

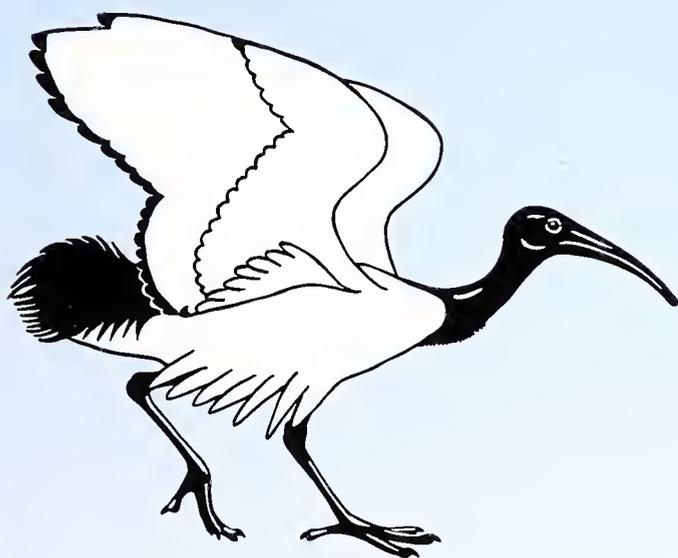
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Bulletin of the British Ornithologists' Club

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PRESENTED



Volume 133 No. 1
March 2013

FORTHCOMING MEETINGS

See also BOC website: <http://www.boc-online.org>

BOC MEETINGS are open to all, not just BOC members, **and are free.**

The evening meetings are in an **upstairs room at The Barley Mow, 104 Horseferry Road, Westminster, London SW1P 2EE.** The nearest Tube stations are Victoria and St James's Park; and the 507 bus, which runs from Victoria to Waterloo, stops nearby. For maps, see http://www.marketaverns.co.uk/the_barley_mow.html or ask the Chairman for directions.

The cash bar will open at **6.00 pm** and those who wish to eat after the meeting can place an order. **The talk will start at 6.30 pm** and, with questions, will last about one hour.

It would be very helpful if those who are intending to come would notify the Chairman no later than the day before the meeting and preferably earlier.

Saturday 6 April 2013—Joint meeting with the African Bird Club and the Natural History Museum.

A one-day meeting in the Flett Theatre, Natural History Museum, South Kensington, London SW7 5BD starting at 10.30 am. Attendance is free. Speakers and titles were listed in the December 2012 Bulletin. Full details are in the flyer which is enclosed with all copies sent to addresses in the UK and can also be found on the BOC website.

21 May 2013—5.30pm—Annual General Meeting (see Club Announcements) followed at 6.30 pm Dr Hugh Wright—White-shouldered Ibis conservation and the value of traditional land use

Abstract: Many aspects of White-shouldered Ibis *Pseudibis davisoni* ecology have intrigued ornithologists in South-East Asia, not least its apparent association with people in its dry-forest home. Hugh will present findings from the first ecological study of this Critically Endangered waterbird, examining the links between its foraging ecology and local land use practices, namely livestock grazing and fire. He will then assess the importance of these practices for local livelihoods and consider whether conservation can exploit the shared dependence of both people and the ibis on the dry-forest grazing system. The value of traditional land management practices is well recognised in Europe, but elsewhere the benefits of human land use receive much less attention. The case of the White-shouldered Ibis provides an interesting example of a synanthropic species in the developing world, and raises difficult challenges for conservationists to address.

Biography: Hugh Wright undertook his M.Sc. and Ph.D. research on the White-shouldered Ibis while at Univ. of East Anglia, Norwich. He spent 18 months in northern Cambodia studying various aspects of this species' ecology and local people's livelihoods. Hugh is now a post-doctorate research associate at the Univ. of Cambridge working on methods to improve the sustainability of agriculture.

NB: We had originally planned to have a programme of short talks by members, but no offers were received by the published deadline.

24 September—*please check the BOC website where details will be posted as soon as they are finalised.*

19 November—*please check the BOC website where details will be posted as soon as they are finalised.*

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CLUB ANNOUNCEMENTS

Chairman's message

Subscriptions were due for renewal on 1 January 2013. If you have not already paid, please do so as soon as possible to avoid the need for further reminders. Please remember that the subscription is £25.

I am very pleased to report that all the Bulletins, up to and including Vol. 127 (2007), are now freely available via the Biodiversity Heritage Library website at www.biodiversitylibrary.org/bibliography/46639.

Helen Baker

ANNUAL GENERAL MEETING

The Annual General Meeting of the British Ornithologists' Club will be held in the upstairs room at The Barley Mow, Horseferry Road, Westminster, London SW1P 2EE, at 5.30 pm on Tuesday 21 May 2013.

AGENDA

1. Apologies for absence.
2. Minutes of the Annual General Meeting held on 12 June 2012 (see *Bull. Brit. Orn. Cl.* 132: 137–138, and the BOC website).
3. Minutes of the Special General Meeting held on 12 June 2012 (see *Bull. Brit. Orn. Cl.* 132: 138–139, and the BOC website).
4. Receive and consider the Chairman's Review, the Trustees' Report and the Accounts for 2012 (these will be available in the room before the start of the meeting).
5. The Bulletin Editor's report—Mr G. M. Kirwan.
6. Election of Officers and other Trustees. The Committee proposes that:
 - i. Mr Chris Storey be elected as Chairman (*vice* Miss Helen Baker)
 - ii. Dr Robert Prŷs-Jones be re-elected as *Hon. Secretary*
 - iii. Mr David Montier be re-elected as *Hon. Treasurer*
 - iv. Mr Nigel Redman be elected to serve as a Trustee (*vice* Mr Ken Heron-Jones).
Mr Steven Gregory's four-year term has also ended and he is not being replaced.
All other Committee members are eligible to serve at least one more year in office.
(See notes below)
7. Any other business (*any items should be received by the Hon. Secretary by 7 May 2013*).

Notes to the Agenda of the 2013 AGM

Item 6: Committee nominees for election

Chris Storey

Following national service and university, Chris Storey was an administrator in the British Council and then the BBC, working in both television and radio. Since his retirement he has been active in the voluntary sector, establishing a network for Community Service Volunteers; fundraising for Macmillan Cancer Support (in conjunction with the Richmond Orchestra of which he is a playing member); and recently completing an MA in Photographic Studies at the Univ. of Westminster. Chris has travelled extensively, mainly in the Palearctic but also Australia and more recently Brazil, on ornithological pursuits. He is a committed member of the British Trust for Ornithology and the BOC.

Nigel Redman

Nigel Redman has been an active birder since the mid 1960s. He is a publisher by profession, and is currently Head of Natural History for Bloomsbury Publishing, which includes the Christopher Helm and T. & A. D. Poyser imprints. He also works as a bird tour leader and since 1982 has guided more than 100 tours for Birdquest, mainly to Asia and Africa. He is a former chairman of the Oriental Bird Club, has served on the councils of the British Ornithologists' Union, the Ornithological Society of the Middle East and the African Bird Club, and has been a member of the editorial board of *British Birds* since 1998. Nigel is also co-author of *Where to Watch Birds in Britain* and senior author of *Birds of the Horn of Africa*.

The 971st meeting of the Club was held on Tuesday 18 September 2012 in the Sherfield Building, Imperial College, South Kensington, London SW7 2AZ. Fifteen members and 11 non-members were present.

Members attending were: Miss HELEN BAKER (*Chairman*), KEITH BETTON, Cdr. MICHAEL CASEMENT, RN, STEPHEN CHAPMAN, Dr JOANNE COOPER (*Speaker*), DAVID FISHER, MARTIN GAUNTLETT, TONY GIBBS, RICHARD LANGLEY, DAVID MONTIER, Dr ROBERT PRYS-JONES, Dr PETER RUDGE, TONY STATHAM, CHRIS STOREY and PETER WILKINSON.

Non-members attending were: Mrs CHRISTINA CASEMENT, Mrs PAT CHAPMAN, Mrs MARGARET GAUNTLETT, PETER LANGSDON, CHRIS LANGSDON, Mrs MARY MONTIER, JOHN OLIVER, Dr IRIA RATIKAINEN, DOUGLAS RUSSELL (*Speaker*), Dr BARD STOKKE and Ms CHANTEL WILLIAMS.

As Prof. Graham Martin had been unfortunately obliged to withdraw from delivering the talk advertised in *Bull. Brit. Orn. Cl.* 132(3), two shorter replacement talks were presented.

Dr Joanne Cooper (Natural History Museum Bird Group, Tring) spoke on *John Gould's glittering gems: the 1851 hummingbird cases at the Natural History Museum*. John Gould famously exhibited his collection of mounted hummingbirds during the Great Exhibition of 1851 at a specially designed pavilion at the Zoological Gardens, London. More than 75,000 people visited the dazzling display, among them Queen Victoria and Charles Dickens, where they could view some 25 state-of-the-art cases containing hundreds of specimens set amongst foliage in the most life-like manner possible. Upon Gould's death in 1881, most of the mounted hummingbird series was purchased by the Natural History Museum, along with >6,000 other bird specimens from Gould's private collection. Many of the cases were subsequently placed on public display in the central hall of the museum. However, as a result of damage sustained, notably in World War II, only a few of the cases now survive intact behind the scenes, the majority having been dismantled and the specimens preserved individually. Despite their original fame, relatively little attention has been given to the recent history of the collection and how the surviving material reached its present condition. The recent restoration of one case by taxidermist Derek Frampton in preparation for exhibition has revealed much about the cases' original construction, highlighting in particular their many vulnerabilities and the curatorial challenges faced by their custodians. Ravaged by time and indeed war, it is hoped that the refreshed interest in this collection may eventually lead to some of these fragile survivors once again taking their place on public display.

In *Dr George Murray Levick (1876–1956): unpublished notes on the sexual habits of the Adélie Penguin*, Douglas Russell (Natural History Museum Bird Group, Tring) described a previously unpublished four-page pamphlet by Dr George Murray Levick R.N. (1876–1956) on the 'Sexual habits of the Adélie Penguin', which was recently rediscovered at the Natural History Museum (NHM) at Tring. Printed in 1915 but declined for publication with the official expedition reports, the account was based on Levick's detailed field observations at Cape Adare during the British Antarctic (Terra Nova) Expedition 1910. Levick was one of the six members of the 'Northern Party' led by Lt. Victor L. A. Campbell, R.N. (1875–1956) charged with exploring the coast west of Cape North in Antarctica. Levick's graphic and now infamous account commented on the frequency of sexual activity, auto-erotic behaviour, and seemingly aberrant behaviour of young unpaired males and females including necrophilia, sexual coercion, sexual and physical abuse of chicks, non-procreative sex and homosexual behaviour. Zoologists are nowadays more free to publish on such allegedly unusual behaviours, which have since been widely documented, but the seminal observations in Levick's pamphlet have until now been totally overlooked. Describing and reinterpreting selected observations in detail, Douglas commented on its significance as a forgotten work by the pioneer of research on Adélie Penguin *Pygoscelis adeline*. Results from Douglas' investigation have now been published in Russell, D. G. D., Sladen, W. J. L. & Ainley, D. G. (2012) Dr. George Murray Levick (1876–1956): unpublished notes on the sexual habits of the Adélie penguin. *Polar Rec.* 48: 387–393.

An outstanding event in the Club's 2012 calendar was a conference on the scientific legacy of Allan Octavian Hume. The one-day conference held on 23 October 2012 was organised jointly by the Natural History Museum (NHM) and South London Botanical Institute (SLBI), and supported by the BOC and the Linnean Society of London. It was held at the Natural History Museum, London SW7 5BD. The full title was *Indian ornithology, British botany and Allan Octavian Hume (1829–1912): the scientific legacy of a founder of the Indian National Congress*. Approximately 80 people attended the event.

Hume—'Indian ornithologist extraordinaire, enlightened administrator ... early leading light of the Indian National Congress and founder of the South London Botanical Institute'—presents an enormous challenge for students of his achievements and legacy, but the contributors to the conference skilfully and beguilingly steered us through the 'thickets' of his remarkable life.

The conference was opened by Ian Owens (Director of Science, NHM). Next, Honor Gay (NHM), in her succinct account of Hume's life—Haileybury, his rise to Secretary of the Department of Revenue, Agriculture and Commerce in the Indian Civil Service in 1871, his fall from grace in 1879, the formidable ornithological activity, his central role in the founding of the Indian National Congress, his final return to England in 1894, the establishment of the South London Botanical Institute in 1910 and his death two years later—set the scene for the day's discussions.

Robert Prÿs-Jones (NHM), Nigel Collar (BirdLife International) and Pamela Rasmussen (Michigan State University Museum) outlined Hume's ornithology and his scientific legacy, including the vast collection of over 100,000 specimens, his 200 published papers plus 'his own home-grown journal *Stray Feathers*' and the 148 taxa described by him that are still accepted today. Their account culminated with Hume's break with ornithology precipitated by the 'truly crushing blow' in the winter of 1882–83 of the theft and destruction of all of his notes for his planned 'Birds of the British Indian Empire' plus 6,000 foolscap sheets of his museum catalogue. Hume's final contribution to ornithology was his donation in 1885 of >80,000 specimens to the then British Museum (Natural History).

Roy Moxham and Prof. Edward Moulton (Univ. of Manitoba) dealt with Hume's Indian Civil Service career, his involvement with the completion of the salt tax 'customs hedge' (The Great Hedge of India), his passionate concern to change through improved agricultural practice the health and well-being of the 'millions of our people' and his many initiatives to modernise the administration of British India. Prof. Sriram Mehrotra (whose paper was presented by Alice & Edward Moulton as he was unfortunately unable to attend in person) then showed how, following his retirement from the Indian Civil Service at the start of 1882, Hume's growing impatience with the rigidities and short-sightedness of Colonial rule resulted in his active involvement in political reform, leading to the formation in 1885 of the Indian National Congress of which he was the first General Secretary. He held this position until 1894 when he left India and retired to England, settling in Upper Norwood, south-east London.

Hume's Upper Norwood years, his renewed preoccupation with botany, his botanical collections, his founding in 1910 of the South London Botanical Institute and that organisation's current activities were outlined by Keith Spurgin (Emeritus Recorder for the Botanical Society of the British Isles) and Petra Broddle (SLBI).

The facts about Hume's legacy, alive and active in south-east London, ended the conference on a very positive note. Throughout the day his enigmatic personality had at times overwhelmed — all that prodigious effort in appalling conditions, away from home and family — and at others seemed elusive and contradictory. But the contributing speakers left us in no doubt about the stature of the man, the immensity of his contribution and the importance of addressing and recalling his achievements.

