Nathalie is currently a student at the Zoological Department of Cambridge University, and studying for her PhD on the behavioural ecology of the Subdesert Mesite *Monias benschi*, in Madagascar. She is a veteran of several international ornithological expeditions, including one to western Ecuador.

Applications to the Hon. Secretary by 2 March, please.

Tuesday 20 April 1999. Roger Safford will speak on **"Birds of Mauritius"**. After gaining his degree in Natural Sciences in Cambridge in 1988, Roger obtained his PhD on Conservation of the forest-living birds of Mauritius, at the University of Kent, in 1994. His special interest is in natural history and conservation in the western Indian Ocean and East Africa, and he has spent five years in the area, especially in Mauritius, and also in Madagascar. He is currently Tropics projects co-ordinator, Royal Holloway Institute for Environmental Research, University of London. As a Member African Waterfowl Census, he was National Co-ordinator, for Mauritius 1990–93, and has been a Member IUCN Species Survival Commission, since 1991.

Applications to the Hon. Secretary by 6 April, please.

Meetings are held in the Sherfield Building of Imperial College, South Kensington, London SW7. The nearest Tube station is at South Kensington, and car parking facilities are available; a map of the area will be sent to members, on request. The cash bar is open from 6.15 p.m., and a buffet supper, of two courses followed by coffee, is served at 7.00 p.m. (A vegetarian menu can be arranged if ordered at the time of booking.) Informal talks are given on completion, at about 8.00 p.m.

Overseas Members visiting Britain are particularly welcome at meetings. For details in advance, please contact the Hon. Secretary, Cdr M. B. Casement, OBE, RN, Dene Cottage, West Harting, Petersfield, Hants GU31 5PA.

Tel/Fax: 01730-825280 for late bookings and cancellations.

Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

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CLUB NOTES

The eight hundred and seventy eighth meeting of the Club was held on Tuesday, 15 September 1998 at 6.15 p.m. 28 Members and 13 Guests attended.

Members present were: The Revd T. W. GLADWIN (*Chairman*), Miss H. BAKER, P. J. BELMAN, P. J. BULL, D. R. CALDER, Cdr M. B. CASEMENT RN, Professor R. J. CHANDLER, Professor R. A. CHEKE, Dr N. J. COLLAR (*Speaker*), J. FARNSWORTH, D. J. FISHER, F. M. GAUNTLETT, D. GRIFFIN, T. M. GULLICK, C. R. HELM, T. P. INSKIPP, J. A. JOBLING, Dr C. F. MANN, D. J. MONTIER, Mrs A. M. MOORE, R. G. MORGAN, Mrs M. N. MULLER, Dr R. P. PRŶS-JONES, N. J. REDMAN, Dr R. C. SELF, P. J. SELLAR, N. H. F. STONE, and M. P. WALTERS.

Guests attending were: A. V. ANDREEV, Mrs J. C. BULL, Mrs J. B. CALDER, Mrs M. H. GAUNTLETT, Mrs J. M. GLADWIN, Ms C. HOFF, Mrs C. INSKIPP, Mrs M. MONTIER, P. J. MOORE, M. J. SEDGEMORE, C. J. SEDGEMORE, Ms A. J. STATTERSFIELD and F. STEINHEIMER.

On completion, Nigel Collar gave a presentation, illustrated with slides and museum specimens, entitled "*Two Indian Enigmas*".

Indian ornithological enigmas include Pink-headed Duck *Rhodonessa caryophyllacea* (probably extinct), Himalayan Quail *Ophrysia superciliosa* (missing since 1876), Jerdon's Courser *Rhinoptilus bitorquatus* (rediscovered in 1986), Intermediate or Rothschild's Parakeet *Psittacula intermedia* and Forest Owlet *Athene blewitti*. Recent work led by Dr Pamela C. Rasmussen of the Smithsonian Institution has shed light on the last two (Rasmussen & Collar 1988, Identification, distribution and status of the Forest Owlet *Heteroglaux* (*Athene*) *blewitti*. Forktail 14: 41–49; in press a, A major specimen fraud in the Forest Owlet *Athene* (auct.) *blewitti: Ibis*, in press b, Rothschild's Parakeet *Psittacula intermedia* is a hybrid. *Bull. Nat. Hist. Mus.*).

Seven dataless specimens sent from India around 1895 (the type) and 1907 (six others) were so clearly midway between Plum-headed Parakeet *Psittacula cyanocephala* and Slaty-headed Parakeet *P. himalayana* that Rothschild gave them the name *P. intermedia*, yet he, his curator Hartert and subsequent authorities resisted the notion that they were of hybrid origin. However, scrutiny of this and other material, and comparisons including Blossom-headed *P. roseata* and Grey-headed *P. finschii* Parakeets, disprove all six defences of specific status for *intermedia*, namely: (1) the specimens show uniform characters (they do not—one is even an immature *himalayana*); (2) they have a single origin (stuffing style and material suggest otherwise); (3) they have a non-captive origin (plumage abrasion and soiling suggest otherwise); (4) a 1932 description of hybrid *cyanocephala* × *himalayana* does not match *intermedia* (the account is muddled and only treats juveniles); (5) reported captive *intermedia* currently exist in Austria and India (this proves nothing); and (6) biochemical analysis showed the distinctness of Indian captives (these are *cyanocephala* × *krameri*, and anyway were inadmissibly analysed). Measurements confirm *intermedia*'s consistent intermediacy between *cyanocephala* and *himalayana*, a condition unknown in any true species.

Mr Melville Sedgemore (present) recently crossed a male *cyanocephala* with a female *himalayana* expressly to determine if offspring show characters of *intermedia*. They do; and their measurements also closely match *intermedia*. There is thus no question that *intermedia* is a hybrid, and it is inconceivable that the specimens were not bred in captivity.

The Forest Owlet is known from central India from seven old specimens, the most recent of which was purportedly collected by R. Meinertzhagen in Gujarat on 9 October 1914. However, Meinertzhagen's diary and specimen catalogue indicate that his presence in Gujarat on that date is implausible. Scrutiny of the specimen establishes that it was extensively remade, and that it has features (wings tied outside the body, cotton wing-stuffing, a once stretched-out neck) indicating that the true collector was J.

Davidson. Examination of the British Museum register reveals a missing Davidson specimen from Maharashtra in 1884.

The Forest Owlet has always been considered virtually identical to Spotted Owlet *Athene brama*, but evaluation shows that it strongly differs in having a faintly spotted crown and back, pale auriculars with no white rear border, a broad complete dark frontal collar, breast almost solid brown, boldly barred flanks, an unmarked white lower breast and belly, and prominently banded wings and tail (structurally it may merit Hume's monotypic genus *Heteroglaux*). These features, combined with greater clarity over records following the elimination of Gujarat, led to the bird's rediscovery in 1997 by Dr Rasmussen with B. F. King and D. F. Abbot. It is, however, in serious danger from deforestation.

The eight hundred and seventy ninth meeting of the Club was held on Tuesday, 13 October 1998 at 6.15 p.m. 16 Members and 10 Guests attended.

Members present were: The Revd T. W. Gladwin (*Chairman*), Miss H. Baker, P. J. Belman, P. J. Bull, Cdr M. B. Casement RN, Professor R. J. Chandler, Professor R. A. Cheke, J. A. Jobling, R. H. Kettle, Dr C. F. Mann, D. J. Montier, R. G. Morgan, Dr R. P. Prŷs-Jones, R. E. Scott, Dr R. C. Self and N. H. F. Stone.

Guests attending were: Mrs J. C. Bull, Mrs C. R. Casement, J. H. W. Chitty, Mrs D. Chitty, Mrs J. M. Gladwin, Dr B. Hatchwell (*Speaker*), Ms C. Hoff, Mrs M. Montier, J. Scharlemann and F. Steinheimer.

Dr Ben Hatchwell subsequently gave a highly interesting presentation, illustrated with slides, entitled "*The Cooperative behaviour of Long-tailed Tits*".

The Long-tailed Tit *Aegithalos caudatus* is one of about 300 bird species known to breed cooperatively—some individuals forego personal reproduction and instead help to rear offspring which are not their own. Such behaviour poses a problem for evolutionary biologists because animals are expected to act in their own selfish interests rather than in the interests of others. What are the benefits of cooperation and why has it evolved in Long-tailed Tits?

Long-tailed Tits spend most of the year (June–February) in flocks of 10–15 birds, typically comprising a family of 8–10 juveniles, their parents and a variable number of helpers. Flocks split up in early spring, males adopting part of the flock range, while females either pair up within the flock, or disperse to neighbouring flock ranges. All birds start the season breeding in pairs, but 80% of nests fail due to predation, mostly by corvids. Pairs who fail have two options: (i) they may re-nest if failure occurs early in the season, or (ii) if they fail after early May, they may become helpers at another pair's nest, assisting them by feeding their nestlings. About 50% of nests have at least one helper (maximum 4) for part of the nestling period. DNA fingerprinting and genealogical data indicate that helpers assist close relatives.

Helpers benefit in two ways from their cooperation. First, by assisting relatives they gain indirect fitness benefits by increasing the production of related offspring. The presence of two or more helpers increases the amount of food given to nestlings, so each fledgling is heavier and has a higher probability of surviving to breed. Secondly, by helping, failed breeders might increase their own chance of reproducing in the following season (a direct fitness benefit) because helpers tend to have a better chance of surviving to the next season (65%) than do failed breeders who do not help (45%).

Given these potential benefits, why has cooperative behaviour evolved so rarely? Do cooperative species differ ecologically from non-cooperative species? The Ecological Constraints Hypothesis attributes cooperation to constraints (e.g. a lack of vacant territories or breeding partners) which restrict dispersal, forcing grown offspring to 'stay at home' and help their parents, even though they would prefer to breed independently. Long-tailed Tits do not fit easily into this hypothesis because analysis of BTO ringing data shows that their natal dispersal does not differ from ecologically similar non-cooperative species. Furthermore, all birds are able to breed independently. Nevertheless, one can speculate on those aspects of Long-tailed Tit biology that might promote cooperation. First, dispersal occurs unusually late (eight months after fledging), giving family members ample opportunity to learn who their relatives are, enabling them preferentially to assist kin following breeding failure. Second, late dispersal may result from their small size which makes flock membership critical for winter survival. Failed breeders who cooperate might 'buy' access to the communal roosts which are characteristic of this species.

Such species-specific explanations are unsatisfactory because they obviously do not apply to all cooperative breeders. However, they do serve to identify factors (e.g. the benefits of group living) which are likely to be of general significance in explaining this unusual behaviour.

The B.O.C. Archive

The British Ornithologists' Club has been in existence now for over a hundred years, during which time it has not had a permanent home. A few years ago a tin box was returned to the Secretary from the London Zoological Society where it had been stored. This contained the minute books and attendance records from the earliest time (less one attendance "lost on the Underground"!).

It was thought an ideal time to think of the future of this material plus that of the correspondence etc. that had accrued over the years from various Chairmen and Secretaries. Mr Ronald Peal and Mrs Amberley Moore were instrumental in passing material to me as well as giving good advice, as did Dr James Monk.

The archive consists, in addition, of the Herbert Stevens Archive, historical material brought together when a history of the Club was considered (this includes an audio tape), a bound set of the Bulletin and copies of the Club's publications. A recent addition, provided by Mr David Griffin, is a list of speakers and subjects compiled from the Bulletin.

The committee decided that the material available should be catalogued and organised as an official archive and I was asked to do this. The Secretaries' and Chairmen's correspondence is very limited in content; some people in the past kept every scrap of paper, others threw them out after dealing with them. The material that was kept does show the amount of work that these two posts involved, although the ability to make mountains out of molehills was very obvious. However it is a pity that material by such stalwarts as Lord Rothschild, R. Bowdler-Sharpe and W. L. Sclater were not kept. It is also possible that we might have had some gems by the Rev. Jourdain and N. F. Ticehurst.

Some aspects of the Archive are of course ongoing, and this has meant that the index is in several parts to accommodate new material where necessary. The archive is at present housed at the Natural History Museum (Tring), thanks to the generosity of the museum and staff. Access is restricted, and applications to consult the archive need to be approved by the Chairman and Archivist; the latter will usually be able to advise on the material available.

N. H. F. Stone
Archivist

WHY MUSEUMS MATTER: AVIAN ARCHIVES IN AN AGE OF EXTINCTION

A conference organised jointly by the British Ornithologists' Club, British Ornithologists' Union, The Natural History Museum and BirdLife International, 12–14 November 1999 (see announcements in *Bull. Brit. Orn. Club* 118(3): 135–136 and *Ibis* 140(4): 723).

CALL FOR OFFERED PAPERS/POSTERS

Papers/posters relevant to the conference theme are invited. Offers, with brief abstracts, to Dr R. Prŷs-Jones, Natural History Museum, Tring, Herts HP23 6AP, U.K.; fax: +44 (0) 1442 890693; e-mail: R.Prys-Jones@nhm.ac.uk

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A new Scops Owl from Sangihe Island, Indonesia

by Frank R. Lambert & Pamela C. Rasmussen

Received 14 September 1998

Situated between the Minahasa peninsula of Sulawesi and the Philippine island of Mindanao, the Sangihe and Talaud islands (Fig. 1) have been poorly explored ornithologically, but are now recognised as a centre of avian endemism (Stattersfield *et al.* 1998). Recent work in the Talaud islands has revealed the presence of two new species of rail (Lambert 1998a, 1998b), and on Sangihe the existence of an endemic species of shrike-thrush *Colluricincla sanghirensis* has been confirmed (Riley 1997a, Rozendaal & Lambert in press).

Four specimens of a scops owl collected on Sangihe Island (=Sangi or Great Sanghir, hereinafter "Sangihe") between 1866 and 1887 were thought not to differ from the Sulawesi Scops Owl *Otus manadensis* (Meyer 1884, Blasius 1888, Finsch 1898), and thus were never given a name. Meanwhile, from nearby Siau (Fig. 1), a single specimen obtained in 1866 was described as *Scops siaoensis* on the basis of its exceptionally small size (Schlegel 1873, Plate 4). That name was later synonymised with *manadensis* (Meyer 1884, Meyer & Wiglesworth 1898), a treatment followed uncritically by most subsequent authors. In Marshall's (1978) treatise on Asian *Otus*, no firm decision was taken on the systematic position of either *siaoensis* or the Sangihe population due to the lack of data on vocalisations. Marshall (1978) mentioned unspecified differences in colouration and tarsal feathering between *manadensis* and populations from islands off Sulawesi, including Sangihe, but he apparently examined no specimens from the Sangihe group. This led to his very tentative allocation of all these populations to the widely distributed, highly variable Moluccan Scops Owl *Otus magicus* (*sensu* Marshall 1978, Marshall & King 1988). Bruce (*in* White & Bruce 1986) thought specimens from Sangihe showed affinities with *manadensis*, but the population was nevertheless allocated (*op. cit.*) with a query to *magicus*. In 1985, F. G. Rozendaal heard an *Otus* calling on Sangihe and collected a single specimen, noting that its call was "the same whistle as heard on 'mainland' Sulawesi" (F. G. Rozendaal, *in litt.* 1998). On this basis, the Sangihe bird was placed in *manadensis* by Marshall & King (1988), who reasoned (apparently without reference to specimens or recordings) that all taxa from islands closer to Sulawesi than is Sangihe (including *siaoensis*, *mendeni* of Peleng I., and *kalidupae* of Tukangbesi Is.) should also belong with *manadensis*.

In 1996, FRL photographed a scops owl on Sangihe (Plate 5), tape-recorded its vocalisations (Fig. 2), and realised that the songs sounded different from Sulawesi birds. Subsequently, Riley (1997b; *in litt.* 1998) photographed and took a few measurements of a caged scops owl on Sangihe in poor condition and with clipped wings, but although the bird soon died it was not preserved as a specimen. Both Riley

Plate 4. Sangihe Scops Owl *Otus collari* (lower), in comparison with a Sulawesi Scops Owl *Otus manadensis* (AMNH 298939, upper left) and the unique specimen of *Otus* [*magicus*] *siaoensis* (upper right). Original watercolour painting by J. C. Anderton. Iris colour of *siaoensis* is assumed to be yellow based on colour of most related taxa.

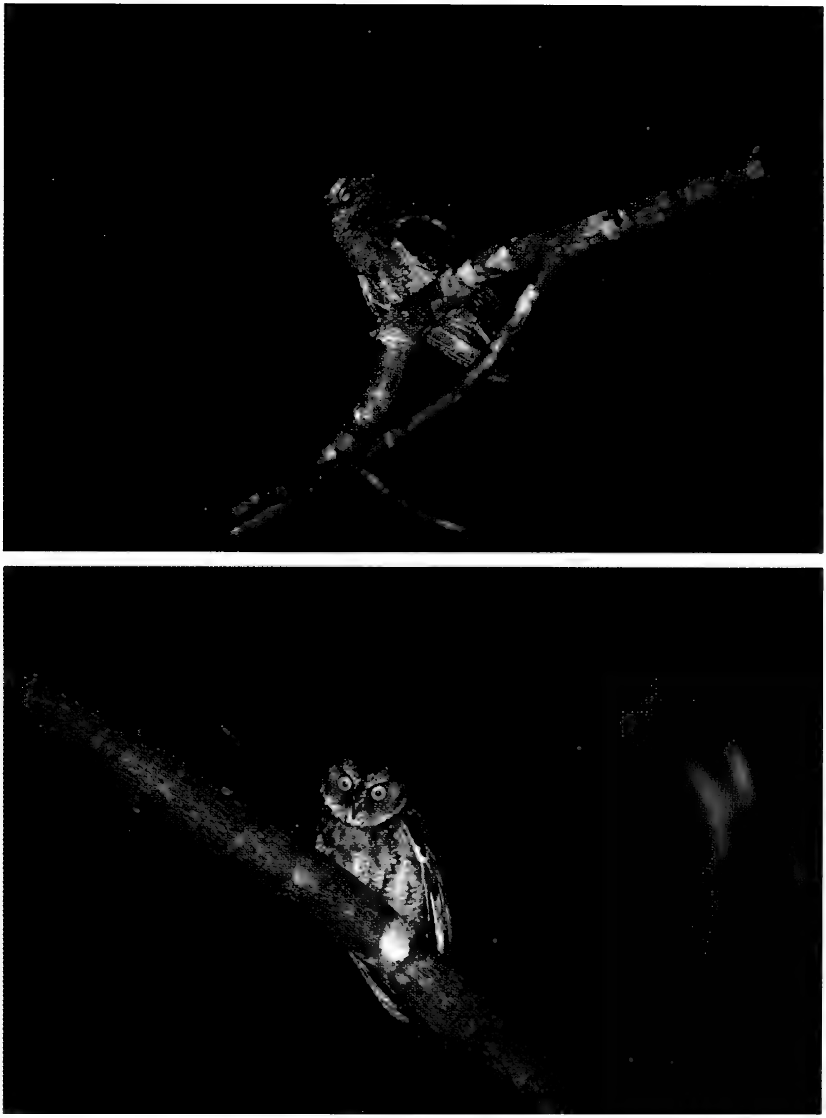

Plate 5. Photographs of a live Sangihe Scops Owl on the lower slopes of Mt. Awu near Telawid Atas, 30 July 1996 (FRL).

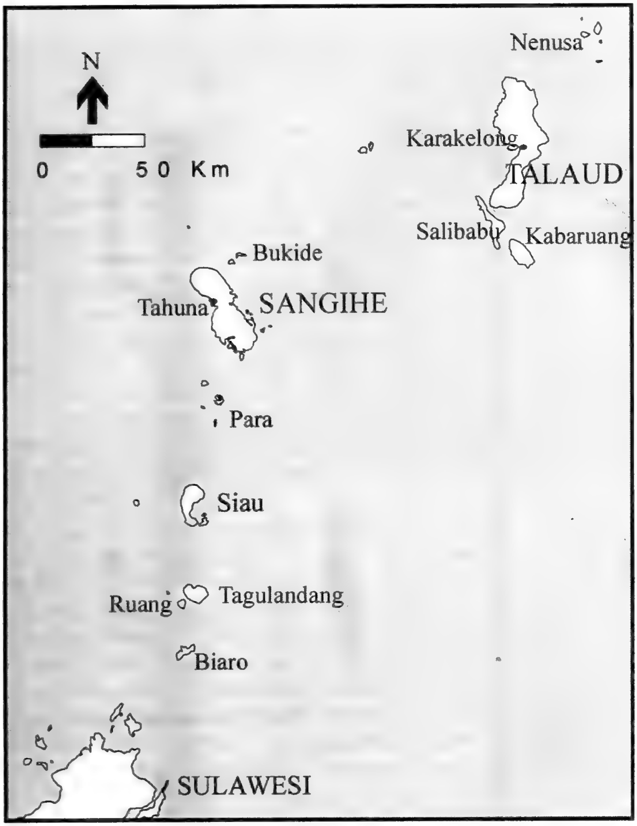

Figure 1. Map showing the location of Sangihe in relation to the Talaud Islands, Siau and the Minahasa peninsula of northern Sulawesi.

(1997a) and B. F. King also heard and tape-recorded scops owls on Sangihe. While scops owls heard by Riley (1997b) were said to sound "identical to birds heard and seen near Manado on mainland Sulawesi", sonagrams from Riley's tape show that they are indistinguishable from those taped by FRL. Additionally, the plumage characters reported by Riley (1997b) that were said to confirm the placement of the Sangihe bird in *manadensis* can equally be applied to some taxa of *magicus*. In 1998, PCR examined four Sangihe specimens, photographs by FRL and J. Wardill of the two above-mentioned living individuals from Sangihe, and specimens of all related taxa. Although the Sangihe bird is indeed very like some *manadensis*, several morphological differences exhibited by all specimens and photographs examined, as well as numerous striking vocal differences consistent among recordings, indicate that it is distinct at the specific level. We propose for it the name:

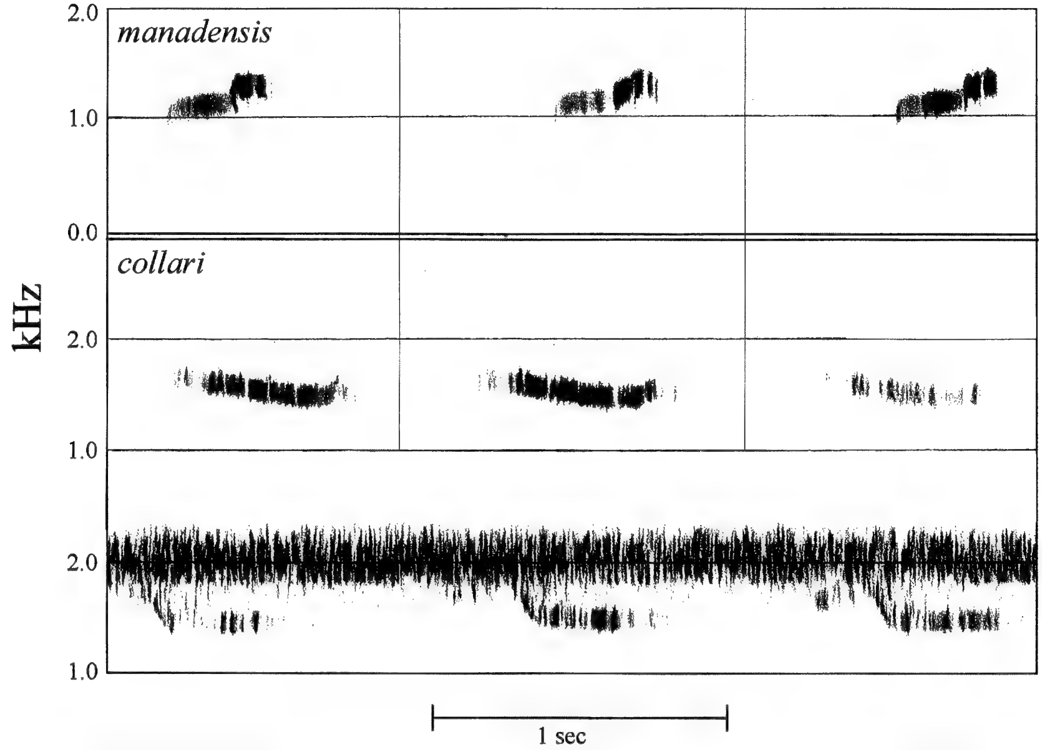

Figure 2. Sonagrams of songs of *Otus manadensis* (upper row of three phrases, intervals shortened) and *collari* (lower two rows, intervals of middle row shortened, intervals of lower recording natural. The middle row is from a recording by FRL of the bird shown in Plate 5 on 30 July 1996, while the lower recording is of a more distant bird vocalising in response to the nearby one, and the constant noise around 2 kHz is due to insects).

Sangihe Scops Owl *Otus collari*, sp. nov.

Holotype. Staatliches Naturhistorisches Museum, Braunschweig (SNMB), female, from "Sangir" (exact locality not given, but the island is centred at 3°35′N, 125°32′E), collected 2 January 1887 by Dr C. Platen, no. 6968; specimen "a" of Blasius (1888).

Diagnosis. A drab brownish, rather small, yellow-eyed scops owl with a horn-brown bill, long narrow wings, a rather long tail, and small pale feet and claws, the latter tipped darker (Plate 4). The eartufts are medium-length with buff spots, black streaks, and elliptical tips; the pale supercilium is rather short; the face shows little contrast, the darkest part being between eye and bill; the upperparts have dark shaft streaks and are prominently spotted buff; the scapular spots are pale buff on the outer web with triangular black tips; the underparts have prominent but mostly fine black shaft-streaking and a finely vermiculated base pattern; the flight feathers are banded dark brown and buff, but the tertials are not prominently banded; the tail has narrow irregular dark buff bands and wider dark brown bands; and the tarsal feathering ends just above the tarsal joint in front and meets around the rear.

Otus collari is close to certain *Otus manadensis* (Plate 4, $n=100+$), especially to immatures, but relative to *manadensis* even from a single locality, the degree of variability among the six individuals examined of *collari* is much reduced. On the head, the facial disk of *collari* is paler and contrasts less with rest of face, there is a definite dark-barred area on the rictal bristles between eye and bill, the whitish supercilium is somewhat less obvious and ends above the bill, and the streaks on the crown are usually narrower and contrast more strongly with the paler brown base colour. On the upperparts, *collari* is slightly more coarsely vermiculated, with generally shorter, more diffuse, less obvious blackish shaft streaks, the upper wing coverts are plainer and less pale-spotted, and the scapulars have pale buffy outer webs with relatively larger triangular black tips. The underparts have a finer, sketchier background pattern with less definite, reduced cross-barring, most of it stippled rather than solid, the band interstices are drab, stippled brown, and have reduced contrast, while most of the streaks on the underparts are longer and narrower, and the pale spots on the underparts are usually smaller, buffier, more regular, and less conspicuous. The wings of *Otus collari* are longer than for *manadensis*, but they are considerably narrower due to the inner primaries being shorter and emarginations of the outer primaries being more proximal, even when corrected for size (log data divided by log wing length; Table 1), and its primaries show reduced contrast due to the pale bands being buffy and the dark bands being browner and less blackish. The tail of *collari* is slightly longer (Table 1) and the toes and claws relatively weaker than in *manadensis*. There is very limited overlap in each of these plumage and mensural characters with the extremely variable *manadensis*, (in which no more than a few of these features occur together in the same individual), and in combination they give *collari* a more uniform, drabber appearance than for adult *manadensis*.

See under "Remarks" for additional morphological distinctions from other related taxa.

Otus collari is vocally readily diagnosed by its clear, mainly downslurred, fluty, liquid, relatively high-pitched, long whistle; see under "Voice" for details.

Distribution. The new species is apparently widespread on Sangihe. In southern Sangihe, *collari* has been reported from the upper slopes of Mt. Sahendaruman (3°31′N, 125°32′E; F. G. Rozendaal, *in litt.* 1998), the southwest coast at Manganitu (3°35′N, 125°31′E, RMNH 84653) and Mt. Sahengbalira (3°31′N, 125°31′E, Riley 1997b); on the west-central coast, from near Tahuna (3°37′N, 125°29′E; Riley 1997b); and in northern Sangihe, from the northeast coast at Tabukan (=Tabukanlama, 3°41′N, 125°33′E, Meyer 1884), and from areas around Telawid, on the lower slopes of Mt. Awu (3°43′N, 125°24′E, Riley 1997a, FRL).

Description of the holotype. Colour comparisons were made under fluorescent light. Capitalised colour names and the first numbers in parentheses are from Smithe (1975); Munsell (1977) colour matches are also presented, in which the first number and letters represent the hue (but are interpretable only with reference to Munsell charts), the next increasing value or lightness, and the last increasing chroma or saturation. The holotype was directly compared with 11 *manadensis* assembled at the National Museum of Natural History, USNM, the two Leiden specimens with 25 *manadensis* at NNM, and the Dresden specimen with 19 *manadensis* at MTD; all four Sangihe specimens were compared with photographs of specimens of all taxa. For the holotype, colorimetric readings (using a Minolta CR-221 Chromameter) were taken of certain relatively solid colour plumage areas larger than 3 mm in diameter. Three sequential measurements were taken and summary statistics instrumentally calculated, then summary statistics were calculated for three independent sets of the above, with the colorimeter repositioned between each triad of measurements. Values are given in terms of the opponent colour coordinate system (L, a, b; Graves 1997), in which higher values of L show increasing lightness (0–100), higher positive a values increasing redness (vs. greener for lower negative values), and higher positive b values increasing yellowness (vs. bluer for lower negative values), as calculated by the colorimeter. Primaries are numbered from outer to inner, so P1 is the outermost primary.

Feathers of centre of forecrown through nape with prominent pointed blackish shaft-streaks up to c. 5 mm wide, each streak bordered on both sides by spots of Pale Pinkish Buff (121D; Munsell 7.5YR 8/4), distalmost spots up to c. 3 mm in diameter, more proximal and semiconcealed spots up to c. 4 mm; streaks on hindcrown and nape narrowest. Base colour of forecrown through nape Cinnamon-Brown (33; $L=39.0 \pm 8.1$, $a=8.1 \pm 0.4$, $b=19.2 \pm 1.3$), finely vermiculated blackish overall. Supercilia short and not very conspicuous, extending only from base of eartufts to above bill, formed of small feathers that are whitish to pale buffy on outer webs and parts of inner webs, most with black tips and/or edges. Eartufts prominent, longest feather c. 29 mm long and c. 9 mm wide, feathers fresh, each strongly tapering toward elliptical tip, and vermiculated Cinnamon-Brown on distal half of outer web, with a black shaft streak up to c. 3 mm wide with Pale Pinkish Buff spots up to c. 3 mm wide along the outer edge of the streak, inner web and medial portion of outer web mostly Pale Pinkish Buff (L=53.9 ± 2.2, a=6.3 ± 0.6, b=23.6 ± 0.5). Rictal bristles up to c. 20 mm long, mainly blackish, with barred bases of Pale Pinkish Buff (bars up to c. 2 mm wide) alternating with Vandyke Brown (221) bars up to c. 2.5 mm wide; these feathers form the darkest region of the face. Feathers just above eye Raw Sienna (136; Munsell 5YR 5/6), feathers just to the rear of and below eye slightly paler, auriculars with fine, vague concentric bands, broader and darker laterally, pale bands of auriculars Pale Pinkish Buff (219) and up to c. 2 mm wide, dark bands Sepia (219; Munsell 5YR 3/2) and up to c. 1 mm wide, medial auriculars have extended distal barbs up to c. 4 mm long, while lateral auriculars mostly lack extensions. Chin and throat mostly Pale Pinkish Buff (L=59.0 ± 0.8, a=4.0 ± 0.8, b=20.6 ± 2.0), chin slightly paler, more caudal feathers with fine Hair Brown (119A) barring and a few very small Hair Brown shaft streaks. Facial disk with incomplete, narrow, inconspicuous blackish border, heaviest at sides of throat, and bordered at rear by a poorly-defined Pale Pinkish Buff band.

Background colour and pattern of hindneck, mantle, inner scapulars, and back similar to that of forecrown (mantle colour, L=29.3 ± 0.3, a=7.4 ± 0.2, b=14.0 ± 0.3), with a few short blackish shaft-streaks with prominent Pale Pinkish Buff spots on either side of shaft streaks (up to c. 4 mm wide); on hindneck spots more profuse and streaks smaller. Rump and uppertail coverts appear darker (L=29.2 ± 0.8, a=7.2 ± 0.9, b=13.9 ± 1.5) due to lack of buff spots, shaft streaks are smaller and more obscure, and feathers are more distinctly barred dark. Outer scapulars have the outer webs and a smaller area on the centre of the inner web Pale Pinkish Buff (L=53.5 ± 1.4, a=3.8 ± 0.8, b=19.7 ± 1.1) with triangular blackish tips, c. 3 mm long on smallest, uppermost pale scapular, and c. 5 mm long on largest, lowest scapular; the two largest pale scapulars also have blackish shaft streaks up to c. 1.5 mm wide.

On the lesser coverts, the vermiculated background colour appears similar to but plainer than the mantle (L=33.6 ± 1.9, a=6.8 ± 0.2, b=14.9 ± 1.1) due to lack of large pale buff spots, but most feathers have narrow (c. 2 mm wide) Clay Color (123B; 7.5YR 7/8) bands and c. 1 mm blackish shaft streaks. The base colour of all upperwing coverts is similar (greater coverts: L=28.9 ± 1.0, a=6.2 ± 0.3, b=10.6 ± 0.6) but the markings are progressively heavier distally, and there are large (c. 5 mm) Pale Pinkish Buff (L=51.2 ± 0.8, a=4.5 ± 0.7, b=17.2 ± 0.6) spots to either side of the shaft streaks of the greater coverts. The tertials are relatively paler (L=41.4 ± 1.4, a=5.9 ± 0.4, b=14.6 ± 1.2) than rest of upperparts, irregularly and vaguely banded, and heavily vermiculated.

Banding of the secondaries is more definite and regular, with most darker bands c. 5.5 mm wide and Cinnamon-Brown (L=37.4 ± 1.0, a=6.4 ± 0.5, b=15.0 ± 1.2) and paler bands c. 2.5 mm wide and Sayal Brown (223C, Munsell 7.5YR 6/6). The banding of the upper surfaces of the primaries is better defined, most of the dark bands on the outer webs of P3 are c. 7 mm wide and Raw Umber (223; *L*=31.2 ± 1.3, *a*=6.0 ± 0.7, *b*=12.4 ± 0.7) and the pale bands (of which there are 9.5) are c. 5.5 mm wide, and darker than Pale Pinkish Buff (*L*=47.2 ± 1.9, *a*=8.9 ± 0.2, *b*=21.4 ± 1.0). The bands are narrower on P1, the dark bands c. 5 mm wide (*L*=26.7 ± 3.6, *a*=6.5 ± 0.6, *b*=11.6 ± 1.9), the pale bands c. 3 mm wide, and there are 8.5 pale bands on the outer web of P1. Most of the dark bands are finely outlined by narrow darker bands, the pale bands typically narrowly abut the shaft, and pale bands are vague on the inner webs. The tips of the primaries are paler, scarcely banded, and very finely vermiculated, with a dark shaft streak.

On the underwing, the secondary coverts are Pale Pinkish Buff, the proximal primary coverts vermiculated brown, and the distal primary coverts Vandyke Brown (221) with Pale Pinkish Buff distal halves, forming a distinct dark patch near the bend of the wing. The undersurfaces of the primaries are Glaucous (79; *L*=37.6 ± 0.1, *a*=3.9 ± 0.2, *b*=9.7 ± 0.2) with Pale Pinkish Buff bands. The axillaries are paler than Pale Pinkish Buff, with dark brown subterminal spots c. 3 mm long.

The overall aspect of the underparts below the throat is very finely vermiculated dull brown, with the breast darker, and with prominent but mostly narrow blackish shaft streaks. The background colour of the breast is closest to Mikado Brown (121C; *L*=42.9 ± 2.9, *a*=7.7 ± 1.1, *b*=19.8 ± 2.4), while the background colour of the lower underparts is distinctly paler (*L*=56.5 ± 2.4, *a*=4.7 ± 0.4, *b*=18.7 ± 0.8). Each major feather of the underparts has a long dark shaft streak up to c. 3.5 mm wide but usually much narrower, two bands of Cinnamon-Drab (219C) finely outlined with blackish stippling, one terminal band up to c. 5 mm wide, separated from the other Cinnamon-Drab band (up to c. 3.5 mm wide) by a whitish band (*L*=69.0 ± 2.1, *a*=3.2 ± 0.6, *b*=17.2 ± 1.1) up to c. 2.5 mm wide. More proximally, there is a wider, usually concealed whitish band, and a pale rufous band (*L*=54.0 ± 2.5, *a*=9.3 ± 1.2, *b*=26.4 ± 1.2). The undertail coverts and feathers around the vent are relatively uniform and paler than Pale Pinkish Buff, each of the longer feathers with an irregular dark brownish subterminal mark.

The uppertail surface is very irregularly but rather prominently banded, with most dark bands c. 5 mm wide (*L*=35.2 ± 0.4, *a*=5.2 ± 0.1, *b*=11.4 ± 0.1) and pale Tawny Olive (223D) bands c. 3 mm wide.

The tarsi are densely feathered to just above the distal joint, the feathering is complete around rear of tarsus, most being unmarked and paler than Yellow Ocher (123C; *L*=62.3 ± 1.0, *a*=5.3 ± 0.4, *b*=26.2 ± 0.5), the upper side with sparse short fine dark brown streaks. The toes and claws are relatively small and weak, and the claws have pale bases and dark tips.

Specimens. 1) Holotype. 2–4) Paratypes: 2) National Museum of Natural History, Leiden (NNM), RMNH Kat. No. 16 (listed by Sharpe 1875 as *manadensis* No. 15, but this number is crossed out on the label), adult female (according to the label but a male according to Schlegel 1873), from "Sangir-Isl.", collected 10 January 1866 by C. P. Hoedt; 3) Staatliches Museum für Tierkunde, Dresden (MTD) No. C2446, adult of unknown sex, from Tabukan, collected in 1871 by A. B. Meyer, No. 8254 [although Meyer (1879) acknowledged failing

TABLE 1

Mean ± s.d., *n* for measurements (mm) of relevant *Otus* taxa, and raw measurements for each specimen of *Otus collari* (in this order: holotype, RMNH 84653, RMNH Kat. No. 16, MTD C2446). Measurements by Blasius (1888) for holotype of *collari* and missing specimen are given in brackets. Shortfalls of each primary tip measurement from wingpoint of longest feathers (P1 S=shortfall of outermost primary, etc.); wing notches and emarginations measured from tips of individual feathers (wing feather measurements for *siaoensis* approximate due to damage). Tarsal feathering measured from tip of distalmost feather to joint of phalanges 1–2, digit three. Significant differences (two-sample *t*-test, unequal variances) of each taxon from *collari*: $*=P\le0.05$; $**=P\le0.01$; $***=P\le0.001$. For primary shortfall, emargination, and notch measurements, significance tests were done on log-transformed data divided by log wing length; untransformed data are presented here. Due to small samples, significance tests were not done for *siaoensis*, *mendeni*, *kalidupae*, or *sulaensis*