Chris Storey

CORRIGENDUM

In *Bull. BOC* 132: 170, five species were inadvertently omitted from the head of the Appendix. These are:

		min.	max.	wet	dry	evidence	IUCN	Peru	EBA	Peru	remarks
<i>Nothoprocta pentlandii</i>	Andean Tinamou	300	2,100	X	X	C, R					XC5257, 21770, 21771
<i>Sarkidiornis melanotos</i>	Comb Duck	200	400	X	X	P					
<i>Penelope barbata</i>	Bearded Guan	1,360	2,150	X	X	P, R	VU	EN	SCA		XC5179
<i>Penelope albipennis</i>	White-winged Guan	550	1,400	X	X	C, P	CR	CR	T	P	
<i>Tigrisoma fasciatum</i>	Fasciated Tiger Heron	800	1,360	X		P					see Angulo <i>et al.</i> (2008)

Ornithological survey of the mountains of the Huon Peninsula, Papua New Guinea

by Benjamin G. Freeman, Alexandra Class, Jennifer Mandeville,
Suzanne Tomassi & Bruce M. Beehler

Received 1 March 2012

SUMMARY.—Based on field work conducted between 2009 and 2012 in the YUS Conservation Area on the Huon Peninsula, we present novel distributional information for 47 avian species. This includes range extensions, elevational records, demographic data and new records of species poorly known in New Guinea. Meyer's Goshawk *Accipiter meyerianus*, Rufous-throated Bronze Cuckoo *Chrysococcyx ruficollis*, Papuan Scrubwren *Scricornis papuensis*, Alpine Robin *Petroica bivittata*, Greater Ground Robin *Amalocichla sclateriana*, Yellow-breasted Bowerbird *Chlamydera lanterbachii* and a possible Rufous Monarch *Mouarcha rubiensis* are recorded for the first time from the Huon Peninsula. The northern scarp of the mountains of the Huon Peninsula is shown to be a contact zone for several lowland species-pairs.

New Guinea is justly famed for its endemic avian radiations, best exemplified by the spectacular birds of paradise (Frith & Beehler 1998, Laman & Scholes 2012). Diversification of New Guinean bird lineages has been shaped by the island's geography, particularly the location and aspect of its mountain cordilleras (Diamond 1972, 1985, Heads 2002). New Guinea's highest and most extensive mountains are the Central Ranges, which form a continuous montane spine that stretches north-west–south-east along nearly the entire island. In addition, New Guinea has 19 outlying mountain ranges that vary in size and distance from the Central Ranges (Diamond 1985). New Guinea's mountains constitute a classic study system in island biogeography, and comparative study of avian distributions on the Central Ranges and outlying ranges has been used to infer historical patterns of speciation and community assembly (Diamond 1972, 1973).

The highest and most extensive of New Guinea's outlying ranges, with peaks of up to 4,120 m, are the Huon Mountains in north-east New Guinea, comprising the tectonically affiliated Finisterre, Saruwaged, Cromwell and Rawlinson ranges (Fig. 1). The Huon Mountains are geologically young; the majority of uplift occurred in the last one million years, and they continue to rise at a minimum rate of 0.8–2.1 mm / year (Abbott *et al.* 1997, Hovius *et al.* 1998). In comparison, the Central Ranges are similar in height (peaks up to 5,030 m) but much older; while a large degree of uncertainty remains, the majority of uplift is thought to have occurred *c.*5 million years ago (van Ufford & Cloos 2005).

The Huon Mountains are isolated from other montane regions by the lowland barrier of the Ramu / Markham Basin lowlands. The nearest montane regions are the adjacent Central Ranges, *c.*10–30 km distant, and the outlying Adelbert Mountains (highest peak *c.*1,700 m) *c.*30 km to the north-west (Fig. 1). This isolation has spurred allopatric speciation; the Huon Mountains are home to four endemic bird species—Spangled Honeyeater *Melipotes ater*, Huon Melidectes *Melidectes foersteri*, Huon Astrapia *Astrapia rothschildi* and Emperor Bird-of-Paradise *Paradisaea guilielmi*—while Wahnes's Parotia *Parotia wahnesi* is endemic to the Huon and Adelbert Mountains (Beehler *et al.* 1986). With the exception of Emperor Bird-of-Paradise, whose range abuts that of Lesser *P. minor* and Raggiana Bird-of-Paradise

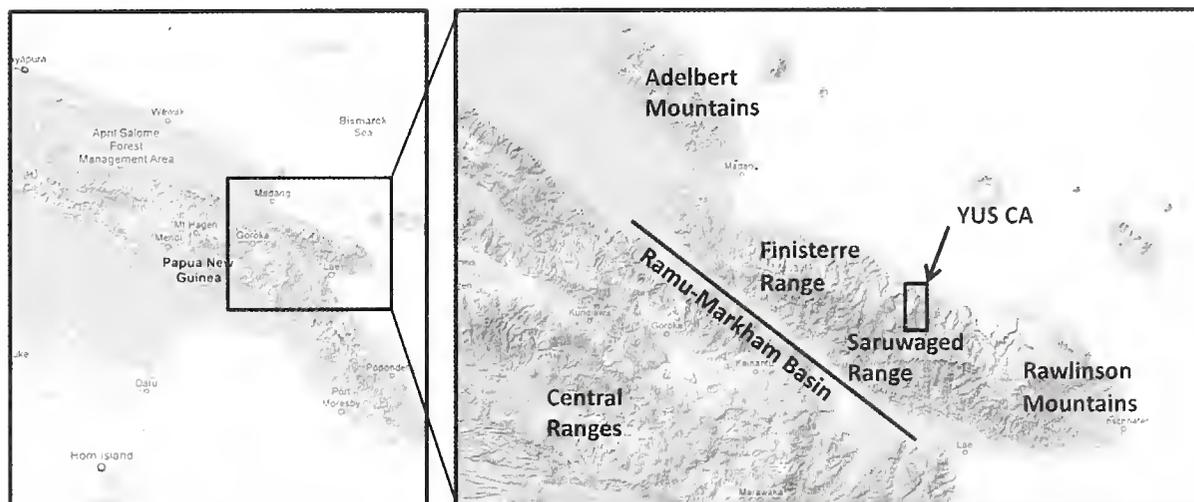


Figure 1. Map of New Guinea showing the location of the Huon Peninsula in relation to the Central Ranges and Adelbert Mountains. Field work took place within the YUS Conservation Area (YUS CA), in the Saruwaged Range of the Huon Peninsula.

P. raggiana at lower elevations, the Huon endemics are all allospecies, with closely related species in the Central Ranges. The Huon Mountains also harbour 24 endemic subspecies, with a further five endemic subspecies shared with the Adelbert Mountains (Coates 1985, Beehler *et al.* 1986, Coates 1990).

While the isolation of the Huon Mountains has promoted evolutionary divergence, the intervening lowlands of the Ramu / Markham Basin act as a geographic barrier limiting the colonisation of montane taxa from the Central Ranges. New Guinea's outlying ranges are in all instances species-poor compared to the Central Ranges (Diamond 1973, 1985, Beehler *et al.* 2012). The Huon Mountains are both large in extent and relatively close to the Central Ranges. Accordingly, the avifauna of the Huon Mountains is the most diverse of New Guinea's outlying ranges and far more so than that of the relatively small and isolated Adelbert Mountains (Pratt 1982, Diamond 1985).

New Guinea's montane avifauna provides a classic system in island biogeography (Diamond 1985), with distributional patterns in New Guinea's montane regions repeatedly used to infer processes of speciation, diversification and community assembly (Diamond 1970, 1973, Mayr & Diamond 2001). The accuracy of such studies is dependent on the quality of distributional data used in analyses. Here we present the results of extensive field work in the Saruwaged Range of the Huon Mountains—the most thorough avifaunal survey of the Huon Mountains conducted to date. Our surveys build on information garnered by early collectors (summarised in Stresemann 1923), and especially field work conducted in the Rawlinson and Saruwaged Ranges by E. Mayr in 1928–29 (>1,000 specimens collected; Mayr 1931, Haffer 2007). More recently, the Huon montane avifauna was surveyed by BMB (Mount Bangeta, Saruwaged Range, 19–28 September 1975, 1,400–3,750 m; 75 specimens in United States National Museum, Washington), by A. L. Mack, P. Igag, B. Benz, E. Scholes, R. Sinclair & W. Betz in 2001 and 2003 (Teptep area, Saruwaged Range), and by J. M. Diamond & K. D. Bishop in 2004 and 2006 (Wasauon area, Saruwaged Range). Despite these prior unpublished surveys, we document five additions to the 86 montane species (defined as species largely distributed above 1,000 m) previously known from the Huon Mountains, comment on our records of poorly known species, and present several new elevational records. While our findings do not qualitatively alter the conclusions of previous studies of New Guinea's avian biogeography, new distributional information provides a more solid

basis for understanding the biogeography, diversification and community assembly of New Guinea's montane avifauna.

Methods

Surveys were conducted in the YUS Conservation Area (YUS CA, named after the Yopno, Urawa and Som Rivers) in Morobe Province. The YUS CA is Papua New Guinea's first recognised Conservation Area, a formally gazetted national designation given to lands pledged for conservation by traditional landowners (Fig. 1). The region is located between 05°45'–06°20'S and 146°30'–147°00'W. It protects c.76,000 ha of primary humid forest along an elevational gradient from the north coast to alpine heathlands and grasslands at 4,020 m in the Saruwaged Range. Field work took place in October–November 2009 and in June–July in 2010, 2011 and 2012, with a total of c.300 person-days.

We conducted our principal field work along an elevational transect through primary humid forest at 135–3,050 m (see Table 1 for locality information). Twenty-five 1-km trails were cut along contours at intervals of 120–200 m in elevation. We conducted aural censuses and extensive mist-netting along each trail. Aural censuses followed the Variable Circular Plot distance sampling methodology (Beehler *et al.* 1995, Beehler & Mack 1999, Camp & Reynolds 2009). Six census points were established along each contour track at 200-m intervals. A ten-minute sound census was conducted at each point and repeated twice each day for three days. Mist-netting surveys consisted of 36 12-m mist-nets arrayed over 600 m of each 1-km contour trail, and operated for 2.5 days per site (see Table 1 for mist-net effort). Captured individuals were weighed, measured (wing, tail, culmen, tarsus), scored for moult and photographed. We also took blood samples from the brachial vein from the majority of captured individuals. To identify previously captured individuals, we clipped the distal portion of the right three outer rectrices, permitting easy diagnosis of recaptures during the same season. We augmented our quantitative surveys with qualitative observations during the course of field work. Sound-recordings by BMB, BGF & AMC have been archived at the Macaulay Library of Natural Sounds at the Cornell Lab of Ornithology, Ithaca, NY, while georeferenced distributional data have been archived in the Avian Knowledge Network via eBird.

Results

To date we have recorded 267 species in the YUS CA, mist-netted 4,901 individual birds and vocally censused an additional 10,800 individuals over four field seasons. Here, we report novel distributional data for 47 species, including range extensions, elevational records, demographic data and new records of species poorly known in New Guinea. More detailed analyses of community composition will be presented elsewhere.

BLACK-MANTLED GOSHAWK *Accipiter melanochlamys*

Recently discovered on the Huon Peninsula, with sight records (Coates 1985) and a specimen collected from the YUS CA in 2001 (B. Benz, University of Kansas Natural History Museum, KU95811). Uncommon in montane forest in the YUS CA at c.1,700–3,000 m (BGF, ST photographs), we mist-netted three individuals at 1,790 m, 2,180 m and 2,420 m. We observed three other individuals, one as low as 1,090 m (BGF & AMC sighting, 15 July 2011).

MEYER'S GOSHAWK *Accipiter meyerianus*

We present the first record of this large montane goshawk for the Huon Peninsula (Beehler *et al.* 1986). BMB, JLM & ST observed an adult vocalising and giving a display flight for more

TABLE 1

Location of study sites in YUS for surveys conducted in 2009–12. Abbreviations for type of census: A = aural census using Variable Circular Plot method, M = mist-net sampling, O = qualitative auditory and visual observations. Further information detailing survey methodology for both mist-net and aural censuses is presented in Methods. All mist-nets used were 12 m in length.

Site name	Elevation (m)	Latitude	Longitude	Type of census	Mist-net hours	Years
Nanaiya 2 Camp Bottom	143	05°55'31.6"S	146°52'88.4"E	M, A	1,004	2012
Nanaiya 2 Camp Lower	230	05°55'80.6"S	146°52'275"E	M	1,096	2010
Nanaiya 2 Camp	258	05°55'89"S	146°52'11.8"E	M, A	1,452	2012
Nanaiya 2 Camp Upper	300	05°56'48.8"S	146°51'93.5"E	M, A	1,196	2012
Nanaiya 1 Camp	390	05°57'048"S	146°51'535"E	M	1,082	2010
Baiks Camp	610	05°55'864"S	146°49'769"E	M	1,102	2010
D'Kina Camp	620	05°57'10.6"S	146°52'40.7"E	M, A	1,536	2012
Waganon Camp	750	05°57'55.4"S	146°52'076"E	M	1,056	2011
D'Kina Camp Upper	808	05°57'69.2"S	146°52'56.1"E	M, A	1,364	2012
Gutganaknon Camp	910	05°57'593"S	146°50'551"E	M	1,099	2010
Waganon Camp Upper	1,000	05°58'60.9"S	146°52'48.7"E	M, A	857	2012
Sombom Camp Lower	1,090	05°58'983"S	146°52'341"E	M	1,067	2011
Sapmanga Village	1,100	06°04'35.30"S	146°49'17.11"E	O	NA	2010, 2011
Gormdan Village	1,250	06°03'2.21"S	146°49'1.96"E	O	NA	2009, 2010, 2011
Langmang Camp	1,360	05°58'207"S	146°49'484"E	M	1,084	2010
Sombom Camp	1,510	06°00'152"S	146°52'910"E	M	1,098	2011
Sombom Camp Upper	1,660	06°00'852"S	146°52'587"E	M	1,035	2011
Kolmit Camp	1,790	05°58'639"S	146°49'810"E	M, A	1,089	2010
Kolmit Camp Upper	1,900	05°58'848"S	146°49'742"E	M	724	2011
Gamben Wagain Lower	2,040	05°59'310"S	146°49'839"E	M	1,017	2011
Camp 11 (Gamben Wagain)	2,150	06°00'13.7"S	146°49'25.9"E	M, A	2,201	2010, 2011
CL 11.5 (Youngurong Camp Lower)	2,280	06°01'094"S	146°49'900"E	M, A	1,038	2010, 2011
CL 12 (Youngurong Camp)	2,420	06°01'642"S	146°50'328"E	M, A	1,065	2010
Boksawin Land	2,550	06°05'16.39"S	146°51'44.38"E	M	569	2012
Camp 13 Lower (Kotom)	2,700	06°03'44.5"S	146°52'34.8"E	M, A	760	2011
Camp 13 (Yabem Daron)	2,821	06°04'18.9"S	146°52'35.2"E	M, A	900	2011
Wasauon Camp	2,936	06°05'54.3"S	146°54'89.6"E	M, A	1,178	2011

than ten minutes on 6 June 2011 at 2,400 m above Boksawin village. Boksawin inhabitants reported this location to be a traditional nest site for the species. The vocalisation of this pale-morph adult was a forced *wih-i-yu*, with three calls given in four seconds.

PYGMY EAGLE *Hieraaetus weiskei*

New Guinea endemic, recently split from Australian Little Eagle *H. morphnoides* (Gjershaug *et al.* 2009), which was previously thought to be confined to elevations below 2,000 m (Beehler *et al.* 1986). BGF & AMC observed a soaring individual in good light for two minutes on 30 June 2011 at 2,420 m.

NEW GUINEA SCRUBFOWL *Megapodius affinis*

Widespread in lowlands of New Guinea, but previously unknown above 2,100 m (Beehler *et al.* 1986). We commonly observed it in montane forest in the YUS CA at 2,120–2,950 m (BMB sound-recordings at 2,950 m, 2010 and 2011). While we have not located any nest mounds in the YUS CA, local informants report that it nests commonly near sea level and in montane forest above *c.*2,500 m, but not at intervening elevations.

BRONZE GROUND DOVE *Gallicolumba beccarii*

Restricted to elevations above 1,200 m on mainland New Guinea (Baptista *et al.* 1997), it ranges far lower in the YUS CA, with individuals mist-netted as low as 390 m (AMC photograph). The presence of this small forest dove at low elevations is perhaps related to the apparent absence of several lowland dove species as yet unrecorded from the YUS CA (although reported for the Huon Peninsula by Coates 1985), including the medium-sized White-bibbed Ground Dove *G. jobiensis* (Diamond & LeCroy 1979).

PHEASANT PIGEON *Otidiphaps nobilis*

The previous highest-elevation record of this foothill species was 1,900 m (Beehler *et al.* 1986); BGF & AMC heard its distinctive two-note whistle at 2,050 m on 14 June 2011.

GOLDIE'S LORIKEET *Psitteuteles goldiei*

Known only from the Huon Peninsula by sight records presented by Coates (1985), BGF observed four in a flowering tree at 1,330 m on 11 July 2011 (BGF sound-recordings, video). This tree also attracted *c.*75 Little Red Lorikeets *Charmosyna pulchella*, 40 Red-collared Myzomelas *Myzomela rosenbergii* and a Pygmy Lorikeet *Charmosyna willhelminae*. On 20 July 2011, BGF & AMC observed and sound-recorded a flock of *c.*40 *P. goldiei* in a flowering tree at 1,600 m, with four Papuan Lorikeets *Charmosyna papou* and *c.*10 Little Red Lorikeets. These are our only observations of Goldie's Lorikeet despite months of field work at appropriate elevations, suggesting that the species is relatively uncommon in the YUS CA.

PYGMY LORIKEET *Charmosyna willhelminae*

Uncommon and probably overlooked throughout its ample New Guinea range (Beehler *et al.* 1986), BGF observed one in good light on 11 July 2011 in a flowering tree at 1,330 m (see Goldie's Lorikeet), foraging next to much larger Little Red Lorikeets *C. pulchella*.

BREHM'S TIGER PARROT *Psittacella brehmii*

Resident in the Central Ranges at 1,500–2,600 m, *P. brehmii* inhabits higher elevations in the YUS CA, from 1,750 m to at least 3,050 m, and is abundant at *c.*2,700–3,050 m (40 mist-netted individuals in 2011). This expanded elevational distribution is perhaps due to the absence on the Huon Peninsula of Painted Tiger Parrot *P. picta*, which replaces the present species above *c.*2,500 m in the Central Ranges (Diamond 1972). On more than ten occasions, BMB found the species foraging on the ground in forest interior for fruit or fallen flower buds.

PESQUET'S PARROT *Psittrichas fulgidus*

Threatened by hunting pressure throughout much of New Guinea and rare above 1,000 m, with a handful of records up to 2,000 m (Beehler *et al.* 1986). We observed it on a daily basis at 600–2,420 m in the YUS CA, a new high-elevation record for this distinctive New Guinea endemic.

CHESTNUT-BREASTED CUCKOO *Cacomantis castaneiventris*

A resident of hill forest at 500–2,300 m (Beehler *et al.* 1986), it ranges lower in the YUS CA. JLM mist-netted one individual at 250 m on 18 July 2012 and a second individual at 300 m on 23 July 2012 (JLM photographs).

RUFOUS-THROATED BRONZE CUCKOO *Chrysococcyx ruficollis*

Previously unknown from the Huon Peninsula (Beehler *et al.* 1986), we regularly heard the species in montane forest in the YUS CA between c.2,100 m and 3,000 m, where it appears to be an uncommon resident. JLM & ST mist-netted one at 2,850 m on 11 June 2011 (BMB photographs).

RUFOUS OWL *Ninox rufa*

This lowland species was previously known to occur only below 2,000 m (Marks *et al.* 1999). BGF & AMC observed and recorded one at our 2,150 m camp in June 2011 (e.g., AMC recording 22 June 2011). The species' vocalisation is a soft, low-pitched double hoot, *lu-lu*. This individual (or pair) frequently remained active until well after dawn (e.g., BGF observation of one vocalising in flight at 06.50 h on 26 June 2011). Additionally, AMC observed a Rufous Owl attempting to predate a mist-netted Rufous-backed Honeyeater *Ptiloprora guisei* at 07.45 h at 1,900 m on 20 June 2011.

PACIFIC SWIFT *Apus pacificus*

A rare winter visitor to the New Guinea region, recorded principally from the southern watershed of New Guinea during the boreal winter, in October–March (Beehler *et al.* 1986). We are aware of just one previous record from the Huon Peninsula—a sighting at Wasu Station in mid November (Coates 1985). AMC & BGF observed four of these distinctive large, fork-tailed swifts flying high in a flock of *Collocalia* sp. on the overcast afternoon of 10 July 2010 at 380 m. This is an unusual date, and suggests that some individuals may overwinter in New Guinea instead of returning to their Asian breeding grounds.

BLACK-BELLIED CUCKOO-SHRIKE *Coracina montana*

A resident of montane forest at 770–2,800 m, mainly found at 1,000–2,450 m (Coates 1990), JLM & ST mist-netted one at 2,850 m on 11 June 2011, and BMB additionally heard this canopy species at 2,800 m on 10 June 2011.

BLUE JEWEL-BABBLER *Ptilorrhoa caeruleascens*

Fairly common at 220–590 m, where 13 of the sexually monomorphic *P. c. neumanni* were mist-netted (AMC, BGF, JLM photographs; Coates 1990). Despite intensive mist-netting effort, we did not mist-net or observe Dimorphic Jewel-babbler *P. geislerorum*, which was formerly considered conspecific with Blue Jewel-babbler (Coates 1990). The absence of *geislerorum* from the YUS CA is somewhat surprising; it co-occurs with Blue Jewel-babbler in the Adelbert Mountains to the west and also on the northern slope of the Central Ranges in south-east New Guinea (Coates 1990), and might therefore be expected throughout the Huon Peninsula.

SPOTTED JEWEL-BABBLER *Ptilorrhoa leucosticta*

A montane species previously recorded up to 2,700 m (Boles 2007), BGF observed three individuals at close range at 2,900 m on 19 May 2012.

RUSSET-TAILED THRUSH *Zoothera heinei*

Few records of this rare foothill forest species from New Guinea, including several from the Adelbert Mountains and Huon Peninsula (Beehler *et al.* 1986). Previously considered conspecific with Scaly Thrush *Z. dauma* (Collar 2005). AMC & BGF mist-netted one at 1,360 m on 20 June 2010 (AMC photograph); this was the only individual captured despite intensive mist-netting at appropriate elevations.

PAPUAN SCRUBWREN *Sericornis papuensis* / **BUFF-FACED SCRUBWREN** *Sericornis perspicillatus*

Papuan Scrubwren, previously unknown from the Huon Peninsula (Beehler *et al.* 1986), was first found in the YUS CA in 2004 (J. Diamond pers. comm.). Subsequent surveys revealed it to be uncommon at 1,900–2,420 m, but abundant at 2,700–2,940 m (20–30 individuals mist-netted at high-elevation locations). Papuan Scrubwren's elevational distribution in the YUS CA overlaps with the similarly sized Buff-faced Scrubwren at c.1,900–2,500 m. Papuan Scrubwren differs strongly in its vocalisations from Buff-faced Scrubwren, and is distinguished by its brownish-buff (not grey) crown and forecrown, warm-brown (not buff-orange) face, dark subterminal tail-band and hazel-brown irides (AMC & BGF photographs). While Gregory (2007) stated that Buff-faced Scrubwren possesses a dark subterminal tail-band, we found this to be true in only 8% of mist-netted Buff-faced Scrubwrens ($n = 25$); most had plain brown tails completely lacking any dark banding. In comparison, 93% of mist-netted Papuan Scrubwrens ($n = 28$) had obvious dark subterminal tail-bands (AMC, BGF photographs). At least in the YUS CA, our data concur with Diamond's (1972) suggestion that the presence of a subterminal tail-band is helpful in distinguishing these two species.

BICOLOURED MOUSE-WARBLER *Crateroscelis nigrorufa*

Patchily distributed throughout foothill elevations of New Guinea, this species is restricted to a very narrow elevational belt (Beehler *et al.* 1986). We found Bicoloured Mouse-warblers in the YUS CA at 1,660–1,900 m, and they were abundant at 1,790 m, where we mist-netted 41 individuals (15% of all mist-net captures at this site). The local abundance of this generally rare species is surprising; in comparison, there are just 38 specimen records of Bicoloured Mouse-warbler from anywhere in New Guinea in the ORNIS database. Bicoloured Mouse-warbler is replaced at lower elevations by Rusty Mouse-warbler *C. murina* and at high elevations by Mountain Mouse-warbler *C. robusta*, although in the YUS CA it is sympatric with the latter at 1,790–1,900 m.

BLACK FANTAIL *Rhipidura atra*

Common throughout New Guinea's mountains at 700–3,200 m (mainly 1,000–2,150 m) (Boles 2006). AMC & BGF mist-netted a female-plumaged bird at 610 m in July 2010 (AMC photograph). It is also present at relatively high elevations in the YUS CA, e.g., JLM & ST mist-netted a male at 2,710 m on 15 June 2011 (JLM photograph) and BMB observed this species at 2,900 m on 19 October 2009.

YELLOW-BREASTED BOATBILL *Machaerirhynchus flaviventer* / **BLACK-BREASTED BOATBILL** *M. nigripectus*

Boatbills replace one another elevationally in New Guinea forests. Yellow-breasted Boatbill inhabits forests below 1,300 m and Black-breasted Boatbill those above 1,130 m (Coates 1990). Despite this general pattern, boatbills appear to be absent at c.1,000–1,300 m in many well-studied regions of New Guinea (Diamond 1972), and a similar gap may also exist in primary forest in the YUS CA. However, BMB & BGF observed singing male Yellow-

breasted and Black-breasted Boatbills within 0.5 km along a trail in secondary forest at, respectively, 1,000 m and 1,100 m on 6 June 2011. We suggest that, at least in secondary forest, these congeners occupy abutting elevational distributions in the YUS CA.

RUFOUS MONARCH *Monarcha rubiensis*

Known from the lowland forests of northern New Guinea, from the Bird's Neck to the headwaters of the Ramu River and Madang region, this species has not been previously recorded from the Huon Peninsula (Beehler *et al.* 1986, Coates *et al.* 2006). In July 2010, BGF observed an apparent female of this rarely seen bird at close range as it foraged with a noticeably smaller Hooded Monarch *M. manadensis* at 230 m. However, two bouts of mist-netting (2010, 2012) in appropriate lowland forest habitat failed to confirm the species' presence. This should be the target of future field work in the area, as it would constitute an important range extension across an important biogeographic boundary formed by the Ramu Basin.

SHINING FLYCATCHER *Myiagra alecto*

Widespread across New Guinea's lowlands, but we are unaware of documented records from the Huon Peninsula. It is uncommon at low elevations in the YUS CA, with five mist-netted at 220 m by BGF & AMC in 2010 (BGF photographs), and two additional individuals mist-netted at 250 m by JLM in 2012 (JLM photographs).

OCHRE-COLLARED MONARCH *Arses insularis* / **FRILLED MONARCH** *A. telescopthalmus*

Formerly considered conspecific, these taxa differ markedly in plumage and distribution (Coates *et al.* 2006). Ochre-collared Monarch inhabits tropical lowland forest in the northern watershed of New Guinea (Beehler *et al.* 1986), and is the common *Arses* in the YUS CA, being regularly mist-netted and observed daily below 800 m (AMC photographs). However, AMC & BGF identified a male Frilled Monarch at close range on 7 July 2010 at 230 m, by its pure white breast and head. Subsequently, at 390 m, AMC & BGF mist-netted a male *Arses* with a faint buff-coloured upper breast and head (BGF photographs), in sharp contrast to the rufous head / breast of the common Ochre-collared Monarchs. Two more pale-headed / breasted individuals were mist-netted by JLM & BMB in 2012 at 300 m (JLM photographs). These two taxa co-occur near Wasu Station, c.20 km east of the YUS CA, where they appear to partially segregate altitudinally, Frilled Monarch occurring principally at lower elevations (Coates 1990, Coates *et al.* 2006). Our observations of Frilled Monarchs at 230–390 m and Ochre-collared Monarchs at 230–1,200 m tentatively corroborate this hypothesised pattern. We additionally suggest that the three mist-netted male *Arses* with pale buff-coloured heads / breasts were hybrids; largely Frilled Monarch-like in phenotype but with some characteristics of Ochre-collared Monarch.

BLACK-THROATED ROBIN *Poecilodryas albouotata*

We present a high-elevation record of this montane species, which is typically found below 2,750 m (Coates 1990). JLM & ST mist-netted one at 2,940 m on 21 June 2011 (JLM, ST photographs).

ALPINE ROBIN *Petroica bivittata*

Patchily distributed in the Central Ranges but previously unknown from the Huon Peninsula (Beehler *et al.* 1986). D. Bishop & J. Diamond observed this distinctive species in montane forest at 3,000 m in the YUS CA on more than five occasions during their 2004 field

work (J. Diamond pers. comm.). In addition, BGF twice observed a small party in May 2012 at 2,900 m (BGF sound-recordings).

GREATER GROUND ROBIN *Amalocichla schateriana*

An enigmatic species previously known only from high montane forests in the Snow Mountains of east-central New Guinea and the Owen Stanley Range in south-east New Guinea (Beehler *et al.* 1986). We present the first record for the Huon Peninsula; BMB, JLM & ST mist-netted one at 2,710 m on 17 June 2011 (BMB photographs). Given the species' restricted distribution, our record is a major surprise. The bird had a black bill, brown irides, pink legs and appeared to be smaller than Central Range populations, with the following measurements taken in the field: wing chord (unflattened) = 94 mm, tarsus = 41 mm, tail = 68 mm, exposed culmen = 13.7 mm, weight = 54.7 g. All of these are outside the range of variation of the species' two known populations (Mayr & Rand 1937). Additional material may reveal the new population to be distinct from the two described subspecies.

LESSER GROUND ROBIN *Amalocichla incerta*

Common in the YUS CA at 1,660–2,420 m, BGF & AMC mist-netted a juvenile at 1,360 m on 20 June 2010 (AMC photographs). This record supports Diamond's hypothesis (1972) that juveniles tend to be distributed at the fringes of a species' elevational distribution.

REGENT WHISTLER *Pachycephala schlegelii*

Common in the YUS CA at 1,780–3,050 m, BGF & AMC mist-netted a juvenile at 1,360 m on 20 June 2010 (AMC photographs) This provides a second example of a juvenile observed well beyond the species' typical elevational distribution (Diamond 1972).

VARIABLE PITOHUI *Pitohui kirhocephalus*

Widespread in New Guinea's lowlands, the species is patchily distributed on the Huon Peninsula and largely absent from the Huon Gulf to Collingwood Bay (Beehler *et al.* 1986). In the YUS CA, it is common in forests at 140–750 m (AMC, BGF photographs). The closely related Hooded Pitohui *P. dichrous* generally replaces it at higher elevations, although both species occur syntopically in the YUS CA in a wide zone of overlap at c.140–750 m.