Variable	*collari*	*manadensis*	*siaoensis*	*mendeni*	*kalidupae*	*sulaensis*	*albiventris*	*tempestatis*	Moluccan *magicus*[1]	Philippine taxa[2]	E. Indian Ocean taxa[3]
Culmen (skull)	20.1 ± 0.9, 4; 19.6, 19.3, 20.3, 21.4	20.0 ± 0.8, 53	19.9	21.2 ± 0.4, 3	23.9 ± 0.6, 2	24.6 ± 1.3, 2	21.3 ± 0.9, 24	20.7 ± 0.9, 11	25.1 ± 1.1, 75***	22.7 ± 0.9, 25**	22.8 ± 1.9, 8**
Wing length	161.2 ± 3.4, 4; 160, 166, 161, 158 [162, 160]	151.4 ± 4.4, 57**	127	146.5 ± 4.1, 3	168.0 ± 0.0, 2	167.0 ± 8.5, 2	155.9 ± 5.9, 20*	151.9 ± 4.4, 12**	175.6 ± 7.6, 78***	158.3 ± 8.6, 25	157.6 ± 9.5, 7
P1 S	38.7 ± 2.8, 4; 40.5, 38.1, 34.9, 41.2	36.7 ± 3.6, 50	28.2	37.4 ± 2.5, 3	38.7 ± 1.1, 2	37.4 ± 2.2, 2	35.5 ± 4.0, 19	38.7 ± 3.3, 12	39.9 ± 3.3, 47	40.4 ± 2.2, 19	36.2 ± 6.9, 6
P2 S	15.0 ± 1.7, 4; 14.7, 14.7, 13.3, 17.4	12.8 ± 2.2, 51	14.3	14.7 ± 0.6, 3	13.2 ± 1.5, 2	14.5 ± 1.3, 2	11.6 ± 1.7, 20*	13.6 ± 1.9, 12	15.4 ± 2.3, 48	14.8 ± 2.0, 19	11.8 ± 1.9, 7*
P3 S	4.7 ± 0.8, 4; 4.0, 4.4, 4.4, 5.8	3.0 ± 1.3, 50	6.0	4.0 ± 0.4, 3	2.5 ± 0.1, 2	3.5 ± 0.2, 2	2.8 ± 1.2, 21*	3.9 ± 0.8, 12	4.4 ± 1.1, 50	3.3 ± 1.2, 17	2.0 ± 0.8, 7*
P4 S	0.0 ± 0.0, 4	0.0 ± 0.2, 51	0.0	0.0 ± 0.0, 3	0.0 ± 0.0, 2	0.0 ± 0.0, 2	0.1 ± 0.3, 22	0.1 ± 0.3, 12	0.1 ± 0.3, 50	0.0 ± 0.0, 17	0.0 ± 0.0, 7
P5 S	3.5 ± 1.5, 3; 2.8, 5.2, –, 2.4	1.8 ± 1.1, 45	–	0.2 ± 0.3, 3	1.3 ± 0.3, 2	1.3 ± 0.1, 2	0.7 ± 1.0, 19	0.5 ± 0.7, 11*	1.4 ± 1.2, 47	1.9 ± 1.7, 14	3.1 ± 0.9, 7
P6 S	10.0 ± 1.2, 4; 9.1, 10.8, 11.3, 8.8	7.5 ± 1.6, 42**	8.5	5.0 ± 0.1, 3	6.9 ± 1.7, 2	6.3 ± 1.7, 2	6.7 ± 1.2, 18***	6.6 ± 1.6, 11**	6.7 ± 1.6, 41***	7.7 ± 2.5, 14*	11.6 ± 1.7, 7
P7 S	18.9 ± 1.7, 4; 17.3, 20.9, 19.7, 17.7	14.6 ± 2.0, 43**	15.1	11.9 ± 1.4, 3	14.1 ± 2.0, 2	14.7	14.8 ± 2.2, 18**	14.1 ± 1.8, 12***	14.0 ± 2.2, 39***	14.0 ± 2.4, 14**	19.9 ± 1.4, 7
P8 S	27.7 ± 1.6, 4; 26.7, 28.2, 29.7, 26.2	23.0 ± 2.4, 41**	20.3	18.8 ± 0.7, 3	21.8 ± 2.7, 2	21.4	22.1 ± 2.3, 16**	22.4 ± 2.0, 12***	22.3 ± 2.2, 40***	21.3 ± 2.7, 14***	26.3 ± 2.7, 6
P9 S	34.4 ± 1.8, 4; 32.8, 34.3, 37.0, 33.6	29.1 ± 2.5, 40**	27.3	24.3 ± 1.6, 3	28.0 ± 1.8, 2	29.0	29.1 ± 3.0, 16***	30.1 ± 2.4, 12*	29.6 ± 2.6, 39***	28.9 ± 2.4, 13***	32.1 ± 3.4, 6
P10 S	41.0 ± 1.6, 4; 39.6, 41.5, 43.0, 39.7	36.1 ± 2.5, 40*	36.9	29.9 ± 0.6, 3	33.2 ± 3.8, 2	34.2	35.8 ± 3.2, 15***	35.9 ± 2.1, 12**	36.8 ± 3.3, 38***	37.1 ± 3.2, 13**	39.8 ± 3.8, 6
P1 length	75.4 ± 3.2, 4; 76.0, 78.5, 76.2, 71.0	70.8 ± 4.3, 52*	60.9	66.8 ± 4.6, 3	86.8	81.3 ± 1.8, 2	75.4 ± 4.0, 19	70.2 ± 3.8, 12*	86.1 ± 6.5, 54**	73.2 ± 7.3, 16	76.2 ± 2.8, 4
P2 emargination	59.3 ± 1.3, 4; 58.7, 60.4, 60.5, 57.8	54.1 ± 3.7, 54***	–	50.0 ± 5.0, 3	58.4 ± 4.7, 2	59.8 ± 1.8, 2	55.3 ± 4.2, 21**	55.4 ± 3.8, 11	59.6 ± 4.0, 54***	54.6 ± 2.1, 16***	54.7 ± 4.9, 7
P3 emargination	56.3 ± 4.0, 3; 52.5, 56.0, –, 60.5	49.5 ± 3.4, 52	–	44.6 ± 3.2, 3	52.4 ± 5.7, 2	55.1 ± 0.1, 2	49.2 ± 3.7, 20	48.6 ± 3.7, 12	55.2 ± 3.1, 58	49.1 ± 2.2, 15	49.4 ± 6.6, 7
P3 notch	46.5 ± 1.5, 3; 47.8, 44.8, 46.8, –	41.9 ± 2.6, 32	–	37.9 ± 2.6, 3	41.0 ± 2.4, 2	55.1 ± 0.1, 2	40.2 ± 2.4, 19*	38.8 ± 2.3, 10*	42.6 ± 3.2, 40*	41.5 ± 2.4, 14	39.3 ± 4.0, 5**
Tail length	74.2 ± 3.2, 4; 78.0, 74.6, 74.1, 70.1 [79, 72]	69.9 ± 3.5, 51*	57.1	65.0 ± 1.3, 3	82.0 ± 0.4, 2	75.8 ± 2.0, 2	72.9 ± 3.6, 24	74.3 ± 2.8, 12	84.1 ± 4.3, 71**	75.9 ± 3.9, 25	72.0 ± 8.4, 7
Tarsus length	27.4 ± 0.4, 3; 27.7, 27.6, 26.9, –, [26, 26]	27.0 ± 1.2, 54	26.8	26.7 ± 1.2, 3	33.2 ± 0.0, 2	29.1 ± 0.7, 2	28.2 ± 1.5, 23	27.5 ± 1.6, 12	33.2 ± 1.8, 75***	32.3 ± 2.8, 25***	27.5 ± 2.3, 8
Tarsal feathering	3.7 ± 0.6, 3; 3.0, 3.8, –, 4.3	5.4 ± 2.3, 51*	4.5	14.9 ± 1.4, 3	5.1 ± 1.8, 2	17.2 ± 1.8, 2	5.2 ± 1.3, 25*	4.7 ± 1.3, 12	9.9 ± 3.4, 72***	6.5 ± 1.5, 15***	7.5 ± 2.3, 8

[1] *Otus magicus magicus* ($n=24$), *bouruensis* ($n=9$), *obira* ($n=1$), *leucospilus* ($n=24$) and *morotensis* ($n=21$).
[2] *Otus mantananensis cuyensis* ($n=3$), *sibutuensis* ($n=15$, including *steerei*), *romblonis* ($n=5$) and *mantananensis* ($n=2$).
[3] *Otus enganensis* ($n=4$), *alius* ($n=2$), and *umbra* ($n=2$) combined due to small sample sizes.

to properly label some specimens collected on the trip on which this specimen was collected, MTD C2446 closely matches the other Sangihe specimens in plumage and measurements]; 4) RMNH No. 84653, adult male, from Manganitu, collected 22 May 1985 by F. G. and C. M. Rozendaal, skull completely ossified, weight 76 g.

Another female specimen collected on Sangihe by Platen on 24 January 1887 (specimen "b" of Blasius 1888) is no longer in the collection of the Staatliches Naturhistorisches Museum, Braunschweig, and is presumed to have been lost near the end of World War II (G. Boenigk, *in litt.* 1998). Since measurements given for the holotype (specimen "a") by Blasius (1888) are very similar to those obtained by PCR for the same specimen, it is assumed here that Blasius's measurements of the missing specimen "b" are comparable, and thus they are presented in Table 1, but they were not used in the summary statistics or analyses. The missing specimen was said to be redder and darker overall than the holotype (Blasius 1888).

Measurements of the holotype (lengths in mm). Wing (flattened and straightened) 160; tail 78.0; tarsus 27.7; bill (from skull) 19.6; bill (from anterior edge of cere) 12.8. For additional measurements of holotype and those of paratypes and related species, see Table 1.

Soft-part colours. For the holotype and Platen's specimen "b" (Blasius 1888), the iris was "hell-gelb" (light yellow), and the bill and feet "braun" (brown). RMNH 84653 had "eyes bright yellow; bill horn; legs horn". An individual tape-recorded and photographed at night (with a flash) by FRL (Plate 5) showed pale yellow irides and a narrow dark rim around the eye, visible part of bill brownish-horn with a blackish tip, pale brownish toes, and pale-based, dark-tipped claws. The live specimen photographed by J. Wardill had a brownish-horn bill, greyish uppersurfaces to toes, soles of toes pale pinkish, and claws with pale bases and dark tips, but its eyes were closed in the photographs we have examined.

Voice. Among related taxa for which vocalisations are known, the voice of *collari* resembles only that of *manadensis*, in that both are whistled. However, the quality, form, pitch, duration, and rhythm all differ greatly between the two. The songs of *manadensis* have been documented from various parts of Sulawesi. The typical song of *manadensis* is a breathy, oft-repeated whistle of two short staccato, syncopated elements, "*ploe- ek—ploe- ek*" or "*oe-ek—oe-ek*" (Coomans de Ruiter & Maurenbrecher 1948; Fig. 2), also rendered as "*tona-as*", "*hooit*", and "*dojot*" (Coomans de Ruiter 1950). Each phrase, which falls between c. 1–1.5 kHz, is c. 0.4 sec in duration, commences at the lowest frequency, has a distinct frequency shift at the start of the second element with no decrease in amplitude, and terminates abruptly at the highest frequency. Other songs or calls reported for *manadensis* include a clear "*kéte*" or "*kiek*", sometimes changing into a rapid "*kok, kok, kok*" or "*kiek, kiek, kiek*" of increasing amplitude but steady frequency. Alternating series of song or call types may also be given, "*oe-ek-oe-ek-oe-ek . . . oi, oi, oi, oi, oi, oi . . .*" (Coomans de Ruiter & Maurenbrecher 1948, Coomans de Ruiter 1959).

In contrast, the vocalisations of *collari* are strikingly different. Its whistled song (Fig. 2) is longer, higher-pitched, much sweeter, clearer, more modulated, and slurred. Each phrase is of c. 0.7 sec duration, consists of only one perceptible element, and falls between c. 1.65–1.85 kHz. A descending "*kleeeeer*", it commences at the highest frequency, is downslurred for most of its duration, and is at maximum amplitude during the middle two-thirds of the element. In a tape-recorded sequence of 11 very similar "*kleeeeer*" phrases (Fig. 2; FRL), the intervals between phrases ranged from c. 8–15 sec, mean 11.2 ± 2.2 sec, n=9 intervals (one interval of 28 sec was not included in this computation because a more distant bird was calling; Fig. 2, lower).

The latter song type (Fig. 2, lower) sounds three-noted because each phrase is much more variable in pitch. These phrases, which are separated from one another by only c. 0.3 sec, commence at c. 1.8 kHz, increase in frequency to c. 2.0 kHz, and then abruptly decrease to c. 1.75 kHz, remaining at that frequency for the duration. They are of the same sweet, liquid quality as the single-noted "*kleeeer*" song.

In another, more distant sequence (recording by J. Riley, NSA: wa1997/54:4b; 2010 h, 18 November 1996, Sahengbalira), six near-identical "*kleeeeer*" notes were given in 53 sec, each commencing at its highest pitch and being slightly downslurred (frequency range 1.6–1.8 kHz). The intervals between phrases ranged from c. 9–11 sec, mean 9.4 ± 0.9 sec, n=5 intervals, and each phrase was c. 0.8 sec in duration. Thus, Riley's tape-recorded sequence does not support his (1997b) contention that vocalisations of Sangihe birds are like those of *manadensis*, but instead it is very like the tape-recording made by FRL, and we know of no approach between any of the calls of the two species.

Etymology. This species is named after our friend and colleague Dr Nigel J. Collar in recognition of his numerous contributions to the important field of bird conservation. His work has stimulated enormous interest in threatened birds, and has encouraged a conservation ethic and philosophy amongst a generation of amateur and professional ornithologists and birdwatchers.

Remarks

Differences between Otus collari *and other taxa in* manadensis *superspecies*

Geographically distant and morphologically distinct taxa considered separate species by Rasmussen (1998: Seychelles Scops Owl *Otus insularis* and Biak Scops Owl *O. beccarii*) and those from islands off Africa are excluded from the following comparisons, as are the clearly different taxa of Elegant Scops Owl *Otus elegans*. The present taxonomic placement of certain other taxa is dubious, and work in progress is targeted toward resolving these problems, in particular the status of *siaoensis* (Rasmussen & Lambert, unpubl. data).

East Indian Ocean taxa

From the three "East Indian Ocean" island endemics as a group (including Simeulue Scops Owl *O. umbra*, n=2 adult specimens examined; Enggano Scops Owl *O. enganensis*, *n*=4; and Nicobar Scops Owl *O. alius*, *n*=2, Rasmussen 1998; but excluding the Mentawai Scops Owl *Otus mentawi*), *collari* differs in being more streaked overall, having longer eartufts, a more prominent facial disk, and more spotted upperparts. However, *collari* and *siaoensis* are the only Wallacean taxa of this superspecies with such narrow wings as the East Indian Ocean group, but both of the former taxa differ from the latter group in that the second and third primaries (from outermost) are shorter, which gives them more pointed wingtips (Table 1). Additionally, *collari* differs from *alius* (see plate in Rasmussen 1998) in that its supercilium is whiter and more prominent, in overall plumage it is much more heavily streaked, with spotting rather than barring above, its pale scapular spots are larger with triangular black tips, its tarsi are feathered more distally, and its feet and claws are smaller. From *enganensis*, *collari* differs in its smaller size, especially its bill, feet and claws, in lacking long extensions of the distal barbs of the rear auriculars, in having larger, blacker scapular tips, and in being much less uniform and less rufous overall. From *umbra*, *collari* differs in its much longer wings and tail and much less uniform, less rufous overall plumage.

Taxa from outlying islands in Sulawesi region

Otus [*m.*] *siaoensis*, despite its provenance, differs more strongly from *manadensis* and *collari* than the latter two do from each other (Plate 4, Table 1). Nevertheless, *siaoensis* and *collari* appear to share a pattern of shortfalls of primaries from the wingpoint that differs from that of all the Moluccan and Lesser Sundas taxa of *magicus*, as well as *manadensis*, the following three taxa from islands to the east of Sulawesi, and the more distantly related *beccarii* and *insularis* (Rasmussen 1998). The apparent similarity in wing shape notwithstanding, *collari* differs greatly from *siaoensis* in numerous characters. The former has much longer wings and tail, although the bill, feet and claws are of approximately the same size, its eartufts are longer, less full and more pointed, its throat is more heavily marked and less conspicuously pale, it lacks a prominent pale nuchal collar, its underparts pattern is much more vermiculated, more regularly barred, and drabber in colour, with the black shaft-streaking greatly predominating over the barring, its remiges and rectrices have fewer bands, which are outlined on both edges by narrow blackish bands, and its tail is much more broadly, irregularly, and less strongly banded.

Compared to *Otus* [*m.*] *sulaensis* (Finsch 1898, King 1997; Sula Islands, east of Sulawesi, *n*=2 adults, entire world holdings), *collari* is smaller, less heavily marked, and paler overall (Table 1). Its auriculars are paler, its eartufts blotchier and unbarred, its upperparts more broadly streaked, its scapular spots lack large blackish blotches, the pale bands in its primaries are larger and extend to the shaft and to some extent the inner web, its tail is more prominently banded, and its tarsi are much more extensively feathered, especially on the rear (plantar) surface.

Otus collari differs from *O.* [*m.*] *kalidupae* (Tukangbesi, south-east of Sulawesi, *n*=2 adults, entire world holdings) in being smaller, darker, and browner overall (Table 1). Its eartufts are also much more heavily marked, its scapular spots have large black terminal triangles and lack fine black transverse lines, its underparts have more distinct, finer barring, the upper surfaces of its outer primaries have much wider and more uniformly dark bands, but the undersides of the inner webs of the primaries have less prominent pale barring, and its tertials and upper tail surface are more prominently banded.

From *O* [*m.*] *mendeni* (Peleng Island, off eastern Sulawesi, *n*=3 adults, entire world holdings), *collari* differs greatly in its much longer wing and tail. Additionally, its eartufts are more heavily streaked and spotted, it has a paler bill, the darkest area of its face is between the bill and eyes, its upperparts have much broader streaks and larger pale spots, its overall plumage is much more uniformly brown, the streaking on its underparts is narrower, less blotchy, and lacks rufous areas around the black shaft streaks, its scapular spots have larger pale areas (rather than having black central cross-lines) and larger triangular black tips, its tertials are more prominently banded, and its tarsus is feathered much more distally.

Otus magicus

Compared to *O. magicus albiventris* and *O. m. tempestatis*, the small Lesser Sundas (Nusa Tenggara) subspecies of *Otus magicus*, *collari* differs in that the auriculars and area around the eye do not form a distinct dark patch, its white supercilium does not extend to the front of the face, its bill is browner, its upperparts are more twin-spotted, its lower underparts have smaller, less conspicuous white markings, its primaries have broader dark bands, its tertials are less prominently and less evenly banded, and its tail is much more broadly but less distinctly dark-banded. *Otus collari* also differs from *albiventris* in that its eartufts are shorter, less pointed, more blotched, and have buffier bases, and its underparts are more finely vermiculated with fewer heavy black streaks. Additionally, *collari* differs from *tempestatis* in that its pale scapular spots have larger black triangular tips and lack narrow blackish cross marks. The five Moluccan forms of *Otus magicus* (Table 1) are all considerably larger than *collari*, and none closely resemble it in plumage.

Philippine taxa

To the north of Sangihe, the nearest related taxa are four disjunct Philippine races of Mantanani Scops Owl *O. mantananensis*: *O. m. cuyensis* (Cuyo I., west-central Philippines, *n*=3); *O. m. romblonis* (Romblon, Sibuyan, and nearby islets, *n*=5); *O. m. sibutuensis* [(including *steerei*, type examined), Sibutu and Tumindao, Sulu Archipelago, *n*=15]; and *O. m. mantananensis* (islets between Borneo and Palawan, *n*=2). Compared to all these taxa (combined), *collari* is smaller, especially its bill and feet, although its wings are longer and narrower (Table 1), the lower edge of its throat is less streaked, its facial disk is less distinct, and its tarsi are more extensively feathered. Additional differences exist between *collari* and each race of *mantananensis*.

Habitat, ecology, and conservation

The 1985 *Otus collari* specimen was collected "in cultivation of coconut, nutmeg and secondary growth, along stream, c. 50 m." at Manganitu (label data), and the species was also reported during the same time period from the upper slopes of Mt. Sahendaruman (F. G. Rozendaal, *in litt.* 1998). FRL's tape-recording and photographs were made of a bird calling 2–5 m above the ground in the understorey and lower parts of larger trees just before and after dusk on 30 July 1996 above Telawid Atas, at about 315 m altitude on the slopes of Mt. Awu, in a valley of remnant semi-natural habitat with tall durian and other trees, bamboo and scrub on the edge of a mixed plantation. *Otus collari* was also heard calling on 8 and 9 September at Telawid Atas (Riley 1997a), in November and December 1996 in forest on Mt. Sahengbalira and from agricultural areas around Telawid (Riley 1997b), and a captive obtained in Tahuna was said by locals to have come from nearby mixed plantations (Riley 1997b). Thus it appears to be widespread throughout Sangihe, from the coast to at least the lower parts of the hills. Given its apparent tolerance of mixed plantations, a habitat which has dominated the landscape of the island since the early part of the 20th Century (Heringa 1921, Whitten *et al.* 1987), *Otus collari* seems unlikely to be threatened.

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Misima's missing birds

by Mary LeCroy & William S. Peckover

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We observed 37 species of birds on Misima Island, Louisiade Archipelago, Papua New Guinea during a visit from 1–12 October 1993. Comparison of our list with species collected on the same island by A. S. Meek in 1897 (Hartert 1898a,b, 1899) led to the discovery that a number of species were "missing" from our list. Thinking that perhaps the missing species had been victims of the extensive habitat alterations that have taken place in the past century, we undertook a careful analysis of avian records from Misima. This paper presents our results and shows that the uncritical use of the published records might have led to false conclusions, but that careful analysis of archival and specimen records may provide unexpected discoveries and useful insights.

The Louisiade Archipelago has long been known to Europeans. Captain Luis Baez de Torres discovered it in 1606 and named it Tierra de San Buenaventura (Hilder 1980: 24 and fig. 6), but he sailed south of the bordering reefs and islands without making a landfall on or naming any of the islands individually. Perhaps unaware of the earlier Spanish name, Captain Louis-Antoine de Bougainville in 1768 called the group the Louisiade Archipelago to honour King Louis XV of France. On 14 June 1793, Captain A. J. R. Bruni D'Entrecasteaux sighted the island now known by its local name of Misima and named it St. Aignan for Frenay de Saint-Aignan, Lieutenant on the *Recherche*, a frigate under D'Entrecasteaux's command (Wichmann 1909: 267) (Fig. 1).

Existing collections and records

Between 1879 and 1930 two large and several small collections of birds were made on Misima. The largest was made by A. S. Meek who, with his brother W. G. Meek, one of the Eichhorn brothers never mentioned by name, and local assistants, visited in 1897, collecting for Lord Walter Rothschild. The part of this collection reported on by Hartert (1898a,b, 1899) is now in the American Museum of Natural History (AMNH) in New York. Hartert gives no clear idea of the number of specimens or dates of collection but lists 65 species and dates between late July and December. Meek (1913: 89) says that he spent three months on Misima. We were able to trace 273 former Rothschild Collection specimens at AMNH, including all species listed by Hartert except *Ducula zoeae*, and three species not listed by him, *Pluvialis squatarola*, *Sterna sumatrana*, and *Lorius hypoinochrous*. The nests and eggs collected remain in the Natural History Museum, Tring, U.K. formerly the British Museum (Natural History) (BMNH); most dates given for these by Hartert (1899) are in November and December.

The second largest collection was made by Hannibal Hamlin (MS), when leader of the AMNH Whitney South Sea Expedition, and two assistants. They spent 21–30 July 1930 at Bwagabwaga Bay on the south side of Misima, and 95 specimens of 23 species were catalogued, of which we traced 93. Weights and conditions of gonads are noted on the labels, as are some soft parts colours. This collection has not been reported as a whole, although specimens from it have been incorporated in various papers resulting from the Whitney Expedition and in Mayr (1941).

Hamlin (MS) was also in the Bonvouloir Islands in 1928: on Hastings Island on 8 October, collecting 27 specimens of seven species and seeing an additional one; on East Island on 10–11 October,

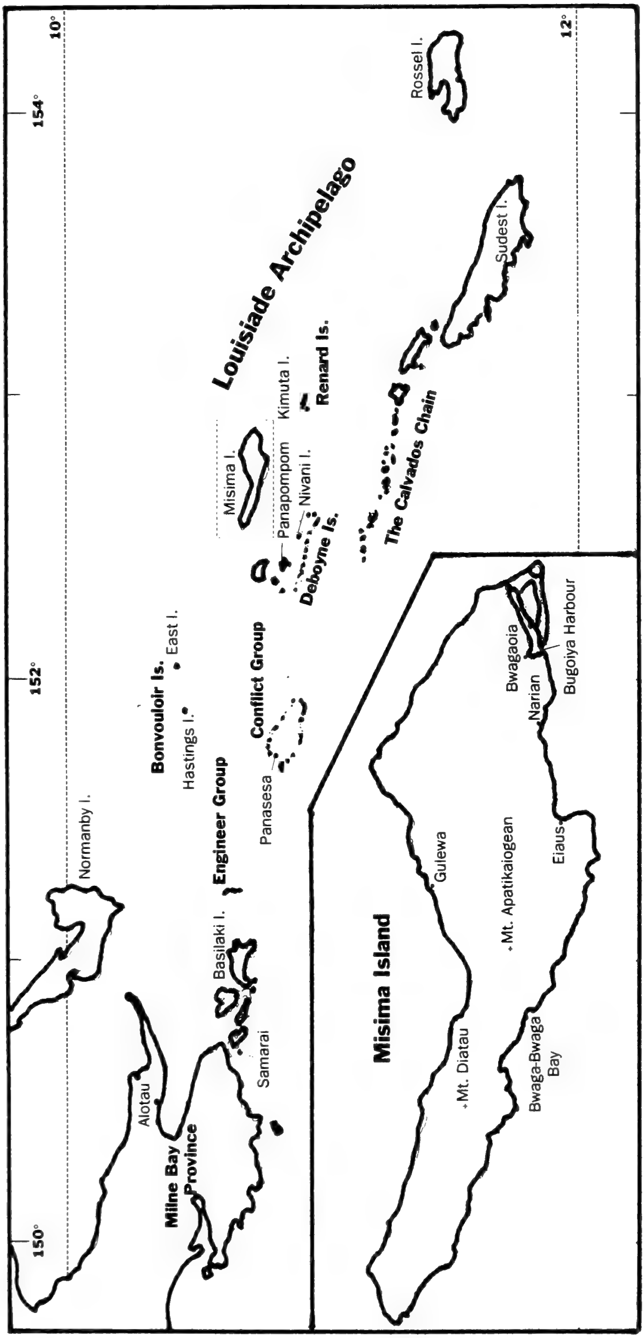

Figure 1. Southeastern tip of Papua New Guinea and the Louisiade Archipelago, inset enlarged to show Misima Island.

collecting 58 specimens of 11 species. On 28–29 April 1929 and 18 July 1930 he was on Panasesa ["Pana" means "island" (Brass 1959: 33)], Conflict Group, where he collected 29 specimens of six species and observed five additional species; and on 30–31 July 1930 on Panapompom, Deboyne Islands, where he collected 15 specimens of six species. On 19–20 and 30 July 1930 he was on Nivani Island, Deboyne Islands, where he recorded seeing nine species, apparently without collecting. These records have been included in Table 1.

Tristram (1882) reported on a collection made in 1879 by G. E. Richards, R.N., at Blanche Bay, New Britain, and on Misima. Richards was captain of the Royal Navy warship *Renard*, involved in survey work in the Solomon Sea (Wichmann, 1910: 269, 1912: 828–829). He sent a total of 62 species from both localities, but a complete list is not given and only *Lorius hypoinochrous*, *Esacus magnirostris*, *Pluvialis fulva*, and *Ducula pinon salvadorii* (*Carpodacus salvadorii*, described as new) were definitely ascribed to Misima.

Other small collections made about the same time were reported on by DeVis (1890, 1892) and Tristram (1889b). The specimens listed by DeVis were from collections made for Sir William MacGregor, Administrator of British New Guinea, during his official visits to the Louisiade Archipelago: the first, 11 species from Misima, was made during his first ten months in office (September 1888 through June 1889), but no dates are given by DeVis; the second, during June and July 1891, when collections were made on Misima (four species), nearby "Renard Island" (=Kimuta Island, nine species) and Panapompom (one species). We have considered only the species that were listed with specific localities (Table 1). Some specimens from the latter of these two collections are in the Queensland Museum (QM) in Brisbane.

Tristram (1889b) reported on the birds collected by Basil H. Thomson, Secretary to Sir William MacGregor, while on a government exploring trip. He spent 20–23 October 1888 on the island, anchoring "on the lee side at a spot which would be quite unsafe in the north-west monsoon". His group, including geologists, apparently walked across the centre of the island. "We found that the limestone hills which compose the centre of the island were honey-combed with caves and densely timbered. We crossed the range and descended to a most romantic spot called by the natives Kaiaba . . . The eastern part of the island consists of very rugged hills, through which the streams have cut very deep and narrow gorges" (Thomson, 1889). Tristram listed five species from Misima, including *Cinnyris christianae* (=*Nectarinia aspasia christianae*) which he described as new.

Maitland (1893), who was unable to pinpoint Kaiaba, explored the headwaters of Gulewa Creek and thought perhaps this was the same area described by Thomson, implying that Thomson crossed from south to north. More recently, the Fifth Archbold Expedition spent 14 July–14 August 1957 on Misima. Brass (1959: 34) notes that a visit was made to "a big cave a mile or more up a creek from Ehaus [=Eiaus] village, about 4 miles west of camp. Caves on three levels were reported. Only the middle-level cave, seemingly called Kuiaba, was

TABLE 1

List of species known from Misima Island and small islands in the vicinity. See text for explanation. x=specimens, *=sight records

	Location												
		Misima					Kimuta						
Species	31 July	Meek	Hamlin	ML & WSP	Others	5–11 Sept	Meek	Devis	Panasesa	Pana-pompom	Nivani	East	Hastings
Fregata ariel				*									
Egretta intermedia				*									
Egretta s. sacra				*			x						
Dupetor flavicollis gouldi				*			x						
Haliastur indus			x	*	x						*		
Haliaeetus leucogaster				*									
Accipiter novaehollandiae misulae		x		*								x	
Accipiter poliocephalus		x		*									
Pandion haliaeetus									*				
Falco peregrinus				*									
Anas superciliosa rogersi						9							
Megapodius freycinete macgillivrayi		x		*		11						x	
Amaurornis olivaceus					*								
Porphyrio porphyrio melanopterus		x	x	*									
Haematopus longirostris							x						
Himantopus himantopus		x											
Esacus magnirostris					x		x						
Glareola maldivarum					*								
Pluvialis fulva					x	10	x	x			*		
Pluvialis squatarola							x						
Numenius phaeopus variegatus		x		*									
Tringa brevipes							x						
Tringa hypoleucos		x		*		11	x						
Calidris acuminata							x						
Calidris ruficollis							x						
Calidris ferruginea					*								

TABLE 1 *(continued)*

	Location												
		Misima					Kimuta						
Species	31 July	Meek	Hamlin	ML & WSP	Others	5–11 Sept	Meek	Devis	Panasesa	Pana-pompom	Nivani	East	Hastings
Sterna sumatrana			*				x		*		*		
Sterna a. anaethetus							x						
Sterna bergii cristatus							x						
Anous sp.			*						*		*		
Columba vitiensis halmaheira	x		x										
Macropygia amboinensis cunctata		x	x	*	x	9							
Chalcophaps indica crysochlora				*		9	x					x	
Caloenas n. nicobarica		x		*				x					x
Ptilinopus s. superbus		x	x	*		6							
Ptilinopus rivoli strophium	x	x	x			6	x					x	x
Ducula pistrinaria postrema						11							
Ducula pinon salvadorii		x		*	x								
Ducula bicolor spilorrhoa					x	11							
Trichoglossus haematodus micropteryx						8	x				*		
Lorius h. hypoinochrous		x	x	*	x								
Cacatua galerita triton		x	x	*							*		
Micropsitta pusio stresemanni		x			x	10							
Geoffroyus geoffroyi sudestensis		x		*		11							
Chrysococcyx lucidus plagosus		x											
Eudynamis taitensis						10							
Scythrops novaehollandiae				*									
Collocalia vanikorensis tagulae		x		*	x		x						
Collocalia esculenta misimae		x		*			x						
Halcyon macleayi incincta		x											
Halcyon chloris colona				*		7	x		x			x	
Halcyon s. sancta		x	x		x								

TABLE 1 *(continued)*

	Location												
		Misima					Kimuta						
Species	31 July	Meek	Hamlin	ML & WSP	Others	5–11 Sept	Meek	Devis	Panasesa	Panapompom	Nivani	East	Hastings
Halcyon s. saurophaga		x					x						
Alcedo atthis hispidoides		x	x										
Merops ornatus		x	x			10			*				
Eurystomus orientalis waigouensis		x	x	*	x								
Coracina novaehollandiae melanops		x											
Coracina tenuirostris tagulana		x											
Lalage leucomela pallescens		x	x	*	x								
Gerygone magnirostris onerosa		x	x			5							
Rhipidura rufifrons louisiadensis						10	x			x		x	x
Rhipidura rufiventris nigromentalis		x	x	*	x	5							
Monarcha cinerascens rosselianus						9	x	x				x	
Monarcha guttula	x	x	x			5							
Monarcha trivirgatus melanopterus		x				11	x					x	x
Myiagra rubecula sciurorum		x	x	*			x		x	x			
Myiagra cyanoleuca		x	x	*			x						
Myiagra alecto lucida		x	x	*	x			x					
Pachycephala pectoralis collaris	x					10	x	x	x	x		x	x
Dicaeum pectorale nitidum		x		*									
Nectarinia aspasia christianae		x	x	*	x	10			*		*		
Zosterops g. griseotinctus	x					5	x	x	x	x	*	x	x
Myzomela albigula pallidior	x						x		x	x		x	*
Myzomela nigrita louisiadensis		x	x	*	x								
Aplonis cantoroides				*		8	x	x	x				
Aplonis m. metallica		x	x	*	x	11							
Corvus o. orru		x	x	*									

entered, in company with villagers from Ehaus." We feel that Thomson and his group probably anchored on the north coast, certainly "unsafe in the north-west monsoon", and perhaps not far from our locality of Gulewa where a track across the island, now a road, has its northern terminus. If they then walked across on this track they would come out on the south coast not far from Eiaus and Kuiaba cave. Additional circumstantial evidence that Thomson landed on the north coast is the establishment in 1889 of government headquarters for the Louisiades at Siagara on the north coast, where it remained only briefly before being moved to the protected site of Bwagaoia (Brass 1959: 19). It may be that Thomson' 1888 visit affected the choice of the first government station. If we are correct in our interpretation of Thomson's route, the "densely timbered" hills that he reported are largely denuded of forest today.

Brian Finch (1985) added two species to the Misima list from observations at the Misima airstrip at Bwagaoia in February 1985: *Glareola maldivarum* and *Calidris ferruginea*. More recently, Len Tolhurst (1996: 34–35) has reported two records for Misima: a breeding *Amaurornis olivaceus* and *Merops ornatus*. However, *Merops ornatus* was collected earlier by Meek (Hartert 1899: 212) and also by Hamlin (unpublished). No collections or observations have been made on Mt. Diatau (1,038 m) and Mt. Apatikaiogean (703 m), the two highest points on the island. Meek (1913: 86) mentions that his collectors obtained butterflies at higher altitudes, even though his base camp was at Bugoiya Harbour, and it is possible that some of his birds came from these areas as well.

Misima in 1993

Most of our stay on Misima was spent at and near the village of Gulewa, in a mixed forest–garden area *ca.* 200 m above sea level, 2 km south of the village. We spent 1–3 and 12 October at Misima Mines Pty. Ltd. headquarters and some observations were made there, and between there and Bwagaoia. All of these records are listed in Table 1.

At the time of our visit, Misima had had no rain in five months. The hillsides were very dry and local people were cutting and burning large tracts of the remaining forest for gardens. Many of the slopes that were being denuded of forest were very steep (up to 60°) and will be prone to erosion. Large trees were felled and burned on the site. Smaller timber was utilized to help prevent erosion, to build pig-proof fences around the gardens, or to build houses. Light showers early in our stay became more numerous and heavier, until by the time we left Gulewa the fires were all out and the air clear. Gardens already extended to the tops of some of the hills, although higher hills were still topped by forest. True gullies were not cultivated and some of these had sago trees and tree ferns growing in them. We did not see tree ferns or palm trees in the forest, but there were a few low palmetto-like plants on the forest floor.

Misima Mines Pty. Ltd. has provided numerous amenities to the local people, including a good road around the eastern half of the island and piped water into most villages. Most small streams near the coast were dry, but water was still available at the village faucets. Larger rivers were still running and people used them for bathing and for washing clothes and dishes.

The country between the mine and Bwagaoia was mostly coconut plantations, with cocoa planted beneath the coconut trees. Both were old, unkempt, and dying; there were very few new plantings. There were some banana plantations in lower, presumably wetter, locations. Much of the northeastern end of the island is high, with cliffs, often deeply undercut by waves on the windward side. On the north coast, just outside Bwagaoia, there is an area of dry eucalypt forest. The beaches around Gulewa are coralline rock, sharp and pitted, with few areas of sand.

The forest remaining near the coast was very disturbed and largely dry, but there was some lush sago forest, even though the ground in it was dry at this season. Trails into the gardens from Gulewa were everywhere steep, and the soil in the gardens was very dry and rocky. Several residents were pasturing cattle in scrubby land.

We spent 4 days at a garden house about 200 m above Gulewa. The walk to this place began in a dry area of planted sago, coconut, breadfruit, cocoa, and betel nut. A few big forest trees had also been left in place, including "chestnut", *Terminalia* sp. As we started to climb, we went through established garden patches and then into newly cut forest, some still smouldering. This part was very steep and rocky.

Forest, apparently original, covered a small area adjacent to the garden house and topping the hill. Here there were tall buttressed trees, 25–30 m high, and the ground under them was relatively free of undergrowth. The interior of this forest was quite damp and everything green. Most mornings there was a heavy dew; this probably also gave the gardens some moisture, even though the soil was dry and powdery.

Human population growth in Misima is very rapid and this is undoubtedly a factor in the wholesale forest destruction. Catapults are much in evidence, including very large ones, 2–2.5 m long with a "Y" at the top about 30 cm deep. The basal end of the stock is pointed and is stuck in the ground and slanted to aim the catapult. Flying foxes and probably large birds are shot in this way.

Misima conforms to the pattern of bird distribution on other oceanic islands, with relatively few species of birds, but most of these common, and few understorey birds.

Re-analysis of Meek's collection

When we compared our sight records with the species known from Misima, it became apparent that Meek was the only collector to have obtained some species. Further analysis indicated that these were either very widespread species, migrants or species that are small island specialists, and we began to suspect that not all of his specimens came from Misima, even though they were labelled "St. Aignan" and Hartert had apparently accepted this locality. Our analysis also showed that he had collected bird specimens from 31 July–11 September and

26 November–28 December. Most of the anomalous species were taken in late November and December, although a few were taken on 31 July and 5–11 September. Fortunately, we were able to refer to Meek's letters to Rothschild, Hartert or Jordan at Tring, which are now in the Library of BMNH. One of us (WSP) has indexed these letters and they are now on microfilm. Microfilm letter nos 55–64 are the ones applicable to his Misima trip.

Letter no. 55, 9 July 1897, Samarai, Meek to Hartert: "... I shall draw £50 against them [his last collection] for current expenses until I can get a large consignment from St. Aignans, where I hope to be going in about a week from date. The best way I think will be for you to let Gerrard see what you select and for him to value them. I send them to you as I wish (after seeing your letter of 20th April) you to understand that I wish to be as fair as lay [*sic.*] in my power to be ..."

Letter no. 56, 24 July 1897, Cutter *Calliope* [Meek's boat], Samarai, Meek to Hartert: "... Am expecting to get away tomorrow or day after for St. Aignans ... I shall send a consignment from St. Aignans as soon as I can conscientiously do so, for as you've no doubt guessed by now, I'm rather short of money ... Most probably there will be two collections from St. Aignans ..."

Letter no. 57, 19 August 1897, St. Aignans I., British New Guinea, Meek to Rothschild: "It [the Misima birdwing butterfly] is very striking after being accustomed to the green insect; which I have now taken or seen, from Cape Vogel on mainland to the Engineer Group (the nearest group of islands west of St. Aignan's excepting the Conflicts). At the Engineer Group, the females run nearly black, nearly all having black forewings. I captured eight there on my way here."

Another page in the same letter, dated 29 August, "... at present I have something over two hundred bird skins ..."

Letter no. 58, 3 September, St. Aignan's I., Meek to Jordan: "... We have skinned about 230 birds ... so far I have only forty six species of bird, that I can recollect without referring to my books ..."

Letter no. 59, 10 October 1897, St. Aignan I., Meek to Hartert: "Having had scarcely anything but bad news to communicate up to the present time, you will be pleased to know that fortune has taken a favourable turn and am now happy in being able to say that I have now a very fair collection to [*sic.*] little over two months work ... This place is extremely poor as regards birds and mammals. I shall send collections by first opportunity ..."

Same letter, but dated 21 November: "... Shall be sending collections within a fortnight; seven cases in all ..."

Same letter, but dated 29 November, Samarai: "... Am sending six cases of Nat. History specimens and am drawing £200 against them. I think you will be pleased with them. Be on Rossell Island early in January. Written in haste."

Letter no. 60, 18 October 1897, St. Aignan's I., Meek to Rothschild: "... When these collections are dispatched, I intend to sail down to Rossell Island, leaving my collectors at a small island close here called Kimuta, where the Ornithoptera [bird-wing butterflies] are not quite as scarce ..."

Letters nos 61 and 62 have no year and are out of order. They are letters nos 45 and 46 in chronological order, having been written in 1896. They are not concerned with either Misima or Rossel.

Letter no. 63, 10 January 1897, Rossel I., Meek to Jordan: "... Arrived here two days ago from Misima (St. Aignans') bringing my men and five or six tons of yams. This last month I have been cruising around the islands, getting yams and boys. I left my boys on a small island off St. Aignan's named Kimuta. They got three more specimens of Ornithoptera identical with St. Aignan's and a good quantity of bird skins ..."

Letter no. 64, 11 January 1897, Rossel I., Meek to Rothschild: "... I left my men on a small island SE of St. Aignan's named Kimuta. They managed to get three more males of the blue Ornithoptera and some two hundred bird skins ..."

The 273 specimens from the Rothschild Collection, and one that came to AMNH from J. H. Fleming of Toronto and was never a part of the Rothschild Collection, did not seem to account for the number of birds that Meek referred to in the letters quoted above. When we listed AMNH specimens in field number order, we found that the lowest was 721, collected on 31 July, and the highest was 1233, collected on 28 December. This gives a total of 513, of which Rothschild selected only 273. We discovered this discrepancy to be explained by the fact that Rothschild frequently purchased only a portion of a collection, turning over the remainder to a dealer to sell for Meek. This is alluded to in the reference to Gerrard (E. Gerrard & Sons, a London dealer) in letter no. 55 above. Miriam Rothschild (1983: 158) states that Rothschild had an agreement with Meek to take "Six specimens of every species at 6/6 each, with a bonus of £4 for every new species". When one looks at the entire collection listed in field number order, it is apparent that Meek collected long series of common birds on certain days, interspersing that with the fortuitous collecting of rarer species when they could be obtained. Rothschild selected a series of six specimens of the common species and apparently took all specimens of species represented by fewer than six.

Fleming's collection is now in the Royal Ontario Museum (ROM) and includes 74 specimens from "St. Aignan", purchased by Fleming from Gerrard. These have not added any species to those reported by Hartert. Some of the Fleming specimens of *Pachycephala pectoralis* and *Zosterops griseotincta* are labelled "cotype" (=syntype in today's terminology). Their standing depends on whether or not Hartert wrote the 1899 paper before the collection was broken up. Most of the time he did not list the exact number of specimens, and internal evidence is rarely helpful. However, two bits of evidence indicate that he only considered the part of the collection that Rothschild bought, resulting in Fleming's specimens have no nomenclatural standing.

In his discussion of *Monarcha trivirgatus*, Hartert says: "Of this rare bird Meek sent four *males* and one *female* (italics his) from St. Aignan". The AMNH has three adult males, one adult female (identical in appearance to the males) and one female in immature plumage. The ROM has three adult males, two adult females and one immature female; and the BMNH has three adult males and an adult female, none of which is mentioned by Hartert. Had he had all of these specimens, he would surely not have considered it rare.

Hartert gives measurements of two adult males of *Myiagra rubecula* saying, "the adult *males* (italics his) are giants . . ." AMNH has two adult males, one male in late immature plumage, two females, and one female?; the ROM has a further three adult males, one immature male, and two adult females; and the BMNH has an adult male and female. Had Hartert had them, he would surely have measured the additional "giant" males.

Replies to our enquiries disclosed an additional 48 Meek St. Aignan specimens at the BMNH, two at the National Museum of Natural History, Washington, DC (USNM), and one at the Liverpool Museum (LIVCM). None of these changed the species tally but did slightly alter dates, and they have been included in the preparation and discussion of Table 1. Also, the field numbers on non-AMNH specimens extended the collection numbers from 720 to 1234, giving a total of 515 birdskins originally collected, of which we traced 398.

One of the specimens at the BMNH came to them via the Hewitt Collection, the two at the USNM came from the Swales Collection, and the one at LIVCM was from the Barrow Collection. These specimens, once part of large private collections, lead us to believe that Meek specimens were acquired from Gerrard by many collectors and more may be extant but widely scattered. We would appreciate hearing of any additional Meek St. Aignan (Misima) specimens that are held in other museums.

Collecting localities and dates, a discussion of Table 1

We know that Meek was on Basilaki I. on 25 July (see account of *Ducula zoeae*, Meek no. 719, below) and on Misima by 2 August. No specimens were collected on 1 August. In letter no. 57, quoted above, Meek mentions that he collected the birdwing butterfly *Troides priamus* in the Engineer Group on his way to Misima, so we know that he made at least one stop on small islands between 25 July and 2 August; unfortunately the butterfly specimens have no exact date.