VARIED SITTELLA *Daphoenositta chrysoptera*

Previously known from the Huon Peninsula only from sight records presented by Coates (1990), AMC & BGF observed a flock of 8–10 individuals of both sexes on 9–10 June 2010, at our 2,150 m camp. On both dates, the flock was observed for 3–5 minutes foraging in the canopy, flying from tree to tree and calling incessantly. BMB observed small flocks at the same location in 2010–11, and we additionally observed flocks of 4–8 birds on three occasions in June 2011 in Gormdan village at 1,300 m.

RED-CAPPED FLOWERPECKER *Dicaeum geelvinkianum*

A lowland species generally found below 1,500 m, rarely to 2,350 m (Beehler *et al.* 1986), BMB observed and heard one singing at 2,420 m in forest interior on 12 July 2010.

SPOTTED BERRYPECKER *Melanocharis crassirostris*

Widespread and uncommon throughout the mountains of New Guinea (Beehler *et al.* 1986), it is fairly common in the YUS CA at c.1,700–2,300 m, where we frequently observed small groups in flowering trees. Despite this species' strong preference for the canopy, we mist-netted 11 in forest understory (nine females and two males; BGF photographs).

FOREST MELIPHAGA *Meliphaga montana* / **SCRUB MELIPHAGA** *M. albonotata*

These congeners exhibit consistent habitat preferences: Forest Meliphaga prefers primary forest while Scrub Meliphaga primarily inhabits secondary forest and disturbed landscapes, and is 'apparently absent in forest interior' (Higgins *et al.* 2008). However, we mist-netted both species syntopically in primary forest interior at 1,360 m in June 2010 (AMC, BGF photographs), and additionally mist-netted a Forest Meliphaga in young secondary forest near Gormdon village at 1,300 m on 8 June 2011. While the white-eared *Meliphaga* species generally segregate by habitat throughout New Guinea, these observations support Coates' (1990) observations that habitat preferences are not absolute.

CINNAMON-BROWED MELIDECTES *Melidectes ochromelas* / **HUON MELIDECTES** *M. foersteri*

Patchily distributed throughout New Guinea and previously considered restricted to a narrow elevational range at 1,100–1,800 m in the Huon Mountains (Higgins *et al.* 2008), Cinnamon-browed Melidectes is present at higher elevations in the YUS CA, where it is fairly common at 1,640–2,420 m (AMC photograph). The endemic Huon Melidectes *M. foersteri* replaces it in montane forests within the YUS CA at c.2,400–3,050 m, and presumably at higher elevations as well.

YELLOW-BREASTED BOWERBIRD *Chlamydera lauterbachii* / **FAWN-BREASTED BOWERBIRD** *C. cerviniventris*

These congeners are reported to co-occur only in the headwaters of the Ramu and Markham Rivers and near Dumpu along the Ramu River (M. LeCroy pers. comm.). We present the first record of Yellow-breasted Bowerbird from the Huon Peninsula (Beehler *et al.* 1986, Coates 1990). R. Jensen was shown the four-walled bower of this species at Worin village (c.1,500 m) in 2007, where local informants confirmed its presence in the Urawa drainage. BMB observed Fawn-breasted Bowerbirds at Sapmanga station (1,000 m) in 2009, and received reports of two-walled bowers of this species in this area, while Dono Ogate reported both two-walled and four-walled bowers near Yawan village (1,600 m) in 2009. Thus, both of these open-country bowerbirds apparently inhabit the YUS ecosystem, one of the few places where they co-occur.

LESSER BIRD-OF-PARADISE *Paradisaea minor* / **EMPEROR BIRD-OF-PARADISE** *P. guilielmi*

Distributed in the northern watershed of New Guinea, *P. minor* occurs 'irregularly to the northern slope of [the] Huon' (Beehler *et al.* 1986: 232). AMC & BGF observed females on several occasions in the YUS CA, identified by their brown mantle and diagnostic whitish underparts. We only observed this species at 220 m; at higher elevations it is replaced by the closely related *P. guilielmi*, which is common between 390 m and c.1,400 m. Raggiana Bird-of-Paradise *P. raggiana* is common in the north-east Huon Peninsula (Mayr 1931), and readily hybridises with *P. minor* where the two species' distributions overlap in the Ramu / Markham basin (Rand & Gilliard 1967). We therefore suggest that a Raggiana / Lesser hybrid zone is located east of the YUS ecosystem along the north coast of the Huon Peninsula.

MOUNTAIN DRONGO *Chaetorhynchus papuensis*

Common resident of New Guinea foothill forests at 600–1,600 m (Beehler *et al.* 1986) and as low as 200 m, this species is rarely recorded in lowland forests (Beehler *et al.* 1995, Coates 1990). We observed and mist-netted Mountain Drongo at 300–2,150 m (AMC, BGF,

JLM photographs). Additionally, we repeatedly mist-netted both Mountain and Spangled Drongos *Dicrurus hottentottus* in primary forest at 300 m, contradicting Beehler *et al.*'s (1986) assertion that the two species rarely occur together.

TORRENT-LARK *Grallina bruijui*

A distinctive inhabitant of fast-flowing creeks and rivers at 400–2,400 m (Beehler *et al.* 1986), BGF and AMC found small groups of Torrent-larks along the Sari River down to 280 m in the YUS CA. It remains unclear why Torrent-larks do not occur further downstream than this; the river remains fast flowing and rocky to at least 200 m, and the ecologically similar Torrent Flyrobin *Mouachella muelleriana* is present to at least 200 m.

Discussion

The Huon Mountains are considered to be relatively well surveyed by ornithologists (e.g., Mayr 1931, Rand & Gilliard 1967, Diamond 1985, Beehler *et al.* 1986, Coates 1990). However, our comprehensive surveys uncovered six additions to the montane avifauna (species largely distributed above 1,000 m) of the Huon Peninsula. While a relatively small number, these six additions represent a 6.9% increase in the known diversity of the Huon Peninsula montane avifauna, from 86 to 92 species (Coates 1985, Beehler *et al.* 1986, Coates 1990).

The montane avifauna of the Huon Peninsula is the product of colonisation from the Central Ranges (Diamond 1985). Separated by the lowlands of the Ramu / Markham Valleys, montane taxa on the Huon Peninsula have diversified in allopatry, producing five species and 24 subspecies endemic to the Huon Mountains (Coates 1985, Beehler *et al.* 1986, Coates 1990). An additional one species and five subspecies are shared endemics of the Huon and Adelbert Mountains, thought to represent cases of colonisation from one outlying montane region to the other (e.g., from the Huon Mountains to the Adelberts or vice versa; Pratt 1982, Diamond 1985).

Our records additionally provide insight into the lowland avifauna of the Huon Peninsula. This avifauna is depauperate compared to that of the adjacent lowlands of the Ramu Basin (Beehler *et al.* 1986). For example, we did not record Northern Cassowary *Casuarius unappendiculatus*, Victoria Crowned Pigeon *Goura victoria*, White-bibbed Ground Dove, Brown Lory *Chalcopsitta diuvenbodei*, Papuan Babbler *Garritornis isidorei*, Tawny Straightbill *Tineliopsis griseigula*, Twelve-wired Bird-of-Paradise *Seleucidis melanoleucus* and Trumpet Manucode *Manucodius keraudrenii* in the YUS CA, all of which regularly occur in lowland forests of the Adelbert region (Beehler *et al.* 1986). However, our records of Blue Jewel-babbler, Shining Flycatcher, Variable Pitohui and Lesser Bird-of-Paradise from the YUS CA—lowland species thought to be absent from the north slope of the Huon Mountains—demonstrates that biogeographical barriers between the Huon Peninsula and the nearby Ramu Basin are weaker than previously considered (Beehler *et al.* 1986) for lowland species. The coastal plain in the YUS CA is very narrow (c.3–4 km), typical of the northern fringe of the Peninsula. We suggest that the geometry of this c.250 km ribbon-like strip of lowland forest may have led to higher extinction and lower colonisation rates through time, possibly explaining the apparent absence of some species from lowland forests of the YUS CA and the generally patchy distributions of lowland species on the north slope of the Huon Mountains.

Biogeographical inference of diversification and community assembly.—Molecular studies are rapidly increasing our ability to infer drivers of speciation in New Guinean birds (Dumbacher *et al.* 2008, Irestedt *et al.* 2009, Nyári *et al.* 2009, Jönsson *et al.* 2010, Deiner *et al.* 2011, Driskell *et al.* 2011). However, inferring mechanisms of diversification

from distributional data (Diamond 1973, Diamond 1986) continues to remain workable, especially in the absence of phylogeographic and population genetic data.

The geographical distributions of many genera of New Guinea lowland birds show patterns of allopecies occupying different regions of the island (e.g., northern vs. southern watershed; Beehler *et al.* 1986, Diamond 1986). Speciation in these systems is inferred to occur allopatrically due to the isolating effect of vicariant barriers, a hypothesis recently supported by a detailed phylogeography of a polytypic New Guinea lowland bird (Deiner *et al.* 2011). Our discoveries of Lesser Bird-of-Paradise in the YUS CA (with the closely related Raggiana Bird-of-Paradise known from the north-east Huon Peninsula and the Ramu / Markham basin), co-occurrence of and possible hybridisation between Ochre-collared and Frilled Monarchs, and both Yellow-breasted and Fawn-breasted Bowerbirds in the YUS CA demonstrate that the Huon Peninsula is an important zone of secondary contact for allopatric lowland taxa, as suggested by Mack & Dumbacher (2007). The importance of the Huon Peninsula and Ramu / Markham Basin as a driver of diversification in the lowland avifauna of New Guinea is further supported by subspecific taxonomy; 28 widespread lowland species exhibit subspecific breaks on or near the Huon Peninsula, most of which are represented by one subspecies on the Huon Peninsula, Markham Valley and adjacent Central Ranges, and by a different subspecies in the Adelbert Mountains and Ramu Basin (Mack & Dumbacher 2007).

Diamond (1972) observed that many New Guinea bird species exhibit patchy distributions. He hypothesised that local extinctions of montane taxa along the continuous Central Ranges occurred stochastically in small populations and provided the isolation necessary for divergence and speciation to occur. Diamond used the disjunct distributions of New Guinea montane species, including Greater Ground Robin, as evidence for this hypothesis. Our discovery of Greater Ground Robin in the highland forests of the Huon Peninsula is biogeographically surprising, as the species is currently unknown from apparently suitable habitat in the Central Ranges adjacent to the Huon Peninsula. We suggest that patchy distributions of montane taxa represent a form of the 'drop-out' phenomenon described by Diamond (1972), but that this pattern is likely to be the result of complex and dynamic histories of colonisation and extinction driven by climatic cycles and biotic processes rather than by stochastic local extinctions.

Competition between closely related species is thought to play an important role in structuring avian communities in New Guinea (Diamond 1973, Diamond 1986). This hypothesis is supported by distributional patterns of elevational replacements, where closely related species (usually congeners) inhabit abutting distributions along an elevational gradient. We recorded numerous examples of this phenomenon in the YUS CA, including many genera with sequences of three elevational replacements (e.g., *Crateroscelis*, *Melidectes*). While the 'middle' taxon of these 'trios' is often patchily distributed throughout New Guinea (Diamond 1972), we found 'middle' taxa to always be present in the YUS CA and in some cases to be more abundant (Bicoloured Mouse-warbler) or to occupy a wider elevational distribution (Cinnamon-browed *Melidectes*) compared to the adjacent Central Ranges.

The importance of interspecific competition to the maintenance of parapatric range borders in species that replace one another elevationally is supported by examples of enlarged altitudinal distributions in the absence of a competitor (usually congeneric). Diamond (1973) illustrated this phenomenon by comparing the elevational ranges of Rufous-backed Honeyeater *Ptiloprora guisei* in the Huon and Central Ranges. This species is resident at c.1,700–2,500 m in the Central Ranges, replaced above 2,500 m by its close relative Black-backed Honeyeater *P. perstriata*. Black-backed Honeyeater is absent in the Huon

Mountains, however, and Rufous-backed Honeyeater expands its climatic niche, inhabiting a broad elevational zone at c.1,660–3,500 m (higher than the scope of our studies in the YUS CA) in the Huon Peninsula. We comment on two additional examples of climatic niche expansion in the absence of a congener on the Huon Peninsula. First, Brehm's Tiger Parrot *Psittacella brehmi* is present at c.1,700–2,500 m in the Central Ranges where it co-occurs with the closely related Painted Tiger Parrot (c.2,500–3,200 m). Brehm's Tiger Parrot inhabits a wider distribution—from 1,750 m to at least 3,000 m—in the YUS CA, and is abundant at high elevations (2,500–3,000 m). As first suggested by Diamond (1972), this scenario may reflect niche expansion of Brehm's Tiger Parrot on the Huon Peninsula due to the absence of its competing congener. Similarly, the normally montane Bronze Ground Dove inhabits lowland and foothill forests in the Huon; while more tentative, this elevational expansion is perhaps associated with the apparent absence of several lowland ground dove species in the YUS CA.

Conclusion

We completed a comprehensive survey of the avifauna of the YUS CA in the Huon Mountains of New Guinea, using both mist-netting and aural censuses between 135 m and 3,050 m. The new information regarding avian distributions in New Guinea garnered during our field work implies that current knowledge remains incomplete, but confirms the important role of the Huon Peninsula in the diversification of both the island's lowland and montane avifaunas. Our distributional records reveal that the montane avifauna of New Guinea continues to be an excellent system in which to investigate biogeography, diversification and community assembly. Our many elevational records may suggest that some species are expanding their distributions upslope in response to climate change. We recommend further biodiversity surveys of New Guinea's montane regions, with collecting to document plumage variation and facilitate identification of difficult groups (e.g. *Meliphaga*), and continued monitoring of bird populations to investigate the possibility that species range boundaries are shifting in response to climate change. Finally, we recommend field surveys in all under-surveyed mountain regions using large arrays of mist-nets (>35) deployed at many elevational intervals, complemented by aggressive sound-recording by individuals knowledgeable with New Guinea bird song.

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An unusual record of Quebracho Crested Tinamou *Eudromia formosa* from the dry Chaco of Paraguay, with comments on distribution, breeding and vocalisations of the species

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SUMMARY.—An unusual record of Quebracho Crested Tinamou *Eudromia formosa*, found dead on the roof of a building with an egg partially extruding from its cloaca, is reported. A description of the egg and morphometric data for the specimen are provided. We also present details of field observations and vocalisations of this little-known species in both Paraguay and Argentina, while its distribution in Paraguay, Argentina and Bolivia is clarified.

Of the two species of 'crested tinamou' in the genus *Eudromia*, only Quebracho Crested Tinamou *E. formosa* occurs in Paraguay (Davies 2002, Clay & del Castillo 2004). It is a Chaco endemic (Short 1975) of semi-open areas adjacent to dense, xerophytic, thorny forest with open or dense undergrowth. Clay & del Castillo (2004) considered the species scarce in the Alto Chaco of Paraguay, but our observations suggest that it is fairly numerous in the most arid regions of the northern Chaco, beyond km 620 of the Ruta Trans-Chaco. The Paraguayan population was formerly separated as *E. f. mira* (Short 1975, Banks 1977) on account of its browner plumage and broader but less well-defined shaft-streaks on the upperparts. However, subsequently the species has been usually treated as monotypic (Blake 1977, Navas & Bó 1981, Davies 2002), although Cabot (1992) hesitantly recognised *mira*, while noting confusion concerning the overlap zone and that *E. formosa* may 'better be considered monospecific'.