Six species of birds were collected on 31 July (ten specimens, beginning with Meek no. 720, one of which was not traced): *Columba vitiensis*, *Ptilinopus rivoli*, *Monarcha guttula*, *Pachycephala pectoralis*, *Zosterops griseotinctus*, and *Myzomela albigula*. The last three are well known as species occurring on small islands and have not been seen or collected by others on Misima, except for a specimen of "*Pachycephala melanura*" reported by DeVis (1892: 96) which cannot now be found in the Queensland Museum; until corroborated, it should be removed from the Misima list. *Columba vitiensis* is widespread but never common, and while frequently collected on small islands, this is not always the case. It was collected on Misima by Hamlin. *Ptilinopus rivoli* and *Monarcha guttula* are discussed below. In Table 1, 31 July birds are listed separately and are considered to be from one of the groups of small islands between Basilaki and Misima, probably the Engineer

Group; in any case, they do not change the species lists for Misima and Kimuta. During August, none of the small island species was collected.

From careful analysis of all the records, we think it likely that Meek moved some collectors from Misima to Kimuta early in September and had collectors in both localities, during at least part of the period between 5–11 September. Certainly, by 8 September he had some collectors on Kimuta. The only specimens in the collection with a locality other than "St. Aignan" are four specimens of *Aplonis cantoroides* collected on 8 September and marked "small island off St. Aignan" which, from letters nos 60 and 63 above, must refer to Kimuta.

The ten species collected on 1–4 September are included in the Misima list in Table 1 as they are widespread, have been reported by others on Misima, and all except *Collocalia vanikorensis* were also collected by Meek in August.

Specimens of the 27 species collected 5–11 September have been listed separately in Table 1. Only three of these were otherwise collected by Meek on both islands: *Tringa hypoleucos*, *Ptilinopus rivolii*, and *Monarcha trivirgatus*. Four species were collected only during those dates: *Anas superciliosa*, *Ducula pistrinaria*, *Ducula bicolor*, and *Eudynamis taitensis*. *Ducula bicolor* is reported by Tristram (1889b: 558) from Misima; the other three species are not otherwise reported but might be expected on either island. These three species are not counted for either island.

Eleven species were collected by Meek both during 5–11 September and on Misima in August: *Megapodius freycinet*, *Macropygia amboinensis*, *Ptilinopus superbus*, *Micropsitta pusio*, *Geoffroyus geoffroyi*, *Merops ornatus*, *Gerygone magnirostris*, *Rhipidura rufiventris*, *Monarcha guttula*, *Nectarinia aspasia*, and *Aplonis metallica*. Eight of these are known only from Misima; *Merops ornatus*, *Monarcha guttula* and *Nectarinia aspasia* have been reported from other small islands, but not from Kimuta (Table 1).

On the other hand, nine species were collected during 5–11 September and also on Kimuta in November and December: *Pluvialis fulva*, *Chalcophaps indica*, *Trichoglossus haematodus*, *Halcyon chloris*, *Rhipidura rufifrons*, *Monarcha cinerascens*, *Pachycephala pectoralis*, *Zosterops griseotincta*, and *Aplonis cantoroides*. Five of these have not been seen or collected on Misima. *Pluvialis fulva* has been collected by others, and we saw *Chalcophaps indica*, *Halcyon chloris* and *Aplonis cantoroides* (Table 1). Specimens collected on Kimuta on 5–11 September may have convinced Meek that it would be productive to leave collectors on Kimuta in late November.

Meek's activities between the last half of September and the end of November are not documented, but we are sure that he was not collecting birds because the highest specimen number from 11 September is 1030 and the lowest from 26 November is 1031. Apparently he was concentrating on collecting insects and other animals, as he was still writing from "St. Aignan" in October. Also, a cursory glance through articles on insects in *Novitates Zoologicae* in

1898 and 1899 (Rothschild & Jordan 1898, Warren 1899) disclosed a number of species obtained on "St. Aignan" in September, October and November.

Meek's note, added to letter no. 59 and dated 29 November, was written from Samarai, his home base and the port from which he would have shipped specimens. It seems logical to assume, then, that he had left his collectors on Kimuta a few days prior to this and returned home to ship the specimens and prepare for his month of cruising about, hiring helpers and buying food for his projected stay on Rossel I. (letters nos 60 and 63). Labels on specimens dated 26 November–28 December alone are not in Meek's hand, so we believe that all specimens from this period were taken by his collectors on Kimuta.

In Table 1, we have included in the Misima list species collected by Meek from 2 August–4 September; in the Kimuta list species collected 26 November–28 December. We have listed the specimens collected 31 July and 5–11 September separately. Analysed in this way, the number of species collected by Meek on Misima is 40; Hamlin added four, we added ten, Tristram added three, Finch added two, and Tolhurst added one, for a total of 60 species known from Misima. Meek collected 29 species on Kimuta, DeVis added two, for a total of 31 species known from Kimuta.

There were 14 species collected a century ago but not observed by us. Three, *Himantopus himantopus*, *Alcedo atthis*, and *Gerygone magnirostris*, are found near fresh water, of which we saw little. Three, *Micropsitta pusio*, *Halcyon saurophaga*, and *Monarcha guttula*, are inconspicuous and/or local. Five, *Chrysococcyx lucidus*, *Halcyon macleayi*, *H. sancta*, *Merops ornatus*, and *Coracina novaehollandiae*, are southern migrants and our October visit was late for them.

Coracina tenuirostris tagulana is considered to be a resident race on Misima and Sudest. However, named populations of this species from New Guinea's satellite island should be reassessed, as Mees (1982) has synonymized the New Guinea race *muelleri* with the Australian race *tenuirostris* and considers most mainland New Guinea records, except those from the south of the island, to be migrants from Australia. He suggests that careful re-examination of specimens from the New Guinea islands may show them to be migrants also.

Meek collected one specimen of *Monarcha trivirgatus melanopterus* on 27 August on Misima and at least 13 on Kimuta, as well as the nest and egg Hartert (1899: 208) reported. This subspecies, type locality Round Island, a small island off Sudest, is probably also largely a small island specialist. Hamlin did not collect it on Misima but found it on East and Hastings.

Ptilinopus rivoli has perhaps actually become rarer due to hunting pressure. Meek collected at least six specimens; Hamlin collected one during a much shorter stay. Thus, with this possible exception and contrary to our first impressions, it is not apparent that any species have disappeared from Misima in the last hundred years despite massive habitat destruction. But a cautionary note should be sounded, for we have no reliable information on changes in abundance of any species; and forest species may already be at risk.

Taxonomic remarks

Seven subspecies' descriptions have been based on Meek's "St. Aignan" collection and have Misima as the type locality. These need to be re-examined in the light of the above re-analysis.

Accipiter novaehollandiae misulae. This subspecies was described by Mayr (1940: 11). Meek collected four females (including the holotype, AMNH no. 832853, Meek no. 858), two males in adult plumage and one immature male, during 18–29 August on Misima, which remains the type locality. No Meek specimens were found in other museums.

Collocalia esculenta misimae. Salomonsen (1983: 46) chose as his holotype AMNH no. 634526 (Meek no. 789), collected on 11 August. Three additional specimens were collected on 1 September, and Misima is the correct type locality. One specimen in the BMNH was collected on 4 December on Kimuta.

Alcedo atthis hispidoides. Stresemann (1913: 316) designated AMNH no. 636477 as holotype of a now-synonymized form, *Alcedo ispida pelagica*, a specimen collected on 3 September. This holotype is Meek no. 953; this number had been incorrectly overwritten as 963, but 953 is correct, judging by the collecting date. Five other specimens at AMNH and one at ROM were collected on Misima 2–30 August. None was collected elsewhere and Misima remains the type locality.

Gerygone magnirostris onerosa. Hartert (1899: 209) named *G. rosseliana onerosa* based on Meek's material. The holotype, AMNH no. 606581 (Meek no. 964), and another specimen were collected on 5 September; a third specimen was collected on 9 August. Hamlin collected the species on Misima, but it has not been reported from the smaller islands. We believe that the 5 September specimens came from Misima and do not recommend amending the type locality of this subspecies.

Pachycephala pectoralis collaris. Rothschild and Hartert (1918: 311) named *P. p. misimae*, now a synonym of *P. p. collaris*. Galbraith (1956: 203, 206–209) synonymized both *rosseliana* and *misimae* with *collaris* and considered Misima birds somewhat intermediate between the other populations. Differences are slight within the island populations, with Rossel birds more distinct, and Coates (1990: 211) has recognized *rosseliana*. *P. p. collaris* has been collected on Kimuta and in the Deboyne Group by others; according to Coates (1990: 211) it is confined to small islands in the Marshall Bennett, Bonvouloir, Conflict, Deboyne and Renard groups and Teste Island.

The holotype, AMNH no. 657996 (Meek no. 1044), was collected on 29 November on Kimuta and the type locality should be amended accordingly. Six additional AMNH specimens were collected on 31 July, 26 November, and 3, 4, 7 and 20 December. The ROM has 23 more Meek specimens from the following dates: 31 July (two), 10 September (three), November (two), and December (16). The BMNH has four more, collected 1, 17, and 28 December. These are from Kimuta and the small island where Meek collected on 31 July. The Fleming specimens in the ROM and AMNH are all marked "cotype" (=syntype), but Rothschild and Hartert designated a holotype. The other specimens in AMNH from the Rothschild Collection would be paratypes, but the Fleming and BMNH specimens have no nomenclatural standing. The Kimuta specimens are, however, topotypes.

Zosterops griseotinctus griseotinctus. Hartert (1899: 210) named *Z. aignani* (=*Z. g. griseotinctus*). The lectotype (Hartert, 1920: 436), AMNH no. 700680 (Meek no. 1132), was collected by Meek on 7 December, and the type locality should be amended to Kimuta. Seven additional AMNH specimens (paralectotypes) were collected on 31 July, 5 September (four), 30 November and 17 December. Four ROM specimens and four BMNH specimens, all collected in December, were not seen by Hartert and have no nomenclatural standing. They are topotypes, as they are all from Kimuta. DeVis also reports this species from Kimuta and Hamlin from the Bonvouloir, Deboyne and Conflict groups. It has not been reported from Misima.

Mees (1961: 131–143) discusses the *Zosterops griseotinctus* group in some detail and synonymizes *Z. g. aignani* with *Z. g. griseotinctus*. He recognizes, as a poorly defined subspecies, *Z. g. longirostris*, including the specimens collected by Hamlin in the Bonvouloir Islands. Subspecies limits, and Mees' discussion (on p. 135) of the source of the similar but widespread small island populations that he includes in the species *Z. griseotinctus*, need to be reconsidered in the light of the discovery that the species does not occur on Misima itself. Perhaps they came, as Mayr (1944: 169, 1955: 44-45) has suggested, "ultimately from Torres Strait"; or even by westward expansion of some of the Solomons' species included by Mees in the *griseotinctus* group.

Myzomela albigula pallidior. *Myzomela pallidior* was named by Hartert (1989a: 21). In the original description, wing measurements of a male and a female are given. Hartert (1919: 174) designated the male as the lectotype, AMNH no. 692674 (Meek no. 725), collected on 31 July. According to our analysis, the type locality is not Misima, but it is uncertain which of the small islands between Basilaki and Misima it came from. We are not aware of any collections having been made in the Engineer Group, so do not know whether or not the species occurs there. There is only one female in AMNH, which becomes the paralectotype; it has Meek's no. 1178, and was collected 13 December on Kimuta. Four other males, all collected 4–17 December, are from Kimuta. The BMNH has two specimens collected 9 and 17 December. Hamlin collected it on small islands in the Bonvouloir Islands and in the Deboyne Group, and it has not been found on Misima.

Remarks on other species

In addition to those discussed below, we netted, photographed, and released the following species: *Accipiter novaehollandiae*, *Accipiter poliocephalus*, *Lorius hypoinochrous*, *Rhipidura rufiventris*, *Monarcha guttula*, *Myiagra alecto*, *Dicaeum pectorale*, *Nectarinia aspasia*, *Myzomela nigrita*, and *Aplonis metallica*.

Egretta intermedia. We saw a medium-sized egret with yellow bill and black legs and feet feeding in a marshy area near Bwagaoia. This is a first record for Misima.

Haliastur indus. Even though Richards collected a specimen, now in LIVCM, on 12 October 1879, it was not listed by Tristram (1882). Hamlin's specimen, collected on Misima on 23 July 1930, also remains unpublished. These two specimen records, along with our sight record, constitute the first published record of the species for Misima.

Haliaeetus leucogaster. We were first told of the occurrence of this species by A. Stevens and later saw it at several locations.

Falco peregrinus. Alan Stevens reported having seen a pair.

Megapodius freycinet. We were shown a mound, opened and emptied of eggs, in a recently cut forest area, with the debris still being burned.

Pluvialis squatarola. Meek collected three specimens of *Pluvialis fulva* on 10 September and 18 December, probably all on Kimuta. A fourth *Pluvialis*, collected by Meek on 20 December on Kimuta and published by Hartert as *P. fulva*, is actually a specimen of *P. squatarola*, showing the characteristic white rump and black axillaries of that species. That most of Meek's shorebird specimens were from Kimuta reflects both that Misima has few beaches and that the timing of his stay on Kimuta was better for northern migrants.

Sterna sumatrana. Meek collected a specimen on 23 December on Kimuta that was overlooked by Hartert. Hamlin reported "sumatras and noddies" common about Misima and in the Conflict and Deboyne groups.

Anous sp. As noted above, Hamlin reported noddies.

Chalcophaps indica. Hartert (1899: 214) declared this species to be very common. However, Meek's six specimens were collected on 9 September and in November and December, perhaps all on Kimuta. Hamlin did not collect it. We had one brief glance at an individual as it flew between patches of vegetation near Bwagaoia. Its rarity in the areas we visited may be due to the high human population density, as this is a desirable food species.

Caloenas nicobarica nicobarica. Meek noted that the iris was yellowish–white in all three of his specimens. This differs from the grey iris usually noted for this species. Photographs of the species made on Tench Island by WSP show some individuals with a grey iris and some with a yellowish iris. In the AMNH, specimens having soft parts noted are about equally divided between a whitish-yellow and a grey or grey–brown iris, variable throughout the range and not related to sex of the bird. Young birds tend to have a brown iris. Other colours recorded were red or orange, umber, and two-tone with the outer ring grey and the inner tan (once).

Ducula pinon salvadorii. We saw this species and frequently heard its low-pitched calls. A young bird with feathers in sheath was brought in to us and photographed. Its plumage was identical to that of the adult; but the facial skin was bluish, unlike the red of adults.

Tristram (1882: 996) named this form *Carpophaga salvadorii* from specimens collected on Misima by G. E. Richards. One of these, a male, is now in LIVCM, no. T.10054, collected on 9 October 1879. Wagstaffe (1978: 8) noted that "Tristram, when describing this bird, had before him three specimens, one male and two females, but only the above specimen is listed in his catalogue and as a type. There are two specimens in the British Museum, collected by Richards from the same locality and these are possibly the other syntypes." However, neither of the latter is listed by Warren (1966).

Robert Prŷs-Jones (*in litt.*) informs us that there are two specimens in BMNH that are most probably the ones referred to above. No. 1889.2.12.129 was "acquired via the Salvin/Godman collection. In addition to their label, it carries what I presume to be the original label (written on paper from 'The Australian'!) stating: St. Aignan, Louisiade Archipelago, Capt. Richards R.N. No sex/age is given, but the register states ad." No. 188.11.14.20 "only carries a B.M. label which says merely Louisiade Archipelago, ex Tristram. No mention of a collector. However, the register shows it to be part of a batch purchased off Tristram and collected by 'Lieut. Richards'. Old string on the legs of the specimen suggests a label may have been lost." Listing of the male as the type by Tristram (1899c: 43) in his published catalogue serves to designate it as the lectotype and implies that the two BMNH specimens are paralectotypes [International Code of Zoological Nomenclature, Article 74(a)].

[*Ducula zoeae*. Hartert (1899: 213), without comment, lists this species as having been collected on Misima on 25 July. No specimen of the Zoe Imperial Pigeon from Misima or any other island in the Louisiade Archipelago is now in the AMNH, nor was one catalogued with the Rothschild Collection. Rothschild and Hartert (1901: 113) do not list a Misima specimen but do report a specimen (now in AMNH) collected by Meek on Basilaki Island on 25 July 1897. We believe that Hartert (1899) inadvertently included the Basilaki specimen and that this species should be removed from the Misima list.]

Trichoglossus haematodus micropteryx. Meek's specimens, now in AMNH, ROM and BMNH, were collected on 8 September (five), 29 November, 4 and 11 December, most likely all on Kimuta. Neither Hamlin nor we encountered it, and it is difficult to believe we could have missed this noisy species had it been present on Misima. We believe it is confined to small islands in this area. There is some evidence of small island populations differing subspecifically from adjacent mainland populations (Diamond & Lecroy 1979: 509) and exact information on collecting localities and weights might help clarify this distribution puzzle.

Lorius hypoinochrous hypoinochrous. This species does not appear in Hartert's (1899) annotated list of Meek's collection, and in fact he says "not sent by Meek" in his introductory remarks, but it does appear on his appended list of species known from Misima (1899: 216), based on Tristram (1882) and DeVis (1890). This surprised us very much, as it is perhaps the commonest species on the island. However, there are three males and three females in AMNH collected by Meek on Misima between 12 and 23 August, and Hartert (1898b: 530) discussed the Misima specimens in his paper on Meek's collection from Sudest Island.

Hamlin collected a male on 25 July; we heard and saw these birds in large numbers wherever we were on Misima. In the vicinity of Gulewa flowering coconut palms appeared to be a major food source for them, and it is possible that they are now more common than previously due to the establishment and expansion of coconut plantations in the first half of the 20th century. We made tapes of their unusual cat-like calls.

Cacatua galerita triton. This very common species is a great agricultural pest, invading the gardens in large numbers. In one case, we counted a flock of 20 as they took off from a garden area. They dig up manioc tubers, and people are forced to cover young pineapples with plastic bags to try to deter this species. Other avian pests in the gardens were *Porphyrio porphyrio* and *Corvus orru*.

Scythrops novaehollandiae. We saw one individual flying over Gulewa on 5 October, presumably on its southward migration. This is a first record for Misima.

Myiagra alecto lucidus. We saw a female clinging to the trunk of a coconut tree, feeding.

Nectarinia aspasia christianae. Tristram (1889b) described this taxon (as *Cinnyris christianae*) based on two males collected by Thomson on Misima. One syntype, T.15504, collected on 20 October 1888, is now in LIVCM (Wagstaffe 1978: 22). The other syntype, formerly in the York Museum, is now in the BMNH, no. 1945.53.8, and was also collected on 20 October 1888 (Warren & Harrison 1971: 108). It is a very common species on Misima in all habitats; Meek also collected it on 10 September, and Hamlin reported seeing it in the Conflict and Deboyne groups. We saw one partial albino with scattered white feathers on the head and three all white tail feathers.

[*Myzomela rubro-cucullata*. This form was collected by G. E. Richards and described by Tristram (1889a: 228) as being from St. Aignan; the holotype is in LIVCM, no. T.10244. Salomonsen (in Paynter 1967: 360) believed that the locality was an error for Samoa Islands and equated it with *M. c. nigriventris*. Wagstaffe (1978: 22), however, says that the specimen "was examined by R. Sims at the British Museum in 1958 who confirmed its identity as *M. c. cardinalis*. No original field label is present but if Tristram were correct regarding the collector then it would have been collected in the Southern New Hebrides which Richards visited, not in Samoa." It was certainly not from Misima.]

Aplonis cantoroides. Meek collected one male and three females on 8 September on a "small island off St. Aignan", probably Kimuta. These are the only specimens in the entire collection that have a locality other than "St. Aignan" on the label. Meek did not obtain this species on Misima, but obtained an additional 11 specimens on Kimuta in November and December. We saw it near Bwagaoia, and six individuals stayed around some dead trees in the garden above Gulewa, calling and flying about as though preparing to nest.

The following two species were seen by us but not positively identified:

A rail-like bird ran zigzagging along the edge of a rotten fallen tree trunk in the forest. It seemed rather crouched, with its head stretched out horizontally. Only the reddish-brown head and blackish back were seen before it disappeared. Attempts to flush it again were unsuccessful.

The general size and description point to *Rallina tricolor*, but the species has never been collected in the Louisiades.

A medium-sized kingfisher was seen perched in bright sunlight on a low branch over the river. It was a solid, almost royal, blue with no indication of scaling on the head and the underparts were a rich rufous. When it flew, the only turquoise visible was in the rump. The bill was long, black and sturdy with a conspicuous red strip at the base of the lower mandible, and a white marking on the neck was very obvious. It resembled *Alcedo azurea*, which has not been reported from the Louisiades, except that *azurea* has no turquoise in the rump and neither the literature nor specimens indicate the presence of red at the base of the lower mandible.

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A parsimonious phylogenetic tree for the swifts, Apodi, compared with DNA-analysis phylogenies

by Jan Holmgren

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In recent years, new and independent data for evaluating phylogenies in birds have been produced through biochemical and statistical analyses of genetic structures. The techniques used are complex, and room for errors of methodology and ambiguities of interpretation should be admitted (Sarich *et al.* 1989, Lanyon 1992). However, to a substantial extent the new results are consistent with one another, but are sometimes in conflict with traditional views (Bleiweiss *et al.* 1994, Lee *et al.* 1996).

The swifts as a group generally seem to exhibit slow, continuous adaptations for their aerial life, giving the impressions of a morphological conservatism caused by the uniformity of the food niche. The great variability in body size may perhaps be linked with interspecific competition. A great deal of other morphological variation may probably be linked with the intermittent contacts with solid matter in breeding and roosting. Here I present a parsimonious phylogenetic tree

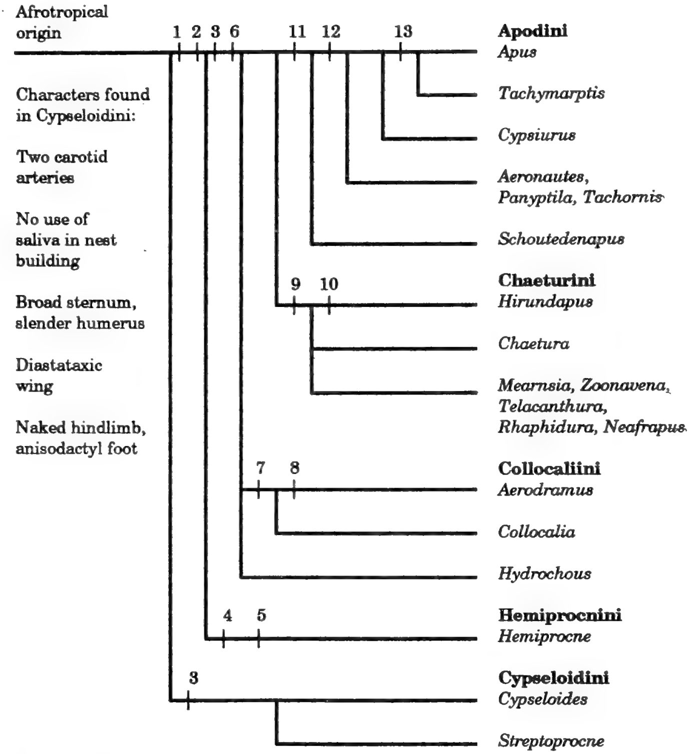

Figure 1. Hypothetical phylogenetic tree for the swifts. No time scale. Numbers denote change of characters as follows: 1. One carotid artery. 2. Use of saliva in nestbuilding. 3. Gradual change towards narrow sternum and stout humerus as adaptations for aerial life. 4. Nesting and roosting on branches, perching. 5. Near stasis (perhaps even regression) in change of sternum and humerus owing to less aerial life. 6. Eutaxic wing. 7. Nesting and roosting in caves, some have feathered hindlimbs. 8. Echolocation. 9. Nesting and roosting inside hollow trees, square and spined tails. 10. No nestbuilding. 11. Feathered hindlimbs. 12. Nesting and roosting in foliage of trees, reduced numbers of phalangi, reversed hindtoe, toes in opposite-pairs. 13. Change to more solid nest and roost sites, tendency towards "all four toes forwards".

for the swifts, which is consistent with a hypothetical historical narrative (Mayr 1988) and zoogeographical facts. This simple tree may serve as a null hypothesis: suggested instances of further convergent or parallel evolution in the specified characters should be explicitly analysed.

Methods

The suggested phylogenetic tree in Figure 1 is derived from key characters (two carotid arteries or one carotid artery (Glenny 1955, Sibley & Ahlquist 1990), no use of saliva or use of saliva in nestbuilding

(Marín & Stiles 1992, Chantler & Driessens 1995), gradual change towards narrow sternum and stout humerus as adaptations for aerial life (Sclater 1865, Harrison 1984), diastataxic (i.e. with apparent absence of 5th secondary remex) or eutaxic wing (Clark 1906, Sibley & Ahlquist 1990)) linked with a general understanding of swift evolution, taking into account the role of various behaviours and substrata in breeding and roosting. A similar approach has proved successful in the swallows (Winkler & Sheldon 1993). The clarification of nest building in the Cypseloidine swifts (Marín & Stiles 1992) is an important recent achievement. The first methodical survey of all swift species (Chantler & Driessens 1995) facilitated an overview.

In any phylogenetic tree, any lineage from the ancestral species to a recent species may be envisaged as a straight continuous line, with all other lineages branching off from that arbitrarily chosen trunk of the tree. In order to standardise trees for the swifts, I suggest that *Apus apus* should be chosen as this favoured recent species, simply because this will produce trees that are most similar to the traditionally accepted order between the main groups of swifts, and so will make direct comparisons easier. Since only the Cypseloidine swifts show primitive states in all the key characters, they are placed at the base of the hypothetical phylogenetic tree.

Results and discussion

The hypothetical phylogenetic tree—Figure 1

Brooke's (1970a) division of the Apodidae into the subfamilies Cypseloidinae and Apodinae (instead of the then traditional division between the Chaeturinae and the Apodinae, based on differences in the hindlimbs, derived from Sclater's (1865) Chaeturinae and Cypselinae) was based on differences in a number of characters. One of Brooke's Cypseloidine characters (diastataxic wing) is also present in the treeswifts, which I now suggest should be placed in Apodinae. Two characters (anisodactylous feet, downlike semiplumes on young nestlings) are present also in some Apodine species. For three characters (egg white profiles with four peaks, little or no transpalatine processes, simple *Musculus splenius capitis*) there is uncertainty about their exact validity, and one character (that there is a sexual dimorphism of plumage in some Cypseloidine species) is questionable since it may be an age character (females acquiring adult plumage later, M. Marín, pers. comm., Chantler & Driessens 1995). However, Brooke's division into subfamilies still seems warranted by two of his characters: the presence of two carotid arteries (Glenny 1955) and the now confirmed (Marín & Stiles 1992) lack of saliva in nest building in the Cypseloidine swifts.

Sibley & Ahlquist (1990) critically reviewed morphological characters used in phylogenetic work. Generally, conditions of the carotid arteries and the 5th secondary were found to be useful to some degree, but not consistent. However, within groups, two carotid arteries and diastataxy were consistently found to represent the ancestral condition. Use of saliva in nest building is special for swifts, and thus represents the derived condition.

The treeswifts have one carotid artery, and they use saliva in nest building. Hypothetically, I suggest that the treeswifts should be treated as a tribe Hemiprocnini within Apodinae, so all extant swifts belong to the family Apodidae. Differences in anatomical details (Lowe 1939) and plumage in the treeswifts may well be explained by their different lifestyle. Fossil and osteological evidence (Sclater 1865, Harrison 1984) show a gradual change of sterna and humeri in the swifts, caused by selection forces linked with their extremely specialised aerial life. A broad sternum and slender humerus in the treeswifts may be explained by near stasis (perhaps even some regression) in this change, following the adoption of a less aerial life.

Analysis of changes in humeral structures led Karkhu (1992) to quite different conclusions, suggesting long independent evolution of the Hemiprocnide and the Apodide swifts. He even suggested that the treeswifts should be placed in a suborder Hemiprocni, while the suborder Apodi would include the other swifts and the hummingbirds, Trochilidae. He did not consider, however, the possibility of near stasis in the treeswifts, coinciding with convergent changes in other lineages leading to recent taxa. His interesting analysis of functional causes for the observed changes may be interpreted in support for convergent change.

The Cypseloidine and Hemiprocnine swifts have diastataxic wings, while all other swifts have eutaxic wings (Clark 1906).

In Collocaliini the Giant Swiftlet *Hydrochous gigas* is remarkably similar to the Cypseloidine swifts, and its choice of nest site is similar (M. Marín, pers. comm., Somadikarta 1968, King 1987). It cannot echolocate, and its nest is similar to Cypseloidine nests, except that some saliva is used (Becking 1971).

When erecting the genus *Schoutedenapus*, De Roo (1968) pointed out a close similarity to *Apus*, but he found it impossible to place the taxon within *Apus* owing to the unmodified (anisodactyl) feet. He discussed, however, the possibility that the feathering of the legs may have been a first step in the evolution of the Apodine foot. Brooke (1970a) temporarily placed *Schoutedenapus* in Collocaliini, and he is followed by Chantler & Driessens (1995). In agreement with De Roo, I contend that the feathering of the hindlimbs in *Schoutedenapus* may be a first step in the evolution of the Apodine foot. Important evidence is still missing; for example no skeleton has been examined (C. T. Collins, pers. comm.). As it is, I suggest that *Schoutedenapus* should temporarily be included, as an early diverged taxon, in Apodini.

The historical narrative

If the birds, as seems likely (Futuyma 1986, Chiappe 1995; for a good overview, though discordant in conclusions, see Feduccia 1996), evolved from a bipedal running and jumping insectivore catching prey in the air with the mouth (Caple *et al.* 1983), the swifts in principle might be the living representatives of a continuous trajectory, increasingly refining the faculty of flight, all the time using similar food: flying insects. DNA analyses suggest that the hummingbirds diverged from the swifts about 95 million years ago (Sibley & Ahlquist

1990), obviously changing to a different food niche. The earliest records in a revision of fossil swifts (Harrison 1984, see also Feduccia 1996) are from Europe and about 50 million years old.

The swallows have had a shorter time than the swifts for the adaptations to their aerial life. According to DNA analyses (Sibley & Ahlquist 1990) the passerines diverged about 100 million years ago, with the swallows diverging after about half that time. Both swallows and swifts seem to have evolved in and radiated from the Afrotropical region (Brooke 1970b, Turner & Rose 1989). One might have expected a more complex pattern for the swifts, considering their more ancient origin. Perhaps earlier radiations of swifts were largely wiped out in the great extinction about 65 million years ago (not unrealistic, if it was caused by an extraterrestrial impact, Alvarez *et al.* 1980), while one or a few species survived in the Afrotropics, and so had a chance to become ancestral to all later forms.

Winkler & Sheldon (1993) superimposed the nest-building behaviours on a DNA-hybridization phylogeny for 17 species of swallows. A remarkable evolutionary conservatism was revealed. Three main groups are characterised by distinct methods of nest construction. Each method seems to have evolved just once, and the three groups have largely distinct geographical distributions. Those that excavate burrows for breeding are in the Afrotropics, except *Cheramoeca* in Australia, and *Riparia*, which has spread to the northern continents. Those that typically adopt cavities are in the New World, mainly tropical America, except *Psalidoprocne fuliginosa* and *Phedina borbonica* in the Afrotropics. In those that typically build mud nests, *Hirundo* species are spread almost globally, while *Delichon* is restricted to Eurasia. The Tree Martin *Hirundo nigricans* in Australia may seem a cavity adopter, but uses mud on occasions, sometimes building a full mud nest. In contrast to earlier hypotheses (Mayr & Bond 1943, Turner & Rose 1989), burrow excavating was found to be a more primitive state than cavity adoption.

A similar evolutionary conservatism is evident in the five main groups of swifts, which use five distinct substrata for breeding and roosting: (1) the ground, (2) branches of trees, (3) caves, (4) the inside of hollow trees, (5) foliage of trees, holes in trees, crevices in cliffs, etc. Similarly, the five groups have largely distinct geographical distributions.

The first group, the Cypseloidinae, are restricted to the New World, but fossil finds in Europe indicate that they represent an early westward radiation from the Old World. They have an ancient method of nest building, "rooting" living vegetable matter, and so are restricted to humid sites with some daylight near waterfalls (Marín & Stiles 1992, Marín 1997).

In the other groups, probably uniquely in birds, the use of saliva in nest building gave new evolutionary options: to place nests in various dry and/or dark sites.

The treeswifts, in using "the outside" of trees, may seem to have a behaviour with some similarity to that of the Apodine swifts. However, several characters indicate that they diverged much earlier than the

Apodine swifts, even earlier than *Hydrochous*, using branches and not foliage or holes. Their present distribution is in India and eastwards to the Solomon Islands.

In the Collocaliini, *Hydrochous gigas* is similar to the Cypseloidine swifts, nests in daylight near waterfalls (and accordingly has no capability of echolocation), and uses much the same vegetable matter as the Cypseloidine swifts for nest building, but with some saliva mixed in (Somadikarta 1968, Becking 1971). A few Cypseloidine species sometimes nest in dark caves, where they place the eggs on ledges without building a nest (Whitacre 1989). The presence of the tendency towards using caves in some Cypseloidine swifts may strengthen the idea that *Hydrochous* represents an early eastward radiation by Cypseloidine-like swifts, however in an early stage of using saliva in nest building, in the course of time becoming ancestral to the swiftlets. Cypseloidine-like features can be found in some other swiftlets. The Glossy Swiftlet *Collocalia esculenta* cannot echolocate, nests in fairly well lit caves, and uses much vegetable material in its nests (Francis 1987, Chantler & Driessens 1995). Tarburton (pers. comm.) in Western Samoa observed a small colony of the White-rumped Swiftlet *Aerodramus spodiopygius* nesting in the spray of a waterfall in a very light situation on a cliff. Feathering on hindlimbs is present in some Collocaliine species and subspecies (Chantler & Driessens 1995).

The Chaeturine swifts, the spinetails and needletails, all typically use the inside of hollow trees or similar structures, such as chimneys. Their use of the tail as a prop is generally accepted as an explanation for their stiff and square tails with spines. Several genera are present in the Afrotropics; a few of their species are also found far eastwards. The genera *Hirundapus* and *Mearnsia* clearly represent eastward radiations, while *Chaetura*, in the New World, represents a westward radiation.

Most Apodine species are known to use solid sites, like crevices and holes in cliffs or trees, for nesting and roosting. However, I suggest that the original causes for the changes in their hindlimbs (feathering, reduced numbers of phalangi in toes III and IV from 4 and 5 respectively to 3, reorientation of toe I (hindtoe) inwards-forwards, the toes forming a pincer-like grasp, toes I and II opposing toes III and IV, Collins 1983) are linked with use of foliage of trees for nesting (palm swifts, Bock & Miller 1959) and roosting (a behaviour still present, for example, in the Common Swift, Holmgren 1993), and not primarily with clinging to vertical rough surfaces, as has often been claimed. *Schoutedenapus* (with feathered hindlimbs) and the palm swifts (*Aeronautes*, *Panyptila*, *Tachornis*, *Cypsiurus*, with the toes more clearly oriented in opposed pairs than in *Apus* and *Tachymarptis*, which tend towards "all four toes forwards") then may be thought to represent early stages in these changes. I suggest that the Apodine swifts should be characterised by a gradual change in the hindlimbs, in the form of a transformation series, rather than by just the most advanced stages of that change, a redefinition that opens up the possibility to include *Schoutedenapus*. They are present in the

Afrotropics and the Palearctic, but some species spread eastwards, and others westwards to tropical America (*Aeronautes*, *Panyptila*, *Tachornis*).

The hypothetical phylogenetic tree in Figure 1, following this historical narrative, gives a parsimonious solution, and it suggests few changes in the current taxonomy of the swifts (cf. Brooke 1970a, Chantler & Driessens 1995). At present, this only means that it is a simple model for the understanding of swift evolution, and it cannot claim to be faultless.

In the phylogenetic tree there are two cases of convergent evolution. The first one is caused by my insistence on placing the Hemiprocnine swifts together with all other swifts that have one carotid artery and use saliva in nest building. This forces me to admit gradual change towards a narrow sternum and stout humerus in two different lineages. However, that tendency is generally present in the swifts owing to their aerial life style, so this convergence should be expected to be omnipresent in the group, except in the treeswifts.

The second case is the feathering on the legs in some swiftlets, which may be convergent with the earliest stage in the evolution of the Apodine foot.

Comparisons with DNA-analysis phylogenies

In Figure 2 the phylogeny for the swifts presented by Sibley & Ahlquist (1990) is adapted to the earlier proposed standard, so it can be directly compared with the tree in Figure 1. Agreement with Sibley & Ahlquist's results, with *Hemiprocne* in a separate family being the earliest branching, was found in a repeated study using DNA-DNA hybridisation (Bleiweiss *et al.* 1994). The trees in Figures 3 and 4 are adapted from Lee *et al.* (1996), who used DNA-sequencing. They derived the first tree by maximum likelihood estimate based on cytochrome b sequences, the second is a bootstrap consensus tree for 1,000 replicates. Both trees have *Hemiprocne* in the same position as Figure 2. Nevertheless I suggest that this question should be regarded as unresolved, until the new molecular techniques are better understood.

Whether the Cypseloidinae are monophyletic seems to be a question that requires more precision than is attained at present (different results appear in Figures 3 and 4).

The next problem in Figure 2 is the place of *Tachornis*. Convergent change in the hindlimbs in different lineages is certainly possible (cf. the feathering on the legs in some swiftlets). *Aeronautes*, *Panyptila* and *Tachornis* might form a separate tribe, representing an earlier branching than the Apodini. However, that the (reduced) numbers of phalangi in the toes are exactly the same seems to be such a specific character that it strongly suggests monophyly.

Also worrying is the place of *Tachornis* between the needletails and the spinetails. It is possible, but seems unlikely. The place of *Collocalia* nearest to *Apus* then seems very unlikely, since *Hydrochous* so obviously has several characters in common with the Cypseloidine swifts.

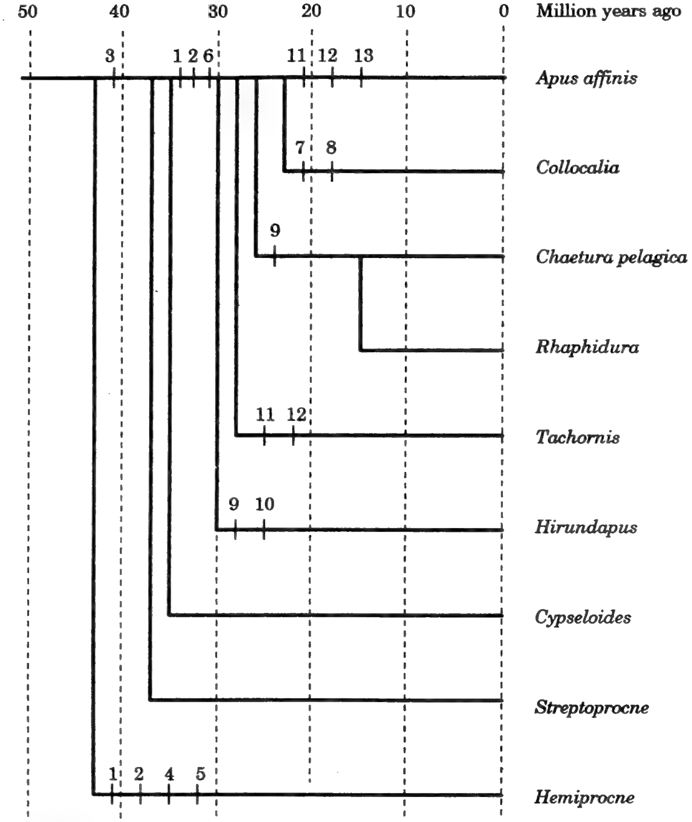

Figure 2. Phylogenetic tree for the swifts, adapted from Sibley & Ahlquist 1990 figure 361, derived by DNA-DNA hybridisation. Δ $T_{50}H \approx 4.5$ million years. Numbers have same meanings as in Figure 1.

Figures 3 and 4 also have *Hydrochous* near *Apus*. This would force us to infer a very remarkable regression in *Hydrochous*: loss of using caves, loss of echolocation (since it is placed with *Aerodramus*), minimising the use of saliva in nest building, and a renewed use of a behaviour similar to that of the Cypseloidine swifts, nesting near waterfalls and using similar vegetable matter.

A remarkable result in Figures 3 and 4 is the polyphyly of the Collocaliine swifts. In Figure 3, allowing for only a little uncertainty in the applied technique, an arrangement similar to Figure 1, lessening the problem with *Hydrochous*, would appear by connecting the *Collocalia* and the *Aerodramus* branches, leaving *Chaetura* on its own. This also would fit the ectoparasite evidence mentioned by Lee *et al.* (1996). In Figure 4 the situation is far from clear, and seems to reflect difficulties with the applied technique.

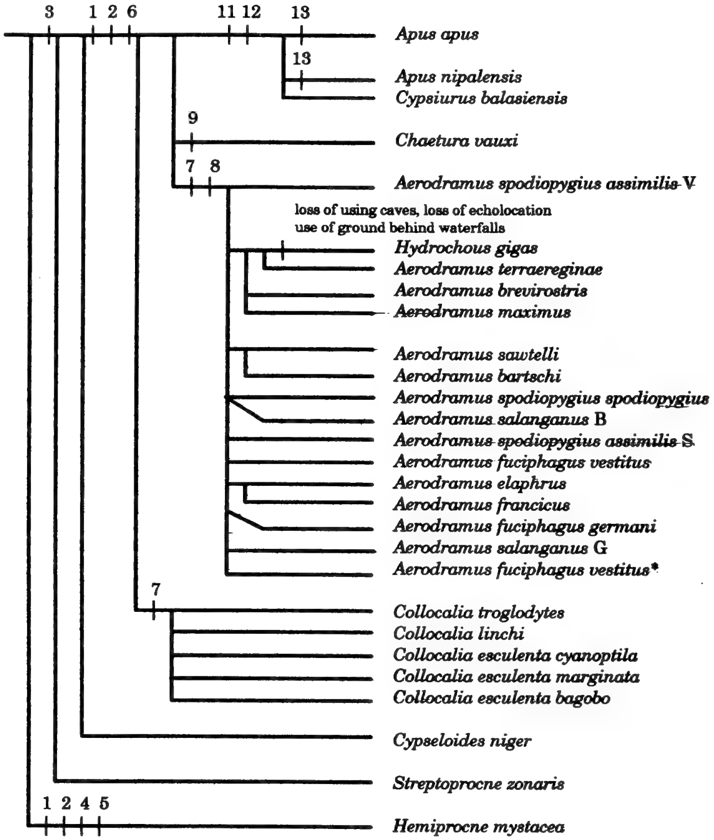

Figure 3. Phylogenetic tree for the swifts, adapted from Lee *et al.* (1996) figure 2, derived by maximum likelihood estimate based on cytochrome b sequences. No time scale. Numbers have same meanings as in Figure 1.