Distribution

In Paraguay, *E. formosa* is more numerous in the driest areas of the Alto Chaco (dpto. Boquerón). It is recorded regularly between Parque Nacional Agripino Teniente Enciso and Parque Nacional Médanos del Chaco, where small groups are commonly seen on roads during late afternoon, but much less frequently further south, with the southernmost observation by the authors at Fortín Toledo (22°19'S, 60°21'W). This area lies outside the range mapped by Short (1975) and more recently Echarri *et al.* (2008), who both consider the Central Chaco (a highly modified area of succession from Humid to Dry Chaco habitat) as the focal point of the species' Paraguayan range. Echarri *et al.* (2008) modelled the distribution of *Eudromia* tinamous and compared the results with published data, concluding that the two corresponded well, leading to the conclusion that *E. formosa* occurs in warmer and wetter areas than Elegant Crested Tinamou *E. elegans*. However, their analysis did not include the information in Guyra Paraguay (2005), which most accurately maps the species' known range in Paraguay and reveals a distinct preference for the most arid parts of the Paraguayan Chaco.

Field observations over several years by the authors suggest that the species is rare in the Central Chaco (heard just once there by PS in seven years of intermittent field work) and that this area probably represents the eastern limit of the species' Paraguayan

range (Guyra Paraguay 2005), it becoming more numerous farther north and west in the Paraguayan Chaco. The discrepancy between published sources and our data probably represents a historical lack of observer effort in the northern Paraguayan Chaco which was, until recently, relatively inaccessible to visitors, or a recent shift in the species' range due to extensive agricultural activity in the Central Chaco since the arrival of the Mennonites in the 1930s and / or climatic changes.

In northern Argentina, the species occurs in eastern Salta, northern Santiago del Estero, western Formosa and western Chaco provinces (MP pers. obs.), having also been collected historically in Tucumán (Olrog 1959), where it is now believed extinct (F. Moschione pers. comm.). Mention (without evidence) of 9 de Julio department in north-western Santa Fe (Giai 1950), if correct, may also reflect the species' former range.

In Bolivia the species was observed in dpto. Tarija in 1973 (J. R. Mata *in* Olrog 1979; J. R. Mata pers. comm.) and a chick initially identified as *E. elegans* (Banks 1977) was thought more likely to be *formosa* by Remsen & Traylor (1983, 1989). *E. formosa* was not listed for Bolivia by Hennessey *et al.* (2003) but was included among those species requiring confirmation, jointly with *E. elegans*. Fernández *et al.* (2009) summarised modern records from Bolivia, including new localities in Tarija and Gran Chaco.

Unusual specimen record

On 11 July 2006, a freshly dead adult female Quebracho Crested Tinamou was found on a low (c.3 m high) sloping roof at the Parque Nacional Agripino Teniente Enciso (21°15'S, 61°40'W) headquarters, immediately adjacent to a perpendicular brick wall. The bird was



Figure 1. Ventral view of dead Quebracho Crested Tinamou *Eudromia formosa*, showing the lime-green egg, Parque Nacional Teniente Agripino Enciso, Paraguay, 11 July 2006 (Paul Smith)

well preserved, though fly larvae were present on a small area of the right thigh, and it was estimated to have been dead no more than 36 hours.

In the days prior to the discovery, Parque Nacional Agripino Teniente Enciso had experienced high, hot winds from the north, presumably sufficient to affect the maneuverability of an airborne tinamou. Tinamous are incapable of sustaining their initial burst of powerful flight due to a small heart (0.19–0.25% of total body weight) providing insufficient blood flow to the well-developed pectoral muscles (Davies 2002). The dead bird was c.1 m from the wall, with the ventral surface face down and neck extended. An examination of the corpse revealed no visible head injuries or broken neck or wing bones that would be consistent with a collision with a hard surface, nor any signs of predation. A uniform lime-green egg half-protruded from the cloaca. Tinamous are known to occasionally 'drop eggs' under stressful conditions such as capture (R. Clay pers. comm.) and it is probable that the egg's appearance in this case was a stress response. Lime-green and ovoid, the egg was partially broken, with liquid yolk and albumen still present. It measured 36 mm at its widest point (which was still intact) and overall length was estimated at c.65 mm, although the largest fragment was only 51 mm. This is longer and narrower than published measurements for eggs of *E. elegans*: 57.1 mm (± 0.97) \times 39.4 mm (± 0.45) (Davies 2002).

De la Peña (1978) provided measurements of approximately 53–55 \times 40–41 mm for Quebracho Crested Tinamou, and described a clutch of up to 11 lustrous yellowish eggs. However, it seems probable that these were sun-bleached, and the dimensions so closely match those of Elegant Crested Tinamou that these data are probably best treated with caution. It also is noteworthy that de la Peña (1978) included north-west Santa Fe, Argentina, within the range of Quebracho Crested Tinamou, whereas *Eudromia* specimens collected there pertain to *E. elegans magnistrata* (Ordano & Bosisio 1997). Otherwise the only published data concerning the eggs of *E. formosa* come from Steinbacher (1962) who, quoting the renowned Mennonite collector J. Unger, stated that the eggs are green and clutch size is 7–9 eggs. He added that the nest is 'normally located near the road', though this presumably reflects the ease in finding nests located close to roads as opposed to those in thorn forest.

Dissection of the specimen revealed no additional eggs within the oviduct. Steinbacher (1962) mentioned two females collected in Paraguay by Unger in November 1955 with well-developed gonads and declared this to be indicative of the species' breeding season. However, a male collected on 13 March 1957 also had well-developed gonads and Unger collected a 'partly grown immature female' in December (year unknown: Short 1976). Adding our record from July (midwinter in Paraguay) and the fact that warm year-round temperatures in the Chaco permit non-seasonal breeding for some species adapted to xerophytic conditions, it appears that breeding occurs throughout the year in Paraguay. Cabot (1992) noted that birds collected in February in Argentina were in breeding condition and a bird taken 60 km north of Fuerte Esperanza, dpto. General Guemes, Chaco, Argentina, in August had an egg in its oviduct, supporting the possibility of year-round breeding elsewhere in the species' range.

Due to permit constraints the specimen was not collected so we include here a plumage description, a photograph of the bird (Fig. 1) and morphometric data for this little-known, range-restricted species.

Measurements.—(Data in parentheses concern females collected in Paraguay, from Blake 1977): bill from gape to tip 37 mm; exposed culmen 25 mm (27.0–32.5 mm, mean 28.5 mm, $n = 4$); head and bill from nape to bill tip 60 mm; bill depth at middle of nares 8.5 mm; bill width at nares 8.5 mm; bill tip to nares 14 mm; tarsus 55 mm (48–53 mm, mean 50.5 mm,

$n = 2$); middle toe 27.5 mm; wing chord 210 mm (flat wing 211–229 mm, mean 217.3 mm, $n = 6$); crest to base of bill 67 mm.

Vocalisations

During field work at Parque Nacional Agripino Teniente Enciso, dpto. Boquerón, on 2–29 July 2006, the species was recorded daily by sight or aurally. Birds were most frequently encountered in small groups of up to four, although singles were occasionally seen. They vocalised throughout the day, especially in the early morning (c.06.30–08.00 h) and late afternoon (c.16.30–18.00 h). Steinbacher (1962) stated that the species can often be heard deep into the night and our field work in Paraguay supports this. In Argentina the species has been heard vocalising up to 40 minutes before dawn and after dusk during the austral spring (MP pers. obs.). We distinguished five different vocalisations:

Advertising call.—A slow, descending double-whistled *foooo-ip foo-ip*, the first part more drawn-out. Occasionally a third, quieter *foo-ip* is added. Given most frequently at dawn and dusk, and only sporadically throughout the day. The most frequently heard of all vocalisations, with individual singing bouts sometimes lasting 30+ minutes. A recording is available at www.xeno-canto.org (XC15601). A variation or different dawn voice is *foooooo-ip fup-fup-fup-fup-fup-fup* with a flatter succession of up to six final notes at a rate of two per second. At dusk gives a variant *foooo fp-fp*.

Contact call?—A double or triple, falsetto *fee-fee* or *fee-fee-fee*, resembling but slightly lower than a common vocalisation given by Purple-throated Euphonia *Euphonia chlorotica*. Given most frequently in the middle of the day for short periods. Similar and perhaps analogous to that on Hardy *et al.* (1995), although the calls we heard were slightly lower pitched and more even in tone.

Alarm call?—An explosive, triple *POO-IT POO-IT POO-IT* resembling the advertising call in form, but differing in its rapid, explosive delivery. Heard only once, the source of the presumed threat was not apparent.

A single rising falsetto *foo-WEE* of uncertain significance heard only once, at 11.00 h on 24 July at Parque Nacional Agripino Teniente Enciso.

Roosting call.—At dusk a melodic liquid *fLI-la-lu* may be delivered 2–3 times with five-second pauses between each phrase, followed immediately by a somewhat lower pitched (by c.1 octave) *fLU-la-lu* also delivered up to three times. Possibly, this voice is an antiphonal duet and sexually dimorphic, perhaps also serving as a signal between birds going to roost.

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Early grasswren specimens in Muséum national d'Histoire naturelle, Paris, and the types of Western Grasswren *Amytornis textilis* (Maluridae)

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SUMMARY.—The first described specimen of Western Grasswren *Amytornis textilis* was not lost at sea but reached the Muséum national d'Histoire naturelle in Paris, where it was written up by its collectors. Authorship has been attributed to Dumont, but examination of the circumstances reveals that Quoy and Gaimard were responsible for its name and published details. The specimen was checked again in MNHN in 1992, but is currently mislaid. It is shown to be one of three syntypes; the others were collected earlier by the Expédition Baudin in 1801 and 1803. One of three further *Amytornis* specimens in Paris represents a subspecies of Western Grasswren *A. t. uyyall* that was collected >30 years before the first published record of that form. Another is a Thick-billed Grasswren *A. modestus* probably of the extinct subspecies *inexpectatus*. The third, a Thick-billed Grasswren of the extinct nominate subspecies, is one of the first two specimens and was previously thought to have been lost.

It has been widely assumed that the specimen material from which the first known species of Australian grasswren was described, the Western Grasswren *Amytornis textilis*, had perished at sea (Whittell 1954, Schodde 1982, Rowley & Russell 1997, Black 2011a). Along with the first specimen of White-winged Fairy-wren *Malurus leucopterus* Dumont, 1824, from Dirk Hartog Island nearby, it was taken by the surgeon-naturalists J. R. C. Quoy and J. P. Gaimard at Shark Bay, Western Australia, in September 1818 on L. C. D. de Freycinet's *Voyage autour du Monde* in the corvette *L'Uranie*. The *Uranie* was wrecked in the Falkland Islands on the return to France, and much of the zoological material was lost. It included, according to Quoy & Gaimard (1824), probably 8–10 new species of Australian birds. Among them was the specimen of White-winged Fairy-wren (Dumont 1824) but no mention was made of the fate of any specimen of the 'Mérion natté' as these naturalists called the grasswren.

Quoy & Gaimard (1824) measured and figured the 'Mérion natté', presumably in the field just as they had the fairy-wren; and it was presumed to have been on that information alone that the grasswren was described by C. H. F. Dumont (Dumont 1824). In the original description, however, Dumont mentioned another specimen with a deformed bill in the 'Muséum de Paris' and one that was darker. Quoy & Gaimard (1824) did likewise in their account of the zoology of the voyage, and went further, noting that naturalists on the earlier French Expédition Baudin in 1801–03 had also recorded grasswrens, but without illustrating them. We reviewed the earliest writings on the species, and examined all available grasswrens in the Muséum national d'Histoire naturelle (MNHN), Paris, as well as related documentation to determine the material upon which the Western Grasswren was based and the authority for its name.

Results

The earliest descriptions.—Mathews (1917) showed that *Amytornis textilis*, as *Malurus textilis*, was first published by Dumont in vol. 30, p. 117 of the *Dictionnaire des sciences naturelles*. It appeared before 29 May 1824, several months in advance of its publication by Quoy & Gaimard on 28 August 1824 (description) and 18 September 1824 (plate) in the write-up of the zoological findings from de Freycinet's 1817–20 *Voyage autour du monde* (Quoy & Gaimard 1824). Since that time it has been presumed that Dumont is the author of *Amytornis textilis*. What Mathews appears not to have understood or to have made clear is that its name and that of the White-winged Fairy-wren, and their descriptive details, were furnished entirely by Quoy & Gaimard. Dumont, who worked in friendly collaboration with them (Mathews 1917), explicitly attributed both scientific names to them, quoted the figures of each species (albeit with the numbers transposed) from the forthcoming atlas (zoologie) of de Freycinet's *Voyage*, and took all of his descriptive data from Quoy & Gaimard's text in that work.

Aspects covering the appearance and habits of both species, even the grasswren with a deformed bill, are exactly the same in both Dumont's and Quoy & Gaimard's accounts. Many of the phrases and clauses are identical, even sentences. As examples, we quote 'La même disposition existe sur la tête, qui est un peu plus brune, et sur le dos, où chaque plume a une ligne d'une blanc sale au milieu' under *Amytornis textilis* and 'les ailes sont blanches dans leur moitié antérieure, et brunâtres à leur extrémité' under *Malurus leucopterus*. There are differences in the order and wording of descriptive details, but the editorial requirements of the *Dictionnaire* appear to be responsible for this. Evidently all Dumont had done, as a compiler of avian sections for the *Dictionnaire*, was to copy across, with editorial amendment, Quoy & Gaimard's forthcoming accounts of the two new species so that he could complete his own review of the known species of 'Mérion' (Australian wrens) for the *Dictionnaire*. As acknowledged providers of both names and the substance of the descriptive text that makes those names available, Quoy & Gaimard are thus the correct authors of *Malurus textilis* and *M. leucopterus* under Art 50.1.1 of the *International code of zoological nomenclature* (ICZN 1999), hereafter the Code.

Whatever the fate of material of *Amytornis textilis* collected on the voyage of *L'Uranie*, it is clear from its original description in Dumont (1824), and in Quoy & Gaimard's (1824) subsequently published version in de Freycinet's *Voyage autour du monde*, that all authors had at least three specimens available to them in Paris. These specimens are (1) the specimen said to have a very sharp, hook-tipped maxilla, (2) another of darker plumage, and (3) the specimen described in some detail, more than could be expected from field notes, and apparently also figured as no. 1 on Pl. 23 of the zoological atlas of de Freycinet's *Voyage*. As was then current practice, no types were designated, and although it appears that *M. textilis* was described from just one specimen (the third), this is not specified and the text includes the others as examples of the species and basis for the name. Given that Quoy & Gaimard (1824) referred to at least two Expédition Baudin specimens in their account, they would have been before them when preparing their descriptions and would qualify as syntypic. We treat all three as syntypes, cf. Art. 72.1.1, 73.1.2, Recommendation 73F of the Code.

Catalogue of grasswrens (Amytornis) in MNHN Paris.—The Gallery Catalogue of mostly mounted specimens contains the following entries:

10695 *Amytis* [25-12, G3] *textilis* Less [added later, = Lesson] (type) (Quoy et Gaim) Nelle.

Hollande Quoy et Gaimard 1820-157. Rapport au laboratoire.

10696 *Amytis textilis* (Quoy et Gaim). Mer du Sud. Exp de Baudin. Lessueur (*sic*) An 11.

10697 *Amytis (macrourus) macrura* (Gould). Nelle. Hollande. Péron et Lessueur (*sic*) An 12.

10697A *Amytis striata* (Gould) Australie Mérid. CG 1879-714.

10697B *Amytis striata* (Gould) Australie Mérid. CG 1879-715.

The Catalogue Général, which was intended to list all specimens in the collection, has the following entries:

1879-714 *A. striatus* don de Musée d'Adelaide GO 10697A—see above.

1879-715 *A. striatus* don de Musée d'Adelaide GO 10697B—see above.

1879-716 *A. textilis* don de Musée d'Adelaide HO 3.

1897-489 *A. textilis* HO 3.

Survey of specimens of grasswrens (Amytornis) in MNHN Paris.—The ensuing specimens and their details are identified by reference to their respective catalogue numbers above but named according to our present identification. Measurements of bill = length (total culmen to skull insertion) × depth (at level of frontal feathering), of wing = flattened chord, and of tail = central rectrices from tip to base.

GC 10695. *Amytornis textilis textilis* (Quoy & Gaimard). This specimen, catalogued as 'type', appears to be the primary subject of Quoy and Gaimard's descriptions of this species (Dumont 1824, Quoy & Gaimard 1824) and of Fig. 1, Pl. 23 of the zoological atlas of de Freycinet's *Voyage autour du monde*. It is evidently a (or the) specimen collected on that voyage and clearly was not lost at sea as had been presumed. In 1992 it was examined in MNHN by RS, who made the following notes: 'type 34: *Amytis textilis* Dumont (as Q&G = Quoy and Gaimard, naturalists on the 'Uranie'). Female; Uranie: Australie: Oct? (as X) 1820. A tail-less female. MNHN mount & reg. no. 10695: wing 64 mm, tail -, bill -: ID correct; breast markings not strong; female correctly sexed.' Since its description it has lost its tail. A search of the MNHN collections in late 2011 failed to locate the specimen; thus we consider it mislaid.

GC 10696. *Amytornis textilis textilis* (Quoy & Gaimard). A mount showing loss of feathers and fading from long exposure. It is relatively pale above and below for *textilis* and shows little if any ventral streaking. Most rectrices are missing; the maxilla is long, pointed and hooked, and the mandible broken. Bill 13.3 × 3.7 mm (artefactually low), wing 62.9+ mm (not stretched), tail incomplete. On the socle is written: '10696. 19 C Expedition de Capitaine Baudin. An 11 [= 1802–03, see Discussion]. B 21 6? le Naturaliste par Mr Lesueur. *Amytis textilis* Q&G Australie. Trait Orn. (1831) p. 454 pl. 67 fig. 2, Bonaparte, Gould pl. 29.' This specimen, collected on the Expédition Baudin and a male by plumage, is almost certainly that quoted by Quoy and Gaimard as having a pointed and hooked bill (Dumont 1824, Quoy & Gaimard 1824).

GC 10697. *Amytornis textilis textilis* (Quoy & Gaimard). A mount with damaged plumage and detached legs. It resembles 10696 in tones, faded, with little evident ventral streaking; the bill is badly damaged. Bill ? × 3.7 mm (artefactually low), wing 63.7+ mm, tail 89.5 mm. On the socle is written (in a different hand from that on 10696): 'An 12 [=1803–04]. Exp. de decouvertes Australie Exp. Baudin. *Amytis macrura* (Gould). Monte par Mme Dufresne.' This specimen, which lacks rufous breast-side patches and is therefore male, could have been the darker specimen mentioned in Dumont (1824) and Quoy & Gaimard (1824) but it has faded badly from exposure over time. Collected on the Expédition Baudin, it would have been available to Quoy & Gaimard when describing *Malurus textilis*. Given the collectors, the attribution to *Amytis macrura* Gould, not described until 1847, is meaningless.

GC 10697A = CG 1879-714. Specimen not located.

GC 10697B = CG 1879-715. *Amytornis modestus inexpectatus* (Mathews, 1912). A mount in fair condition and showing slight rufous tones over the crown and upper dorsum. It is pale and unstreaked below; the bill is rather pointed, mandible profile straight and excessively closed, presumably damaged at its base. Bill 12.2×3.2 mm (artefactually low), wing 58.9 mm, tail 68.9 mm. The base of the sole bears 'S Australie *Amytis striata* (Gould) 1879. No 715 Cat. Gen. Musee de Sydney (*sic*). RG.' This male (rufous breast-side patches absent) is misidentified as *A. striatus* (Gould); its probable identity is assessed below (see Discussion).

CG 1879-716. *Amytornis textilis myall* (Mathews, 1916). A study skin in good condition, dark with moderate ventral streaking, orange-rufous breast-side patches (= female) and bilaterally compressed bill. Bill 13.2×5.8 mm, wing 62.1 mm, tail 72.1 mm. Female by plumage. Label data: 'Sp. 198 *Amytis textilis*. S. Austr.' Label 2: '*Amytis textilis* CG 1879 No. 716, S. Australie'. Receipt of this specimen by MNHN is remarkable, as explained in the Discussion below.

CG 1897-489. *Amytornis modestus modestus* (North, 1902). A study skin in good condition, moderately dark above, almost unstreaked below, and bill bilaterally compressed. Bill 12.0×5.9 mm, wing 63.5 mm, tail 82.9 mm. Label data: '48 D female.' Label 2: '*Amytis textilis* Australie central Expeditn Horn. Envoi du Musee de Melbourne. 1897-489'. Receipt of this specimen by MNHN, one of the 'lost' Horn Expedition specimens of *Amytis modesta*, is as remarkable as the preceding, as explained in the Discussion. It lacks bright breast-side patches and is therefore male.

Discussion

The accounts of the Mériion natté (*Malurus textilis*) in Dumont (1824) and Quoy & Gaimard (1824), described from material collected by early French expeditions, indicate that these were based on at least three specimens. Three specimens of this species, collected during those expeditions, have been located in MNHN within the last two decades: Gallery Catalogue nos. 10695, 10696 and 10697. The first is from de Freycinet's *Voyage autour du monde* (1817–20) and the other two from the Expédition Baudin (1801–04). Allowing for plumage fading, all appear to represent material upon which *Malurus textilis* Quoy & Gaimard was based and should therefore be treated as syntypes.

Yet there are inconsistencies. GC 10695, the specimen from de Freycinet's *Voyage autour du monde*, which is assumed to be the source of the description of *M. textilis* and its figure in the zoological atlas of the voyage (see above), is a female with bright rufous breast-side patches. Yet neither the original description of *textilis*, nor the parallel account of Quoy & Gaimard (1824), mention these distinctive patches; nor does the figure of *textilis* in the zoological atlas of de Freycinet's *Voyage* show it with convincing clarity. It may be that the patch was hidden under the bend of the wing and missed, as others have done (see discussion of GC 1897-489 below), or perhaps the bird figured and described was a lost male from the Freycinet *Voyage* or one of the specimens in male plumage from the Expédition Baudin. We may never know.

There are also questions concerning the provenance and dates of collection of the three syntypes. Although no locality is given in the catalogue entry or RS's notes for GC 10695, it is clear from the original description of *textilis* that it was taken at Shark Bay and on Péron Peninsula in particular (Mathews 1917). It would have been collected there during the fortnight *L'Uranie* spent at Shark Bay from 12 September 1818 (Whittell 1954) and not October 1820, which may relate more to the specimen's date of accession. Neither Expédition Baudin specimen carries a locality and the dates on them (An. 11 and An. 12) do not correspond with times when that expedition put into Shark Bay (23 June–4 September

1801 and 17–23 March 1803: Péron 1824, Cornell 1974). ‘An. 11’ and ‘An. 12’ date years in the calendar of the First French Republic, which began on 23 September 1792; thus ‘An. 11’ = 23 September 1802–22 September 1803, and ‘An. 12’ = 23 September 1803–22 September 1804. ‘An. 11’ and ‘An. 12’ are more likely to refer to later events, such as the dates when the collections were collated and packed, when they arrived in France or when catalogued at MNHN. Expédition Baudin collections reached France on the *Naturaliste* in June 1803 (An. 11) and on the *Geographe* in March 1804 (An. 12) (Péron 1824). Associated with the specimens bearing these dates, furthermore, are the respective names Lesueur for the first and Lesueur and Péron for the second. The names are almost certainly not those of the collectors but they correspond to the respective packers of vertebrate specimens for the voyage home of the *Naturaliste* from Port Jackson (Sydney) on 18 November 1802 (Lesueur alone, also An. 11) and of the *Geographe* from Mauritius on 15 December 1803 (both men, An. 12). Dates and packers indicate that the two Expédition Baudin specimens were collected on different occasions.

Although their exact site of collection cannot be pinpointed, the comment by Quoy & Gaimard (1824): ‘Nous avons tué cet oiseau à la baie des Chiens-Marins, dans la Nouvelle-Hollande. Déjà les naturalistes de l’expédition du capitaine Baudin l’avoient fait connoître; mais il n’étoit point figure’ indicates Shark Bay. Even more persuasive is evidence that landfalls of Expédition Baudin coincide with the known historic range of the species only there. The Expédition Baudin visited Shark Bay twice. On the first in 1801, the *Geographe* landed only on Bernier Island (Cornell 1974), where grasswrens are unknown, whereas the *Naturaliste* spent ten days off Dirk Hartog Island, whose grasswren population is now extinct, and a month off the Péron Peninsula, where grasswrens are, if anything, more abundant now (Brooker 2000, Black 2011a). On the second Shark Bay visit in 1803 *Le Geographe’s* naturalists landed only on the Péron Peninsula (Péron 1824, Cornell 1974). It is probable therefore that the ‘Lesueur An. 11’ specimen was taken on the first visit by the zoologist Levillain, the only zoological collector then on the *Naturaliste*, probably from the Péron Peninsula sometime between 4 August and 3 September 1801, but still possibly from Dirk Hartog Island (Péron 1824). Lesueur himself probably collected the ‘Péron & Lesueur An. 12’ specimen on the second visit to the Péron Peninsula, where the *Geographe* anchored on 17–23 March 1803, as the remaining scientific members, including Péron, collected only marine animals there (Péron 1824). Thus we consider Shark Bay acceptable as the type locality for all three syntypes of *Malurus textilis* Quoy & Gaimard, thereby fixing the name to the Western Australian subspecies *Amytornis textilis textilis*.

GC 10696 is faded and its tail too damaged to measure. Annotations on the socle refer it to the description and figure in Lesson (1831), but it is male and Lesson’s account refers only to material from de Freycinet’s Voyage in *L’Uranie* and his figure shows the bright breast-side patches of a female. That figure could thus be of GC 10695 (for which Lesson’s name was inserted into the catalogue) and the same bird figured on Pl. 23 in Quoy & Gaimard’s (1824) atlas, in which the flank patches were overlooked.

GC 10697 B (CG 1879-715), the last of the mounts reviewed above, is misidentified as *Amytis striata* (Gould) (= *Amytornis striatus*, Striated Grasswren). It is a Thick-billed Grasswren *A. modestus* (North). Annotations on the socle suggest that it came from South Australia via the Australian Museum, Sydney, but entries in the Catalogue Général indicate that it was one of three grasswrens from the South Australian Museum, Adelaide (SAMA); the others were CG 1879-714 (*Amytornis striatus*, unlocated) and CG 1879-716 (*A. textilis*—see below). The date 1879 associated with these specimens is the year of their accession by MNHN. Originally intended to comprise one *A. striatus* and two *A. textilis*, they were, as shown by archival records in SAMA, part of a larger batch of natural history specimens sent

for show at the 1878 Paris Universal Exhibition. Most of this material passed to MNHN the following year (Hale 1956).

The provenance of the SAMA grasswrens is problematic. No precise localities are documented in records at SAMA or MNHN. Moreover, although both Thick-billed and Striated Grasswrens occur widely in South Australia, there is no published direct account of them from that state throughout the 19th century. Concerning GC 10697B (CG 1879-715), archives in SAMA record that the museum received from the widely travelled collector Samuel White (senior), a collection of skins in September 1870, stated incorrectly to be 'principally from north Queensland'. In fact, it included mostly species from inland southern Australia, among them three '*Amytis striata*' (AB pers. data). Samuel White and his brother William undertook a prolonged collecting expedition through Queensland in 1867, returning via inland New South Wales and Victoria in 1868 (Linn 1989). By the late 19th century, both Thick-billed and Striated Grasswrens had been collected in inland New South Wales but not from other Australian states, and there was prevailing uncertainty about their identification and respective habitats (McAllan 1987). It appears that the misidentification of CG 1879-715 was made in SAMA before being sent to Paris; and it may well have been one of White's, presumably from New South Wales. Despite its age, this specimen is rather dark for *A. modestus*, and its appearance is therefore consistent with the extinct inland New South Wales subspecies, *A. m. inexpectatus* (Black 2011b).

CG 1879-716 is correctly identified as *A. textilis*. Its tail is of only moderate length, well below the range for females of *A. t. textilis* (Black 2011a) and this, together with other features of plumage and bill shape, indicates that it is of the subspecies *A. t. myall* (Mathews). Endemic to the north-eastern Eyre Peninsula and the eastern Gawler Ranges in South Australia, this population was not reported until 1902 (Chenery 1903, Morgan 1924), and not described until 1916 (Mathews 1916). The finding of a much earlier specimen is particularly noteworthy. SAMA records show that the collector F. W. Andrews presented to that museum at least five specimens of *Amytis textilis* (= *A. t. myall*) from the Gawler Ranges in 1871-73. None is now at SAMA, and their existence had been unknown until our search of SAMA records revealed that six or more specimens of *Amytornis textilis* (presumably *A. t. myall*) were exchanged with other museums in 1872-74. One that went to the Macleay Museum, University of Sydney, has since been identified as *A. t. myall* (AB pers. data).

CG 1897-489 '*A. textilis*', from the Horn Scientific Expedition to central Australia in 1894, is one of the two missing paler specimens 48C and 48D from that expedition, which North (1896), unaware of the sex-distinguishing value of bright breast-side patches, initially concluded must be the females of *textilis*. Parker (1972) observed that those two specimens were not present when North (1902) described the paler birds as a separate species, *A. modestus*, and had probably vanished earlier. Black (2011c) suggested that they had been badly damaged and were discarded, but this discovery provides a different explanation. Although sexed as a female, CG 1897-489 lacks bright breast-side patches and is therefore male. It is the oldest extant specimen of the extinct subspecies *A. m. modestus*, but it has no type status.

To sum up our findings for the Western Grasswren *A. textilis* (Quoy & Gaimard) itself, we lay out the resulting nomenclatural data to support its taxonomy in ornithological literature, as follows. The acronym GC = Gallery Catalogue: *Malurus textilis* Quoy & Gaimard in Dumont, 29 May 1824, *Dictionnaire des sciences naturelles* 30: 117-118—available by description, valid by seniority. Type data: syntypes MNHN GC10695 ♀ ex *Expédition L'Uranie*, MNHN GC10696 ♂ ex *Expédition Baudin*, and MNHN GC10697 ♂ ex *Expédition Baudin*. Type locality (all syntypes): Shark Bay, Western Australia (as 'la baie des Chiens-marins dans la Nouvelle-Hollande').