Conclusions

Several studies (Prum 1990, Clayton & Harvey 1993, de Queiroz & Wimberger 1993, Winkler & Sheldon 1993, Paterson *et al.* 1995, Kennedy *et al.* 1996) confirm the opinion that behaviour may be as reliable as other characters for evaluating phylogenies. In the swiftlets, however, Lee *et al.* (1996) did not find nest characters to be phylogenetically reliable. I suggest that behavioural characters in the swifts, at a higher taxonomic level, may reveal an evolutionary conservatism rather similar to that found in the swallows (Winkler & Sheldon 1993).

DNA-hybridization and other techniques for genetic analyses have produced interesting new and independent data for evaluating phylogenies. In the swifts more work is required before consensus may

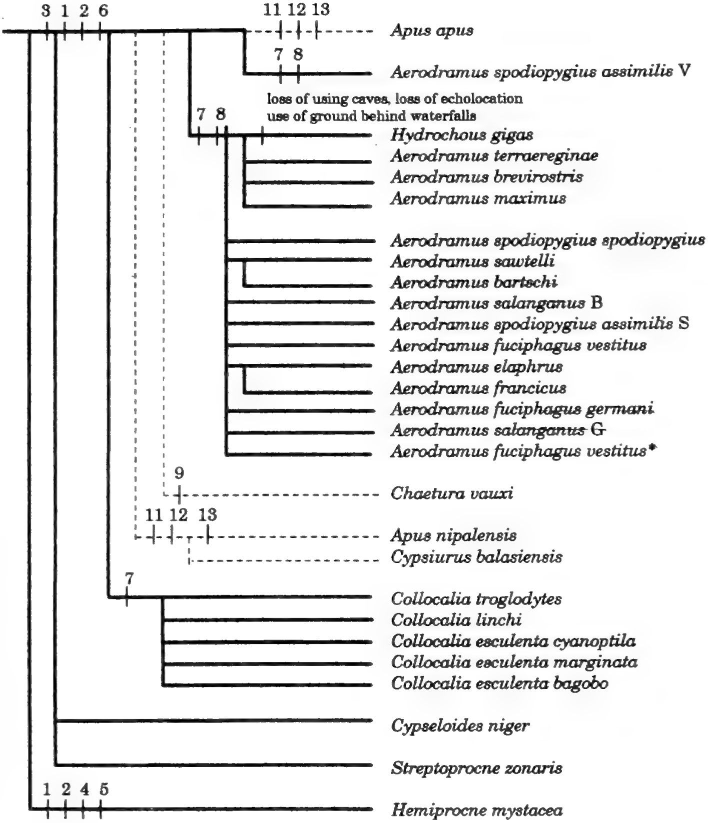

Figure 4. Phylogenetic tree for the swifts, adapted from Lee *et al.* (1996) figure 3, a bootstrap consensus tree for 1000 replicates. No time scale. Numbers have same meanings as in Figure 1.

be established. The aim should be full analyses of all taxa with all available techniques.

Summary

A parsimonious phylogenetic tree for the swifts, which is consistent with a hypothetical historical narrative and zoogeographical facts, is presented. The treeswifts are treated as a tribe Hemiprocnini within Apodinae. Inclusion of the genus *Schoutedenapus* in Apodini is suggested. Three trees based on DNA analyses are adapted in order to facilitate direct comparisons. Differences between the four trees are discussed. Further detailed studies of the swifts with different available techniques are needed.

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On types of trochilids in the Natural History Museum, Tring. I. *Amazilia Sumichrasti* Salvin, in relation to morphology and biogeography within the *A. beryllina* complex

by André-A. Weller

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Within the genus *Amazilia*, about 30 species (e.g. Peters 1945: 29, Walters 1980: 33, Sibley & Monroe 1990: 30) and numerous subspecies are recognized. Peters (1945; based on Simon 1921) gives the most complete list comprising 81 taxa and further types of uncertain status, many of which must be judged from an historical point of view. In certain cases only single specimens were available to the describer, and some of these were believed to be aberrant individuals or hybrids. Moreover, taxonomic work on *Amazilia* has been mainly restricted to selected taxa or species groups (subgenera). In view of their heterogeneous treatment in publications before and after Peters' check-list, further examination as presented in this study can throw new light on the validity of critical specimens or taxa. Here, I examine morphological variation within the Berylline Hummingbird, *Amazilia beryllina*, and ascribe *A. sumichrasti* to a distinct subspecies.

Material and methods

Geographic variation in coloration and morphometric data of *Amazilia* specimens in the Natural History Museum, Tring (BMNH) collection (including types; see Warren 1966) were compared with those of specimens from other museums (see Acknowledgements). The analysis of differences in mensural characters between populations was based on measurements of the bill (proximal end of nasal operculum to tip), wings and tail (rectrices 1, 5). As colours in *Amazilia* species (subfamily: Trochilinae) are mainly iridescent, general descriptions of plumage patterns are subjective and comparisons were made with types or selected individuals. Other colours mentioned in the text refer to Smithe (1975). Subadult birds could be easily recognized mainly by the brownish borders of the body feathers (especially neck, rump), or brownish coloration of the breast and abdominal parts. Measurements of such birds were excluded from the analysis of mensural data.

Information on sex and localities of the specimens were obtained from their labels. However, in some cases the phenotypic characters or measurements indicated that a specimen was wrongly sexed. Collecting sites were located using various maps (scale: 1:4,000,000, 1:1,800,000) and monographs (Friedmann *et al.* 1950, Binford 1989), respectively. In order to obtain reasonable sample sizes, specimens from adjacent localities were grouped in "pools" (method after Vuilleumier 1968).

Results and discussion

Biogeography and morphology within the A. beryllina *group*

The current distribution of the races of *A. beryllina* centres on the Pacific slopes from Mexico to El Salvador. The species is a relatively common inhabitant of oak-rich woodlands, forest edges and shrub (Howell & Webb 1995). Morphologically, the most obvious geographic variation occurs in the dorsal plumage, including the tail. In the western states from Sonora to Guerrero, *A. b. viola* can be regarded the least contrasted taxon of the group. The plumage is dark golden green, similar to *A. b. beryllina*, but with a rufous lower belly and abdomen. The upperparts have sometimes a certain greyish tinge and show dark violet (172 in Smithe 1975) only in the tail coverts and rectrices. Some intergradation in the ventral coloration towards the nominate form can be observed in Michoacán specimens that possess reduced rufous parts abdominally. *A. b. beryllina* ranges from District Federal eastward to Veracruz (here reaching the Atlantic slope), and southward to northeastern Oaxaca, with an altitudinal distribution between 600 and 3,000 m. Concerning the dorsal coloration, more variation is recognizable in nominate *beryllina* than in *A. b. viola*, with copperish to purplish gloss on the lower back and rump. Besides, the rectrices in *A. b. beryllina* are more contrasting copper to rufous.

Within the southern *beryllina* forms, two striking colour morphs exist in the colour pattern of the tail. *A. b. lichtensteini* shows in both sexes a rather light gloss in the rectrices that can be best described as chrome-coloured (see Moore 1950); partially, the lateral parts are purplish. In contrast to all other races, this taxon inhabits a very limited area in western Chiapas that seems mainly to be restricted to the slopes of Cerro Brujo. *A. b. devillei* is the only member of the species that occurs outside Mexico, in the highlands of southern Guatemala, El Salvador and central Honduras. It represents the richest coloured race of the *beryllina* group. Remarkably, the dorsal plumage is more golden to bronze-green than in all other forms. In particular, the upper tail-coverts and rectrices vary from copperish to intensive purple red. A common feature shared with *A. b. lichtensteini* is the less extended (visible), paler chestnut coloration at the wing base than in *A. b. beryllina* and *A. b. viola*.

From the arid valley of Rio Motagua, northeastern Guatemala, Carriker & Meyer de Schauensee (1935) described a questionable subspecies, *A. b. motaguae*. No validity was given to this taxon by following reviewers (e.g. Peters 1945, Land 1970). My examination of the type series revealed that the most important distinguishing characters (i.e. brownish tips in rectrices) should be mostly counted on juvenile or female characters. As there exists a relatively high amount of intraracial variation in *A. b. devillei*, the validity of *A. b. motaguae* should be rejected. Additionally, the southernmost Mexican population of *A. beryllina*, ranging from the coastal Atlantic slopes to the central mountainous areas of Chiapas, has been included in *A. b. devillei* (i.e. Friedmann *et al.* 1950, Howell & Webb 1995).

Morphological aspects and type locality of Amazilia Sumichrasti *(Salvin 1891)*

Holotype: BMNH 1887.3.22.1865, Santa Efigénia, Tehuántepec, Oaxaca, Mexico.

In its general appearance, the type resembles a highly coloured individual of the southernmost *beryllina* race *devillei*. Characteristic features are the relatively dark glittering green plumage, especially on the head, and below extending to the abdomen, the chestnut bases of the inner primaries and secondaries as well as the contrasting tail (see Salvin 1891). It is of interest that the colour of the latter shows a certain purplish gloss instead of only "coppery bronze" mentioned in the first description. As found in other members of the genus, the chin and upper throat feathers lack conspicuous white subterminal bars, suggesting the type to be a male.

The type locality is situated in extreme southeastern Oaxaca (Santa Efigénia). Thus, it has been believed by some authors to represent an extreme western example of *A. b. devillei* or an intermediate towards the nominate form (see below), respectively, although the collecting site is in particular close to the range of *A. b. lichtensteini*.

With the single type at hand, it was not possible to detect either significant morphological or morphometric differences in comparison to other *beryllina* races. The later comparison of a series of possible *A. b. devillei* specimens from Chiapas with typical representatives of the race from Guatemala (holdings of MLZ), with regard to the "unique" features of the *Sumichrasti* type, revealed evidence for the subspecific distinctness of the southern Mexican population of *A. beryllina*.

Taxonomic aspects

The taxonomic history of *A. Sumichrasti* is comparable to those of other single specimens once described as new taxa. Salvin & Godman

(1892) and Boucard (1895) regarded it as a valid species, an opinion shared by Ridgway (1911). Salvin (1892) and Hartert (1900) even noted some similarity with *Amazilia Ocai* (Gould 1859), a presumed intrageneric hybrid of *A. beryllina* and *A. cyanocephala* (Berlioz 1932, pers. obs.) from Mexico, although Hartert also mentioned distinguishing features (crown less shining green, throat lacking conspicuous white centre, tail copperish, chestnut-coloured under tail-coverts). Apparently, Simon (1921) ignored the bird, whereas Peters (1945) considered *A. Sumichrasti* to be an aberrant specimen of *A. b. beryllina* or an intermediate between the nominate race and *devillei*. Since then, intergradation between both subspecies has been proposed as the cause for the coloration patterns in southern Mexican birds (Friedmann *et al.* 1950), regarding the coastal strip of southeastern Oaxaca and Chiapas as a hybridization zone (Moore 1950).

In the latest review on the birds of Oaxaca (Binford 1989), there is no indication of the existence of another subspecies within the *beryllina* complex although the *sumichrasti* type is mentioned (regarded as an intermediate of nominate *beryllina* and *devillei*, too). Against this background, it is not surprising that Sibley & Monroe (1990) cite *A. Sumichrasti* in synonymy with *A. b. devillei*. At least, Howell & Webb (1995) treat the southern forms as a peculiar morphological group, being aware of the taxonomic uncertainties. As mentioned above, the comparison of the type with specimens from other parts of southern Mexico including the races *devillei* and *lichtensteini* strongly supports the view that the *beryllina* population of coastal and interior Chiapas can be separated as a distinct taxon, *Amazilia beryllina sumichrasti*.

Diagnosis

Generally, more grass-green and less shining golden-green than *A. beryllina devillei* and *A. b. lichtensteini*, in this character resembling the northwestern form *viola*, but underparts entirely green as in the former ones. Crown relatively dull. Similar to *A. b. devillei* in the coloration on the base of the inner primaries and secondaries (132A, Brick Red; lacking in female), not as prominent as in the nominate form. Rump nearly without the purplish gloss of *A. b. devillei*. No differences exist in the upper tail-coverts in both sexes and the rectrices in males. Adult females and immatures in general with metallic chrome median rectrices as in *A. b. lichtensteini* (but often with purplish traces); outer rectrices more dark chestnut (32) to purplish. Concerning other features, sexual dimorphism is restricted to the whitish subterminal bars of the throat feathers which are more marked in females.

In size, *A. b. sumichrasti* is similar to *devillei* and *lichtensteini*, although the wings are slightly longer than in the latter form (Table 1). The duller green plumage is typical of the northern distributed subspecies that occur along the Pacific coast (*A. b. viola*) or the central and northeastern parts of Mexico, respectively (*A. b. beryllina*).

Range

A. b. sumichrasti is found in the coastal parts up to the mountains of extreme southeastern Oaxaca, southern and north-central Chiapas

TABLE 1

Ranges, means and standard deviations in morphometric characters of *Amazilia beryllina* subspecies. For geographical reasons, only data of *beryllina devillei* specimens from Guatemala are tabled

	Bill (mm)	Wing (mm)	Rectrix 1 (mm)	Rectrix 5 (mm)
A. b. devillei				
Male: n=15	18.5–21.5 20.3 ± 0.71	52.5–56.5 54.4 ± 1.19	25.0–28.5 27.3 ± 0.99	30.0–34.0 31.7 ± 1.26
Female: n=23	19.5–21.5 20.7 ± 0.71	51.0–53.0 51.8 ± 0.75	25.5–28.5 26.9 ± 0.97	28.5–32.0 30.4 ± 1.19
A. b. lichtensteini				
Male: n=24	19.0–21.0 19.8 ± 0.60	49.0–55.0 53.5 ± 1.65	25.0–28.5 26.9 ± 0.99	30.0–34.0 31.6 ± 0.99
Female: n=18	19.0–22.5 20.7 ± 0.89	50.0–53.5 52.1 ± 1.06	25.5–28.5 27.1 ± 0.72	28.0–32.5 30.2 ± 1.03
A. b. sumichrasti				
Male: n=24	19.0–22.5 20.5 ± 0.83	53.5–56.5 55.2 ± 0.77	25.5–28.5 27.2 ± 0.79	31.5–34.0 32.6 ± 0.66
Female: n=14	20.0–22.0 21.2 ± 0.64	49.5–54.5 52.8 ± 1.14	26.0–28.5 27.5 ± 0.82	29.0–32.5 30.5 ± 1.08

(Fig. 1), but not known from Guatemala. Northward, it inhabits an area as far as Rancho Santa Efigénia (type locality; *c.* 250 m, 16°27′N, 94°14′W) and the Tapanatepec region, but possibly does not range into the adjacent mountains of northern Oaxaca where there is one record of a female identified by A. Weller as *A. b. lichtensteini* (USNM, no. 467908, La Cova). Residential status of *A. b. sumichrasti* can be assumed for the Sierra Madre de Chiapas and probably the Montañas del Norte de Chiapas where it reaches an altitude of at least 1,700 m (Yerba Buena, 17°06′N, 92°53′W). So far, the northwest border of the range remains unclear, as the nominate form has been believed to inhabit the parts of eastern Oaxaca that seem to be at least partially unexplored (Binford 1989, p. 147). In northwestern Chiapas, it is replaced in mountainous areas by *lichtensteini*, the last recognized taxon in the *beryllina* group (Moore 1950). Apart from the type locality (Cerro Brujo, Ocozocuautla), *lichtensteini* has been believed to range also in the central mountains of Chiapas (Friedmann *et al.* 1950), but records of *A. beryllina* from this region (listed by the data bank of ECOSUR, San Cristóbal de las Casas) probably refer to *A. b. sumichrasti*.

Conclusions

Presumably, the current population of *A. b. sumichrasti* once connected the *beryllina* populations from northwestern Mexico to Guatemala. For example, clinal variation can be recognized in the upper tail-coverts which are reddish purple in *A. b. devillei* and *A. b. sumichrasti*, but dark purple in the race *viola*. Based on morphological characters, the new taxon is closely allied to *A. b. devillei* and, with the

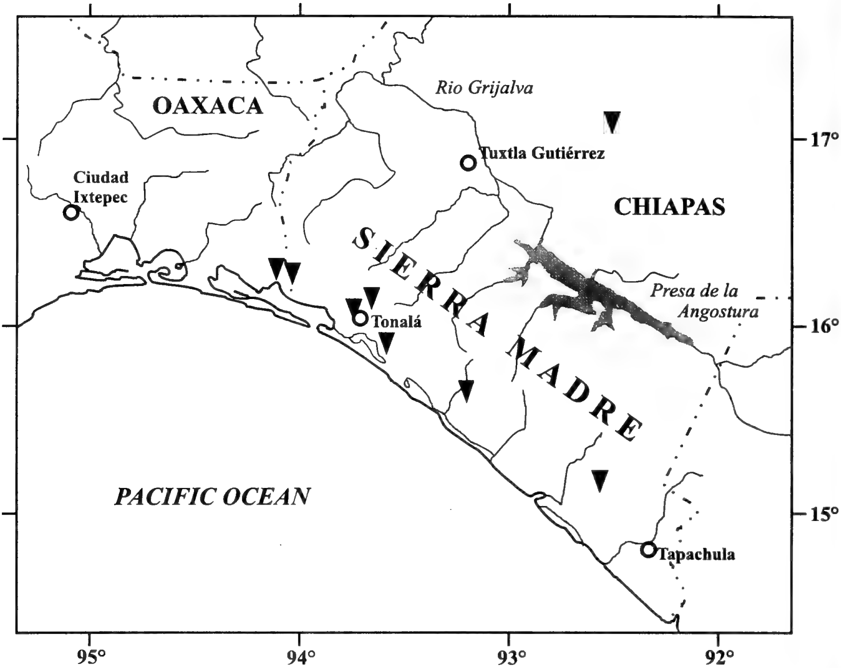

Figure 1. Collecting sites (filled triangles) of *Amazilia beryllina sumichrasti* in Oaxaca and Chiapas, southern Mexico.

difference of the duller plumage and sexual dimorphism in the tail coloration, to *A. b. lichtensteini*. Intergradation of *A. b. devillei* with the nominate form as supposed by Friedmann *et al.* (1950) and Binford (1989) can be excluded not only for reasons of coloration but also of distribution, because there is possibly a separation from the most northwestern population of the race *lichtensteini* in Oaxaca. Additional distributional data on these subspecies are necessary to determine their range boundaries. I presume that *A. b. sumichrasti* is restricted to the southwestern slopes of the Sierra Madre and the Montañas del Norte (as indicated by the MLZ series from Yerba Buena, and adjacent *beryllina* localities in the ECOSUR data bank). With the fragmentary data at hand, it is problematic to estimate if the *sumichrasti* populations are connected or separated by the valley of the Rio Grijalva/Presa de la Angostura in interior Chiapas (Fig. 1), where original woodlands have been widely cleared (Howell & Webb 1995).

Altogether, the appearance of morphological characters in the southern *beryllina* subspecies indicates microevolutionary processes as a result of isolation of preliminary taxa groups. As has been suggested for numerous Central American taxa, including *Amazilia* species (Howell 1993), climatic changes in glacial and interglacial periods which caused, e.g., cyclic extension and forcing back of humid forests, may have isolated small population groups of proto-*beryllina* in drier areas. Under more suitable environmental conditions, the range could be extended leading to some convergence of morphological features. As a result, these geohistoric events probably isolated also *A. b. lichtensteini* and possibly the northern population of *A. b. sumichrasti* (barrier effect of the Rio Grijalva valley?) from the more coastal populations. In comparison to the *A. beryllina* group, similar patterns of distribution and morphology exist in other congeneric species found in southern Mexico, *A. rutila*, *A. violiceps* and *A. viridifrons* (pers. obs., Howell 1993).

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Lectotypification of *Charadrius rubricollis* Gmelin, 1789

by Storrs L. Olson

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The note by McAllan and Christidis (1998) regarding the scientific name for the Australian bird now known as the Hooded Plover reflects a lack of understanding of the rules and procedures of zoological nomenclature. The case involves two competing names *Charadrius rubricollis* Gmelin, 1789, versus *Charadrius cucullatus* Vieillot, 1818. McAllan and Christidis (1998: 60) proposed to resolve what they perceived to be "potential confusion" concerning these names by designating a neotype for the former.

A neotype, however, is only to be selected in the course of revisory work, and then only under exceptional circumstances involving closely similar species for which one or both holotypes may be missing, neither of which circumstances apply in this instance. Furthermore, a neotype is not to be designated as an end in itself, so that the action of McAllan and Christidis, whose note has no other purpose, is automatically invalidated by provisions of Article 75 (b & c) of the International Code of Zoological Nomenclature (I. C. Z. N. 1985—hereafter "the Code").

The name *Charadruis rubricollis* Gmelin (1789: 687), was based entirely on "Lath. syn. III., 1, p. 212, n. 19" which refers to volume 3, Part 1, of John Latham's *General Synopsis of Birds* (Latham 1785). Here Latham described what he called the "Red-necked Plover", this being the source of Gmelin's name *rubricollis*, neither name being at all appropriate for the Australian Hooded Plover, which has *no* red in the plumage. No one in the history of the nomenclatural discussions of this species seems to have remarked on this rather obvious fact. Appropriateness has no bearing on the validity of a name but it should be taken into account when there are other valid grounds for dispensing with a misnomer. Latham stated that his Red-necked Plover "Inhabits the South Seas. Found in Adventure Bay, Van Diemen's Land [Tasmania]".