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Abra Maruncunca, dpto. Puno, Peru, revisited: vegetation cover and avifauna changes over a 30-year period

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SUMMARY.—Avifaunal inventories in 1980, 2007 and 2009 along the eastern slope of the Peruvian Andes at Abra Maruncunca, dpto. Puno, document the occurrence and change in relative abundance of 245 species. Degradation of forest cover with an increase in secondary vegetation probably explains many of the differences between the 1980 and 2009 surveys. We provide details for the first occurrence and clarification of the status in Peru for Ochre-cheeked Spinetail *Synallaxis scutata*, Olivaceous Woodcreeper *Sittasomus griseicapillus viridis*, Scimitar-winged Piha *Lipaugus uropygialis*, White-necked Thrush *Turdus albicollis contemptus*, Blue-browed Tanager *Tangara cyanotis cyanotis*, White-browed Brush Finch *Arremon torquatus* and Yellow-bellied Siskin *Sporagra xanthogastra*, with comments on the taxonomy of Roadside Hawk *Rupornis magnirostris*, Plumbeous Pigeon *Patagioenas plumbea*, a *Pyrrhura* parakeet, White-bellied Hummingbird *Amazilia chionogaster*, an antwren *Herpsilochmus* sp., and Fuscous Flycatcher *Cnemotriccus fuscatus*. The key for ensuring that this rich avifauna is preserved at this site lies in the protection of the relatively intact forest at the base of the massif at the north end of our study area.

The east Andean slope has long been recognised to harbour one of the most speciose avifaunas in the world (Chapman 1917, 1926, Meyer de Schauensee 1970, Stotz *et al.* 1996). Many Andean species possess narrow geographic ranges and are densely packed along an elevational gradient, often corresponding to sharp replacements and specialisation to localised elevational zones (Terborgh 1977, Herzog *et al.* 2005, Forero-Medina *et al.* 2011). High phenotypic variation and endemism is associated with these narrow elevational distributions (Graves 1985, 1988). Deforestation and landscape change along the eastern Andes has had negative consequences for this ecologically complex avian assemblage, resulting in many species with restricted ranges being regarded as globally threatened (Stattersfield *et al.* 1998, BirdLife International 2012, Swenson *et al.* 2012).

Although the unrivaled diversity of the eastern Andes has been appreciated for nearly a century, this avifauna remains poorly known in general (Weske 1972, Lane & Pequeño *in* Vriesendorp *et al.* 2004, Robbins *et al.* 2011) with very few sites surveyed intensively over an extended time (Mee *et al.* 2002, Walker *et al.* 2006, Forero-Medina *et al.* 2011). One of the least-known regions on this slope is in south-eastern Peru between the frequently visited Manu road, dpto. Cusco (Walker *et al.* 2006) and western Bolivia (Hennessey *et al.* 2003a, Schulenberg *et al.* 2010). In part, as a result of the dearth of information from this region, we surveyed the foothill avifauna at Abra Maruncunca, dpto. Puno, in extreme south-eastern Peru, in 1980, 2007 and 2009 (Fig. 1). Located within an important biogeographic region in the Andes, many species' distributions terminate here. Sometimes referred to as the southern Peruvian or Bolivian Yungas (*yungas* is a Quechua word for cloud forest), the region is generally bounded to the north by the Urubamba Valley and Vilcanota cordilleras,

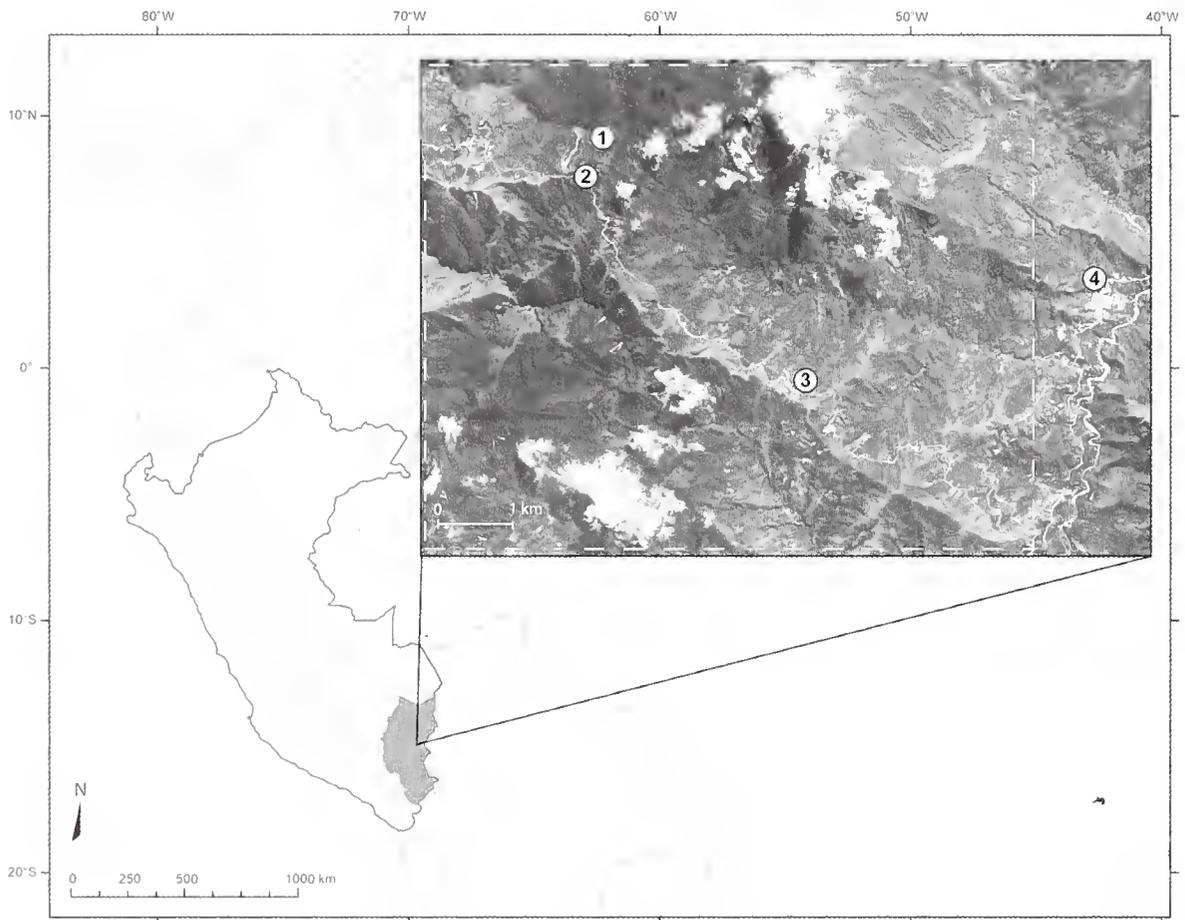


Figure 1. Google Earth image of study area. Dpto. Puno is highlighted in grey. Numbers refer to camp sites: (1) 1980; (2) 2007; (3) 2009. Number 4 refers to San Juan de Oro. Region inside white dotted line refers to area of vegetation analyses. Cloud cover at top of image enshrouds much of the massif seen in Fig. 2.

and is included within Endemic Bird Areas 054 and 055 (Stattersfield *et al.* 1998). Given that an unpaved road crosses the pass and has provided access to this area for decades, it is unsurprising that the vegetation has been subject to extensive anthropogenic modification. We document changes in both forest cover and the avifauna that occurred at this site between the 1980 and 2007 and 2009 surveys.

Study sites and Methods

Avifaunal inventories.—1980 survey: Louisiana State University (LSU) / Museo de Historia de la Universidad Nacional Mayor de San Marcos (MUSM), Lima team's camp was at c.1,650 m, 7 November–6 December 1980, on a trail north of the road just west of Abra Maruncunca. Elevations covered c.1,800 to 2,200 m; camp location approximate in Fig. 1 as no GPS unit was available; personnel were TSS, LCB, A. Urbay T., G. Campos-L. & M. Sánchez. Selectively logged cloud forest was north of the road, whereas the area along the road and to the south had been clearcut, except for steep ravines. Twenty mist nets were in use by 20 November, with another ten added along a ridge above camp on 23 November.

2007 survey: LSU / Centro de Ornitología y Biodiversidad (CORBIDI) team's camp was along the road (14°12.360'S, 69°13.200'W; 2,050 m; Fig. 1) on 3–4 and 14–15 June. Collecting was with shotguns at this site due to the brevity of the visit, and covered c.5 km of road, and c.5 km of trails into better forest, mostly north of the road, over elevations of c.2,000–2,200 m. Additional specimens were taken at sites peripheral to the Maruncunca massif on 2, 5 and



Figure 2. Massif located at the north side of the area that we worked; taken 29 October 2009 from campsite (Mark B. Robbins). See text for the importance of this ridge to forest-dwelling birds in this region. Low-lying ridge on extreme left of photograph was surveyed in 1980 and less extensively in 2007.

16 June. Another camp was established above San Juan de Oro ($14^{\circ}13.800'S$, $69^{\circ}09.960'W$; 1,500 m) with shotgun-collecting only on 13–14 June. The team comprised DFL, AMC, K. Faust & J. Nuñez. Relative abundance designations are not included from the 2007 visit as a result of the survey's short duration. Roadside habitats surveyed were the same as those visited in 2009 (see below). We used trails into the forest that had clearly been established for selective logging, and transected several different habitats, including rock landslide, stunted second growth (canopy c.5–10 m, choked with fern and *Chusquea*-like bamboo), ridgetop stunted forest (canopy c.5–15 m), taller forest on steeper slopes (canopy c.15–20 m) and tall forest on a shallow slope (canopy c.30 m). This visit coincided with the early dry season, but we experienced overnight rain on 2 June, fog and drizzle on 4 June, and a late morning shower on 14 June.

2009 survey: University of Kansas Biodiversity Institute (KUBI) / CORBIDI team's camp on 23 October–6 November 2009 was sited along the road below and east of Abra Maruncunca ($14^{\circ}13.860'S$, $69^{\circ}11.640'W$, 1,925 m; elevations covered c.1,800–2,200 m; Fig. 1); this camp was c.3.8 km in a direct line from the 2007 camp. Personnel were MBR, AN, MC, EA-C, WW & A. Urbay T. All forest below camp and along the road was secondary with patches of taller secondary forest interspersed with thorn-dominated scrub; the latter was more prevalent along the road below camp. Remnant strips of selectively logged forest reached the road between our camp and Abra Maruncunca. Slopes above, to the south and west, were devoid of forest and were covered with a dense fern and thorn-dominated herbaceous growth c.1 m in height. In highly disturbed areas, along the road and at the edge of clearings within the forest, there were bamboo patches (*Guadua* spp.). Surveys

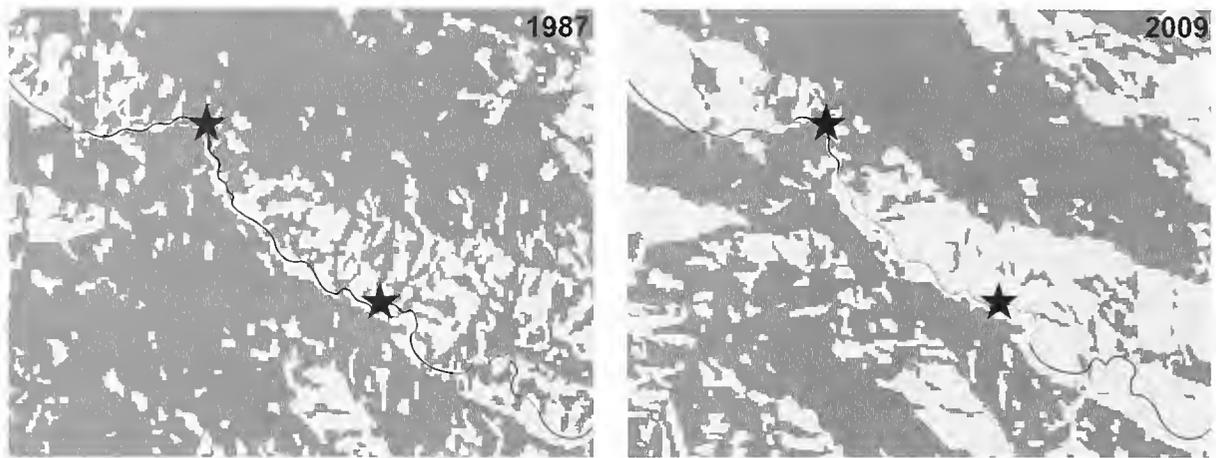


Figure 3. Land cover classification for the years 1987 and 2009. Pale grey = scrub and pasture, dark grey = closed forest. Stars indicate campsites (upper left = 2007, lower right = 2009).

were concentrated in the forest / scrub around camp and downslope to a stream just below 1,800 m and along the road to Abra Maruncunca pass ($14^{\circ}12.360'S$, $69^{\circ}13.140'W$) and for several road km (down to *c.*1,800 m) towards San Juan del Oro. On 24–30 October, 23 mist-nets (12 m in length, positioned at ground level; opened from first light until late evening) were restricted to secondary forest downslope of the camp. Late in the morning on 30th, these were moved to forest at Abra Maruncunca and remained there through 5 November (ten nets were left open throughout the night of 4 November). With the exception of brief periods of rain on 2–3 November, days were mostly clear and relatively warm. The moon was full on 2 November.

Although we were unable to ascertain when the road was constructed through this area, it may have been as early as the 1950s when the military opened several roads in the region (B. Walker pers. comm.). By the time of the first survey in 1980 the natural vegetation had already been significantly modified. LCB (unpubl. field notes) wrote in 1980: 'North of the road the pass remains covered with tall cloud forest, which, at time of our visit, was being subjected to selective logging by the local people. Extensive areas south of the road at the pass, and along the road east and west of the pass, however, are almost completely clear-cut; the remaining forest [there] is restricted to gullies and very steep slopes.' During the 2007 and 2009 surveys, selective logging continued along steep slopes and the valley below. However, the forest at the base and on the near-vertical massif just north of our area was still intact (Fig. 2).

Specimens from 1980 are deposited at LSUMZ and MUSM; 2007 and 2009 material is deposited at LSUMZ, KUBI and CORBIDI. MBR's sound recordings ($n = 172$; ML148142–313) and DFL's audio cassettes are deposited at the Macaulay Library (ML), Cornell Lab of Ornithology, Ithaca, NY. Selected audio recordings by DFL and AMC are available on xeno-canto (<http://www.xeno-canto.org>; XC). Taxonomy and nomenclature follow the South American Check-list Committee as of 8 January 2013 (Remsen *et al.* 2012), except for the Parulidae where we follow Chesser *et al.* (2011).

Measuring changes in vegetation cover.—To quantify vegetation cover changes between 1980 and 2009, ALN categorised three land cover classes (bare soil, closed forest, and scrub and pasture) that were identified, with ground truth occurring during expeditions, using object-oriented classification (Baatz *et al.* 2003) from Landsat images for the following years: March 1987, October 1991, September 1999 and July 2009. The defined area circumscribed the following coordinates (63.5 km²): $69^{\circ}14.820'S$, $14^{\circ}11.340'W$ (top-left corner; Figs. 1, 3) and $69^{\circ}09.780'S$, $14^{\circ}15.120'W$ (bottom-right corner; Figs. 1, 3). These images were chosen as

they were relatively cloud free and gave the best spatial resolution (30 m) available for the period. To complete the classification, we first segmented images in two levels with two scale parameters (4 and 10) using a composition of homogeneity criterion of 0.8 for colour and 0.2 for shape, and 0.5 for smoothness and compactness within shape. This enabled us to select objects in the lowest level that was adequate to identify our three land cover classes. With this process we obtained four maps that were compared using Map Comparison Kit (version 3.2.0) with the Kappa method.