Mathews (1913: 130) found Latham's description to be 'inapplicable to every Australian species, and no previous worker had been able to fix it on any extra-limital form". Latham made no reference to any specimens or illustrations, so on internal evidence his species would have to be regarded as a *nomen dubium* that is not available for any known species. However, the Code suggests that "if an author, in establishing a nominal species–group taxon, does not explicitly state what specimens constitute the type series, evidence in addition to published evidence may be taken into account" (recommendation 72B). As this is only in the form of a recommendation, some workers may still consider any name based solely on Latham's description to be indeterminable.

Mathews (1913) went on to build a strong circumstantial case, though it is still only that, for Latham's description being a composite based upon two water-colour drawings made by William Ellis on Cook's Third Voyage, these being in the collections of the British Natural History Museum and having previously been discussed by Sharpe (1906: 205) and subsequently by Lysaght (1959), who used the same system for numbering them. The first of these, plate 63, was identified by both Sharpe and Lysaght with the species now known as the Red-necked or Northern Phalarope, *Lobipes lobatus*, based on *Tringa lobata* Linnaeus (1758), Ellis's original specimen having been taken "between Asia and America". The second drawing, plate 67, was identified by Sharpe with "*Aegialitus cucullatus* (Vieill.)", based on a specimen from "Adventure Bay". Lysaght (1959: 333) listed this under *Charadrius rubricollis*, following the terminology of Peters (1934), and likewise considered that the species depicted is clearly the Australian bird now known as the Hooded Plover or Hooded Dotterel.

Contrary to McAllan and Christidis, Mathews (1913) gave no reason for his not using *rubricollis* for the species in question, although inappropriateness may have been more of a factor than their surmise that it was because the name was based on two different species. If Mathews' conclusions are accepted as correct, then the name *Charadrius rubricollis* Gmelin, 1789, is a composite, a circumstance that arose many times in the compilations of Linnaeus and Gmelin and that in no way invalidates the proposed name. The disposition of a composite species is resolved by application of Article 74 of the Code: "If a type series contains more than one specimen and a holotype has not been designated, any author may designate one of the syntypes as the lectotype, by the use of that term or an equivalent expression (e.g., 'the type')". No action that constitutes lectotypification of *Charadrius rubricollis* Gmelin occurs in any of the literature bearing on this case as cited by McAllan and Christidis (1998), however.

The syntypes of this name are the specimens depicted in Ellis plates 63 and 67. The fact that these specimens no longer exist is immaterial, *contra* McAllan and Christidis (1998) who mistakenly cite Article 72c (v) in this connection. That article, however, applies only when an illustration is designated as a holotype but the actual specimen upon which it is based still exists. In the present case, the appropriate rule is Article 74c: "designation of an illustration or description of a syntype as a lectotype is to be treated as designation of the specimen illustrated or described; the fact that the specimen cannot be traced does not of itself invalidate the designation." Thus, the paintings themselves in effect become the types and McAllan and Christidis (1998:60) are quite wrong in stating that "no lectotype can be made."

McAllan and Christidis (1998:59) misleadingly considered that Oberholser (1919) "resurrected" *rubricollis* but that he invoked an incorrect argument, stating that because "the name *rubicollis* [sic] refers to more than one taxon it would appear to be a case of instant homonymy and is thus not valid." However, homonymy involves two names with the same spelling being applied independently to different species, which is not a factor here.

Oberholser's (1919) actions were extremely muddled to say the least. He cited Mathews (1913) as showing that *Charadrius rubricollis* was based on drawings of two different species, although he committed a rather serious lapsus in stating that one of these was *Steganopus tricolor*, which is a very different species of phalarope, when he meant *Lobipes* (or *Phalaropus*) *lobatus*. He went on to conclude as follows: "The name, therefore, *should* apply [my emphasis] to the species to which the greater or most pertinent part of the description refers, which in this case is, of course, *Charadrius cucullatus*. If, however, we take the view that it is erroneously described, neither current usage nor the commonly accepted codes of nomenclature allow its rejection because of indefinite or even erroneous characters, if the description can be positively determined as pertaining to a certain species. Thus, in any case, we should call the species ordinarily known as *Charadrius cucullatus* Vieillot by the name *Charadrius rubricollis* Gmelin."

It is difficult to know what, if anything, can be made of the second sentence of this quotation. The description does not apply to "a certain species" it applies to *two* certain species, and nothing in Oberholser's note refers to a "type" or anything that could be construed as a type in such a manner as to meet modern requirements for lectotypification, even though Oberholser's publication has been the only justification cited by previous authors for using the name *rubricollis* Gmelin.

The name *Charadrius rubricollis* may yet be regarded as being of dubious application if determined solely on the internal evidence of Latham's original description. Latham's name Red-necked Plover, as well as Gmelin's Latin derivative of it, *rubricollis*, is clearly indicative of what Latham considered the most salient feature of his species and this feature does not occur in the Australian Hooded Plover. Furthermore, the perfectly descriptive name *cucullatus* Vieillot was well established in the literature of the Hooded Plover prior to 1919 and was used in numerous publications subsequent to that date. For these reasons, and in order to remove any further contention regarding the name, I designate the signed drawing by William Ellis listed as number 63 by Sharpe (1906: 205) and by Lysaght (1959: 332), depicting a phalarope and having the associated information "W. Ellis ad vivum delint: et pinxt: 1778. Between Asia and America.", as the lectotype of *Charadrius rubricollis* Gmelin, 1789, which then becomes a junior subjective synonym of *Tringa lobata* Linnaeus, 1758. Consequently, the Australian Hooded Plover should henceforth take the name *Charadrius cucullatus* Vieillot, 1818.

Acknowledgements

I thank Robert Prys-Jones and Michael Walters, Tring, for reading and commenting on a draft manuscript.

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Correction of the specific name of Long-trained Nightjar

by José Fernando Pacheco and Bret M. Whitney

Received 13 December 1997

The specific name of Long-trained Nightjar *Hydropsalis* (=*Macropsalis*) *creagra* (Bonaparte 1850) requires formal correction under the articles of the International Code of Zoological Nomenclature (ICZN 1985). This spectacular nightjar (curiango-tesourão in Portuguese), endemic to the southern Atlantic Forest region, was described by Nitsch in 1840, with the name *Caprimulgus forcipatus*. Ten years later, Bonaparte (1850) named this species *Hydropsalis creagra*, a name clearly understood as a synonym of *forcipatus* until, for reasons unexplained, it was reintroduced by Peters (1940).

Although relatively few widely distributed papers were published for some twenty years following this, the seminal authors working in Brazil (e.g., Olivério Pinto, Helmut Sick, and Augusto Ruschi) published numerous works employing the correct name *Macropsalis forcipata* for this species. Indeed, almost no papers mentioning the bird were published outside Brazil between the appearance of Peters's volumes and Meyer de Schauensee (1966). However, subsequent to the publication of Meyer de Schauensee's (1966) valuable book (based in large part on Peters's published volumes of his Check-list of the Birds of the World), the incorrect name *Macropsalis creagra* seems to have become stabilized in the literature. For example, Sibley and Monroe (1990) recognized that *forcipata* had priority as the specific name for Long-trained Nightjar, but then suggested that it "qualified" as a *nomen oblitum* because it had not been used for more than 50 years. Even if the ICZN (1985) admitted judgement of a name as a *nomen oblitum* (which it has not since 1 January 1973), this treatment by Sibley and Monroe (1990) overlooked pertinent literature published by authors in Brazil between 1945 and 1966 concerning this exclusively Brazilian species. In accordance with the Principle of Priority (Chapter VI, Article 23; ICZN 1985), the correct name for Long-trained Nightjar is *Macropsalis forcipata* (Nitsch 1840).

We take this opportunity to cite more prominently than has been done previously another paper treating a slightly different nomenclatural anomaly concerning the name *Hydropsalis brasiliana* (Gmelin 1789), Scissor-tailed Nightjar (curiango-tesoura in Portuguese). Teixeira (1992) showed that this name was based on a description and a drawing that did not permit identification of the named form as the species generally known today as *Hydropsalis brasiliana* (in fact, some points of the description would seem to obviate this identification). As demonstrated by Teixeira (1992), the correct name for Scissor-tailed Nightjar is best considered *Hydropsalis torquata* (Gmelin 1789; published one page after the name *brasiliana*). As with the case of *Macropsalis forcipata*, the name *Hydropsalis torquata* (reintroduced by Schneider [1938] and adopted by Peters [1940]) was used consistently in Brazilian literature for the Scissor-tailed Nightjar prior to the publication of Meyer de Schauensee (1966).

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BOOKS RECEIVED

del Hoyo, J., Elliot, A. & Sargatal, J. (eds) 1991. *Handbook of the Birds of the World. Vol. 4, Sandgrouse to Cuckoos.* Pp. 679, 70 colour plates, *c.* 250 colour photographs, *c.* 850 distribution maps, *c.* 8000 bibliographical references. Lynx Edicions, Barcelona. ISBN 84-87334-22-9. £110. 310 × 240 mm.

This volume is the fourth in the beautifully illustrated HBW series (now one third complete). It begins with a lengthy Foreword by Jürgen Haffer, discussing species concepts and species limits in ornithology, dealt with under the general headings of typological species concept, biological species concept and evolutionary and phylogenetic species concepts. Examples are given illustrating clearly the differences in interpretation under the different species concepts, followed by a brief review of the increase in number of bird species described during the past 250 years.

This Volume covers the four orders Pterocliformes, Columbiformes, Psittaciformes and Cuculiformes. The cockatoos are separated in a family of their own (Cacatuidae), rather than being lumped with the parrots (Psittacidae), so that six families are included: Sandgrouse, Pigeons and Doves, Cockatoos, Parrots, Turacos, Cuckoos. The resulting 837 species described are more than in any of the other non passerine volumes. Awkward nomenclatural problems are described with particular reference to the tiny Fig-parrots.

The considerably increased number of figures included in the 70 colour plates of the present Volume (compared to earlier volumes) has resulted in a significant increase in the number of contributing artists, with their associated differing styles. The editors hope, however, that the number of artists will stabilise for future volumes but are conscious of the desire to ensure that HBW continues to appear on schedule.

In the first three volumes of the series the distribution maps (in conjunction with the text) are very useful and indicative but occasionally somewhat difficult to interpret, even for those regions with which I am familiar. The maps in Vol. 4 follow the same criteria, but the editors admit that the maps continue to present problems, available distribution data being frequently rather sparse and occasionally contradictory. Another difficulty is the adequate depiction of migration tendency, the solution adopted generally being to map the entire distribution area as green (signifying both breeding and non-breeding areas), with explanations being given in the Movements section of the text. Altitudinal movement is essentially impossible to indicate because of the small scale. In a few cases, areas are indicated for introduced species.

As in previous volumes, the accepted French, German and Spanish names of species continue to be given, recommended Spanish names continuing to be published periodically elsewhere. The editors acknowledge the many museums and libraries which continue to contribute greatly to the healthy progress of the project. The very extensive bibliography contains many up-to-date references, just to quote one example—*Tauraco ruspoli*/Ruspoli's Turaco includes comments in the Status and Conservation section from Borghesio 1997 (*Bull. Brit. Orn. Cl.* 117(1): 11–16) as well as being categorised as Endangered: Cites II.

Pre-publication literature associated with Vol. 4 indicates that by means of a series of supplements (the first of which is in preparation) the up-to-date information on all species presented so far will be renewed indefinitely, including colour plates of new species described since publication of the corresponding volume. I find this extremely encouraging, as has been the whole project to date and the editors (as well as BirdLife International) are to be warmly congratulated on the timely progress of this magnificent series.

Lynx Edicions titles may be purchased from specialised bookshops or directly from the publishers: Lynx Edicions, Passeig de Gracia 12, 08007 Barcelona, Spain. Tel: +34 93 301 07 77; Fax: +34 93 302 14 75; E-mail: lynx@hbw,com; INTERNET: http://www.hbw.com

S. J. Farnsworth

Henry, G. M. 1998. *A guide to the birds of Sri Lanka.* Third edition, revised by T. W. Hoffmann, D. Warakagoda & U. Ekanayake. Pp. xlvi+488, 29 colour and 3 monochrome plates, many line drawings. Oxford University Press. ISBN 0 19 563813 1. £25. 22 × 15 cm.

This third edition of Henry's guide (the first in 1955, second in 1971) has been revised and updated by members of the Ceylon Bird Club, involving the addition of species, two new plates (by Bruce Henry, the original author's elder son) and a revision of the taxonomic treatment of species according to more modern texts. This involved the re-writing of the introductory sections to some Orders. Most of the species accounts remain as in the earlier editions, as do Henry's original plates and line drawings, although the plate captions now give the page on which the species is described. Where necessary, species accounts have been revised, but the editors emphasise that for many species their distribution remains as Henry first described. Where species have been added to the Sri Lanka list, descriptions and details of occurrence are given but many are not illustrated. This guide thus retains the character of its antecedents and differs markedly from more modern field guides with their more terse styles. Nevertheless, this book provides more information on the birds' natural history than many guides with which it will have to compete, and this may preserve for it a niche in the market place.

Chris Feare

Stattersfield, A. J., Crosby, M. J., Long, A. J. & Wege, D. C. 1998. *Endemic bird areas of the world. Priorities for biodiversity conservation.* Pp. 846, numerous maps, tables and photographs, some in colour. BirdLife Conservation series No. 7, BirdLife International, Cambridge. ISBN 0 946888 33 7. £37, $60. 24.5 × 17 cm. 1.7 kg!

This book represents a milestone in many respects in the ornithological and conservation literature, reporting the findings of a major BirdLife project involving a huge number of people from all parts of the world.

Over a quarter of the world's bird species occupy small areas of the globe and this confers on these species a degree of vulnerability. In 1987, BirdLife (then ICBP) embarked on a project to catalogue and map the distribution of "restricted range" species, to record overlap with other bird species in this category and thereby to identify hotspots of occurrence of such species. The logic of this approach was that the limited resources available for conservation action could be targeted at a disproportionately high proportion of potentially vulnerable species in highly localised geographical areas. During the course of data collection for the identification of what are now termed *Endemic Bird Areas* (EBAs), studies of non-avian taxa revealed a degree of overlap between the distributions of their restricted range species and those of restricted range birds. Thus at least some EBAs have wider significance for biodiversity conservation.

Eleven years after the initiation of the project, we now have this magnificent book which documents the 218 EBAs that were defined on the basis of having at least two bird species entirely confined to the area. Each EBA is allocated a number and an introductory box shows location, mentions key habitats and threats and tabulates the number of restricted range species that occur there. General accounts of the EBA, its restricted range species and threats are accompanied by tables showing the distribution, habitats and conservation status of the species, and by monochrome photographs (of birds, habitats and other animals) and plates of some of the birds. In addition to the EBAs, "secondary areas" are identified and described briefly in a separate section; secondary areas do not qualify as EBAs as fewer than two species are entirely confined there.

In addition to these accounts, seven introductory chapters describe the background to the EBA concept, methodologies employed, a variety of data analyses illustrating how these may be used to set priorities for targeting species and areas, and assessing conservation needs. The final chapter introduces the six regions under which the EBAs are treated, illustrated by maps, tables and colour photographs.

All of these chapters have boxes which summarise key information. This, together with a two-page summary which presents the "meat" of the book with eye-catching headings and bullet-pointed facts, helps to make the book accessible to a wide readership—the promotional literature claims that the book is essential for conservationists, policy makers, scientific advisors, ornithologists and birders—but this approach renders the basic information accessible also to the popular media and, most important in many EBAs, schools.

On might be tempted to regard this book as the pinnacle of BirdLife's achievement in relation to EBAs but, as the authors point out, biodiversity conservation must change as animal and plant distribution change, and especially as our interpretation of taxonomy changes. In relation to birds, re-analysis of species concepts is leading to the elevation of many races to specific status and this will lead to the designation of further EBAs, especially through the elevation of "secondary areas" to EBA rank. BirdLife, and especially the authors, are to be congratulated on the fulfilment of the initial stages of this major biodiversity conservation project and the publication of this excellent, accessible book which will have wide application. We should not forget, however, that over 70% of the world's bird species are not confined to EBAs, and that even some of the most widespread species are undergoing catastrophic declines. Concentration on the EBA approach should not allow these species to be neglected, since they may well be indicative of more widespread depletion of biodiversity.

Chris Feare

Gaston, A. J. & Jones, I. L. 1998. *The Auks*. Pp. xviii+349, 8 colour plates, numerous text-drawings and figures. Oxford University Press ISBN 0-19-854032-9. £40, 25.5 × 20 cm.

The Auks are one of the most extraordinary and diverse of all bird families, and with the group being of a manageable size—only 22 extant species (or 23, see p. 191)—they are ideal candidates for a volume in the series Bird Families of the World. Auks may live in colonies numbering millions, can match the level flight speed of a peregrine falcon, can dive to 200m and catch their prey in virtual darkness, and may exhibit extraordinary ornamentation. The fascination and mystery of this group has obviously enthused the authors, who are responsible for a substantial portion of the research described, and whose authoritative writing reveal their comprehensive knowledge of auks. The text is complemented by Ian Lewington's superb colour plates which capture the nature of auks better than any I have seen previously. The result is a book which makes an outstanding contribution to an impressive series.

The format is similar to that of previous volumes. The first half of the book comprises chapters on general auk biology, including systematics and evolution, distribution and biogeography, the role of auks in ecosystems, social behaviour, chick development, population biology and conservation. These chapters aim at synthesis, with an emphasis on trying to understand the remarkable diversity of life history strategies and ecology found among auks. The second part of the book comprises species accounts for the 22 species of extant auks and also for the most recently extinct member of the family, the Great Auk. Each account includes sections on description, range and status, habitat and feeding ecology, displays and breeding behaviour, life cycle and population dynamics. The text is highly readable and includes numerous figures, tables, sketches and photographs. The text is also extensively referenced and throughout the book the authors find the correct balance between proven facts and informed speculation. A book of this nature also serves to highlight the fact that although tremendous advances have been made in recent years in many aspects of auk biology, e.g. our knowledge of many of the Pacific auks and the role of auks in the marine environment, there are also many areas of ignorance, including the basic biology of species such as Craveri's Murrelet.

This book is essential reading for anyone with more than a passing interest in seabirds, and one that I would recommend highly to any ornithologist.

Ben Hatchwell

Ash, J. S. & Miskell, J. E. 1998. *Birds of Somalia*. Pp. 336, 5 colour plates, 3 colour maps, numerous monochrome photographs and maps. Pica Press, Mountfield. ISBN 1-873403-58-5. £40. 253 × 190 mm.

Extending from the East African equator to about 12°N, and with the longest coastline in Africa, Somalia is a country of immense ornithological interest. It embraces a large part of the unique Somali–Masai biome and occupies the eastern flank of a major migration flyway. Yet the documentation of its birds has until now been patchy. Early information from the northwest, the former British Somaliland, was brought together in the four volume work of Archer and Godman (1937, 1961), while pioneering explorations in the south were described mainly in Italian publications, including the multi-volume treatise by Moltoni and Gnecchi Rusconi (1940–1944), unfortunately interrupted by World War II. It was not until 1983 that John Ash and John Miskell produced, as a supplement to *Scopus*, the first annotated checklist to cover the whole of modern Somalia. These authors, resident at Mogadishu between 1978 to 1985, visited many areas, including the far north and northeast, and added over 50 species, including a new lark, to Somalia's list. They began work on a national distributional survey, and this has resulted in the present book, an atlas which updates and greatly expands the information given in the 1983 list.

An extended introductory section includes an historical review, and chapters on vegetation and various physical aspects of Somalia, with contributions from several specialist authors. The occurrence of migrant birds, Palearctic and Afrotropical, is also reviewed, and breeding seasonality discussed. These topics tend unfortunately to be dealt with in isolation, and more discussion of the impacts of vegetation and climate on bird distribution, movements and seasonality would have been welcome.

The main body of the book deals with the 654 species recorded on the main list, which includes 151 Palearctic migrants and 7 endemics. Nomenclature and sequence broadly follow *The Birds of Africa*. Excellent quality maps plot occurrence and known breeding distribution on a 1/2° × 1/2° grid. The accompanying text gives details of status, abundance and habitat, all Somalia races being mentioned. Breeding information includes seasonality and clutch size. For scarce or little known species all records are given. Further lists detail offshore records, hybrids, and species requiring further confirmation. An extensive gazeteer provides modern Somali as well as English or Italian names, and should prove very useful to ornithologists and others. A full bibliography includes over 500 citations. Five lively coloured plates by Martin Woodcock portray races and species special to the region.

This is an attractive and well-produced book, essential for anyone with an interest in Somalia's wildlife, or indeed with a wider interest in East African bird distribution or migration. It provides a thorough review of current knowledge of Somalia's bird populations and distribution, at the same time indicating areas where much still remains to be discovered. It will certainly provide the basis and stimulus for further exploration of the country when access improves and more settled conditions return.

David Pearson

NOTICE TO CONTRIBUTORS

Papers are invited from Club Members or non-members, especially on taxonomic and distributional topics; descriptions of new species are especially welcome and may be accompanied by colour photographs. **Two copies** of manuscripts, typed on one side of the paper, **double spaced and with wide margins**, should be sent to the Editor, Prof. Chris Feare, 2 North View Cottages, Grayswood Common, Haslemere, Surrey GU27 2DN, UK. All contributions, **including *In Brief* articles**, should follow the style of main papers in this issue of the *Bulletin*.

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