Results and Discussion

Vegetation cover changes.—Satellite imagery enabled us to quantify vegetation changes between 1987 and 2009. Images prior to 1987 were of low resolution that precluded confident classification of vegetation types. Nevertheless, there was *c.*20% increase in bare soil, *c.*15% increase in scrub and pasture, and *c.*15% decrease in closed forest between 1987 and 2009 (Table 1). We presume these are conservative figures given the lack of quantitative information on vegetation coverage during the 1980 survey. Moreover, the closed forest classification does not capture the impact of selective logging upon this vegetation type. Areas significantly degraded by selective logging would still be scored as closed forest.

General results and discussion.—Some 245 avian species were recorded at Abra Maruncunca during these inventories, with 164 in 1980, 161 in 2007 and 174 in 2009. The following numbers are of species unique to each of the surveys: 49 in 1980, 25 in 2007 and 57 in 2009. Because the 2007 inventory was of shorter duration we limit the following comparisons to the 1980 and 2009 surveys. Breeding was documented (specimen gonad data, behaviour and active nests) in 51% of the avifauna during the 1980 and 2009 inventories (105 of 207 species). Forty-one percent (54 of 132 species) of the avifauna was documented breeding in 1980 and 46% (77 of 168 species) in 2009; the above totals exclude diurnal raptor species recorded only once and migrants (Appendix). Naturally, these figures should be considered very conservative given that no specimens were taken for many species (Appendix) and sample sizes for most collected species were very small.

Excluding species for which there were only 1–2 records / species / survey (note that this was especially prevalent in groups that are notoriously difficult to detect, e.g., diurnal raptors and hummingbirds; Appendix) and migrants, changes in avian species composition and relative abundance can probably be explained by vegetation modification and differences in effort. We presume in the intervening period between the 1980 and the later surveys that further deforestation and the accompanying increase in aridity enabled at least 26 species (Appendix; 46% of the unique records recorded in 2009 and not in 1980) to move upslope and become more abundant. It is probable that at least some of these were already present along the road and lower slopes east of Abra Maruncunca in 1980, but effort in that year was concentrated in primary forest near to and north of the pass (Fig. 1). Moreover, those species inhabiting secondary habitats (e.g., Rufous-capped Antshrike *Thamnophilus ruficapillus*, White-winged Black Tyrant *Knipolegus aterrimus*) that were detected in low frequency in 1980 may have been under-estimated as well.

TABLE 1

Area in square kilometres and percentage (between parentheses) of the land cover classes in each of the four years analysed.

	1987	1991	1999	2009
Bare soil	0.01 (0.02)	0.12 (0.19)	0.04 (0.06)	0.14 (0.22)
Scrub and pasture	15.84 (24.96)	23.81 (37.52)	20.71 (32.62)	25.29 (39.84)
Closed forest	47.62 (75.02)	39.53 (62.29)	42.73 (67.73)	38.04 (59.94)

As a result of forest degradation and camp location the 2009 effort was almost entirely in secondary (varying from young to tall, selectively logged) forest and roadside scrub (Fig. 1). It is probable that several species would have been detected in 2009 had the intact primary forest at the base of the steep escarpment been surveyed, as all were detected in 2007, e.g., Ochre-breasted Antpitta *Grallaricula flavirostris*, Hazel-fronted Pygmy Tyrant *Pseudotriccus simplex*, Tufted Flycatcher *Mitrcophanes olivaceus*, Scimitar-winged Piha *Lipaugus uropygialis*, Barred Becard *Pachyramphus versicolor*, Chestnut-capped Brush Finch *Arremon brunneinucha* and Spectacled Redstart *Myioborus melanocephalus*. Furthermore, during the 2009 effort, mist-nets were not placed along forest streams, which may, in part, explain why species such as Sharp-tailed Streamcreeper *Lochmias ncmatura*, Slaty-backed Chat-Tyrant *Ochthoeca cinnamomeiventris* and White-capped Dipper *Cinclus leucocephalus* went unrecorded, despite being found in 2007. Although the 1980 and 2009 surveys occurred at the same season, the primary breeding season for many species (see above), we underscore that there was a major difference in effort among all three inventories (30 days in 1980, nine in 2007, 15 in 2009) that probably accounts for some presence / absence and relative abundance designation differences.

Despite differences in effort there clearly have been changes in the relative abundance for some species. As mentioned above, several species that inhabit young second growth undoubtedly increased in abundance. Less obvious changes concern those species that inhabit forest, ranging from selectively logged to primary. For example, in 1980, Blue-banded Toucanet *Aulacorhynchus coeruleicinctis* was considered to be fairly common and Chestnut-tipped Toucanet *A. derbianus* went unrecorded. Almost the exact opposite in relative abundance was recorded in 2009. Although both occur in montane forest, it is unclear if *derbianus* adapts better to secondary forest than *coeruleicinctis*. Again, not having surveyed primary forest in 2009 probably resulted in *coeruleicinctis* being under-recorded as it was the only toucanet found above 1,200 m in 2007; *derbianus* was only recorded below that elevation in 2007. Andean Solitaire *Myadestes ralloides* was uncommon at the pass in 1980, but just one was recorded in 2009; this may reflect forest degradation and / or tracking fruiting plants. If fruiting plants explained the presence / absence of *Myadestes*, we would have expected this to be reflected also by White-eared Solitaire *Entomodestes leucotis*, but the latter was fairly common and persistently vocalising daily during the 2009 survey. Intriguingly, both Pale-eyed Thrush *Turdus leucops* and Glossy-black Thrush *T. scarranus* were not detected in 2007 or 2009, but were considered fairly common and rare, respectively, in 1980.

Hunting pressure may have declined between 1980 and 2009. In 2009, several Andean Guans *Penelope montagnii* were heard displaying at dawn from our campsite and flocks, comprising up to eight individuals, were observed foraging daily in scrubby vegetation along the road. Just north of the pass in less disturbed forest a minimum of 8–9 Hooded Tinamous *Nothocercus nigrocapillus* and, from our campsite up to the pass, at least six Brown Tinamous *Crypturellus obsoletus* were heard singing daily in 2009. Speckled Chachalaca *Ortalis guttata* was probably more common in 2009 as a result of the humid, tall forest being replaced by drier, secondary woodland. The apparent scarcity of Rufous-breasted Wood Quail *Odontophorus speciosus* in 2009 may simply be related to birds not vocalising during that survey, as appropriate habitat was present just below our campsite and at the pass; both areas were surveyed daily at dawn and dusk when wood quail pairs often duet and can be heard from up to 1 km distant.

In sum, although there appear to have been dramatic changes in the relative abundance for a number of species, the overall composition in 1980 still appeared to be present in 2009. We suspect that the relatively intact forest at the base and along the steep slopes of the massif that is still connected to the area that we worked continues to be a source for those

species that have been negatively affected by forest degradation (Fig. 2). That area is likely key for the continued existence of forest-dependent species.

Several distributional replacements and contact zones occur along the eastern Andes in dpto. Puno and extreme eastern Cusco, where no prominent geographic barriers appear to be involved. For example, the ranges of the following taxa meet somewhere in this region: Grey-browed Brush Finch *Arremon assimilis poliophrys* and White-browed Brush Finch *A. t. torquatus*, Speckled Hummingbird *Adelomyia melanogenys inornata* and *A. m. chlorospila*, Three-banded Warbler *Basileuterus t. tristriatus* and *B. t. punctipectus*, Streak-headed Antbird *Drymophila striaticeps peruviana* and *D. s. boliviana*, and Yellow-rumped Antwren *Euchrepomis sharpei* and Rufous-rumped Antwren *E. callinota*. These examples underscore the large gap in sampling between Cusco (Manu Road) and southern Puno, where range limits between these taxa pairs are poorly known (Cadena & Cuervo 2010, Chaves & Smith 2011, Gutiérrez-Pinto *et al.* 2012, Isler *et al.* 2012). Thus, even with the extensive surveys in the Maruncunca area much more sampling is needed in this region.

Several species recorded at Abra Maruncunca are still unknown from Bolivia (Hennessey *et al.* 2003b), and given the close proximity of our study site to the border, these should be looked for in dpto. La Paz: Rusty-winged Barbtail *Premornis guttuligera*, Ashy-headed Tyrannulet *Phyllomyias cinereiceps*, Variegated Bristle Tyrant *Phylloscartes poecilotis*, Jet Manakin *Xenopipo unicolor*, Blackburnian Warbler *Setophaga fusca* (sight records only for Bolivia), Yellow-throated Tanager *Iridisornis analis* and *Arremon brunneinucha*.

Species accounts

ROADSIDE HAWK *Rupornis magnirostris*

An adult male taken at Maruncunca (KUBI 11560) on 3 November 2009 appears to be intermediate between *R. m. saturatus* and *R. m. occiduus*, as are two immatures at the Academy of Natural Sciences, Philadelphia (ANSP 104011 from La Oroya, Inambari, Puno, 8 June 1931; ANSP 104009 from Santo Domingo, Inca Mine, Puno, 30 June 1931). This widespread hawk is represented in south-west Amazonia and the nearby foothills of the Andes by perhaps three taxa (*R. m. occiduus*, *R. m. saturatus* and nominate *magnirostris*). Recent authors (e.g., Mayr & Cottrell 1979, Thiollay 1994) generally assign all Amazonian birds in Peru and northern Bolivia to *R. m. occiduus* (type locality 'Río Tambopata'), characterised as like nominate *magnirostris*, but having the 'chest bright cinnamon-rufous'; Bangs 1911). Birds in the Bolivian Yungas and adjacent humid lowlands east into the drier lowlands of dptos. Beni and Santa Cruz are considered *R. m. saturatus* (type locality 'Apolo and Tilotilo [dpto. La Paz], Bolivia'), a very distinctive form with dark chocolate-brown upperparts and throat (creating a 'hooded' effect), orange-rufous chest and distinctly rufous bars in the tail. Additional observations of this species from the foothills and lowlands of the Manu region, dpto. Cusco, suggest that *R. m. saturatus* is a seasonal visitor to the area, present May–August, whereas *R. m. occiduus* is the resident form (DFL pers. obs.). Paler grey birds lacking rufous on the breast, presumably best treated as *R. m. magnirostris*, occur at least as far south as northern Junín. Each of these forms appears to grade into one another where they meet, and birds with a mix of *occiduus* and *saturatus* characters (e.g., rufous and grey tail-bands, dark hoods with some grey on the breast) occur as far north as dpto. Cusco (DFL pers. obs.).

PLUMBEOUS PIGEON *Patagioenas plumbea*

Although there is only one named subspecies in south-west Amazonia and adjacent Andean slopes, *P. p. pallescens*, field workers have recognised a distinctive song type

among birds in the Bolivian Yungas (Mayer 1996). We encountered birds with this song type at Maruncunca, the only area in Peru where it has been documented (XC45804, 103879, ML148235). Specimens from Maruncunca and Bolivia do not appear to possess any morphological characters that distinguish them from lowland birds of the 'Amazonian' song type, but tend to be heavier by *c.*50 g. Furthermore, there seem to be birds that sing intermediate songs both at Maruncunca and further north on the Manu Road in dpto. Cusco (DFL pers. obs.; XC92491). A more detailed investigation involving voice, morphology and genetics is necessary to understand the significance of the different song types.

PARAKEET SP. *Pyrrhura* sp.

Pyrrhura parakeets were heard more than seen as small-sized groups (<10 individuals) passed through the forest interior. Although local population size was difficult to assess because of flock mobility, we probably encountered at least three or four groups between 1,800 m and the ridge crest in 2009. The expected species of *Pyrrhura* in this region is Black-capped Parakeet *P. rupicola*, which is widespread in lowland south-east Peru (Schulenberg *et al.* 2010). The type locality of one subspecies, *P. r. sandiae*, is only *c.*30 km west of Maruncunca. Nonetheless, we are unable to identify with certainty the taxon that occurs there. Singles were collected on the 1980 and 2009 expeditions. A female in relatively fresh plumage that was mist-netted and photographed on 5 November 2009 (Fig. 4; CORBIDI uncatalogued) has extensive whitish fringes to the throat and breast feathers, extensive red on the dorsal surface of the rectrices, reddish-brown abdominal feathers and bluish primaries. Three characters that have been used to distinguish *P. rupicola* from other *Pyrrhura* are the solid green uppertail, the lack of a red abdomen and mostly green primaries (Forshaw 1989). As a point of comparison, the plumage characters of the 2009 Maruncunca specimen approach those of Maroon-tailed Parakeet *P. melanura berlepschi*, which is unknown south of dpto. San Martín, Peru (Schulenberg *et al.* 2010). The 2009 Maruncunca specimen has green lores that extend into the forecrown and above the bare orbital skin, which is more *P. rupicola*-like, as this region is typically brown in *P. m. berlepschi*. The other Maruncunca specimen (LSUMZ 98088), although heavily worn and perhaps in transition from immature to adult plumage, also has limited red in the rectrices (the outermost pair are new and dusky, not red; S. Cardiff pers. comm.), the crown is pale brown rather than blackish brown, has extensive red on the belly, and the breast is hardly scaled; rather, it is pale cream with only a hint of darker feather bases. Primaries 1–6 (pp 1–5 are very worn, p6 is new, p3 on right side is completely orange) are green, whereas pp7–10 are bluish. It has been proposed that this specimen is a hybrid between *rupicola* and Green-cheeked Parakeet *P. molinae* (Juniper & Parr 1997). *P. molinae*, which is known from adjacent Bolivia, has extensive pale fringes to the breast feathers, a reddish tail, red abdominal patch and blue outer primaries, thus some of the plumage characters of the 2009 Maruncunca specimen appear to be shared with *molinae* (Fig. 4). However, both Maruncunca specimens have solid red in the wing bend (although this is mixed with some green on the primary-coverts in the left wing of the LSU specimen), which *molinae* lacks. The primary-coverts and primaries are green in *rupicola*. Thus, it appears that these specimens share plumage attributes of both *rupicola* and *molinae*. Nominate *P. rupicola* is restricted to central Peru, at *c.*1,000–2,000 m, in Pasco and Junín (Forshaw 1989, Schulenberg *et al.* 2010). Bond & Meyer de Schauensee (1944) described *P. r. sandiae* based on two adult females from *c.*30 km west of Maruncunca. They distinguished *sandiae* from nominate *rupicola* by the former having a much narrower whitish fringe to the throat and neck. Black-capped Parakeets in the lowlands of south-east Peru, western Brazil and northern Bolivia also have been assigned to *sandiae* (Forshaw 1989, Collar 1997). Lowland populations typically exhibit much stronger scaling on the breast, usually with



Figure 4. *Pyrrhura* sp., showing mixture of characters of Black-capped *rupicola* (red in bend of wing, green ear-coverts) and Green-cheeked Parakeets *molinae* (red upper rectrices, outer blue primaries and reddish-brown abdomen) (Mark B. Robbins). See text for discussion of this adult female (CORBIDI uncatalogued) and other specimens from south-eastern Peru.

the dark feather bases appearing triangular (not as rounded as in the nominate or the type series of *saudiae*). Thus, the use of *saudiae* for lowland birds may be a misallocation, in which case the lowland birds may represent an undescribed taxon. Moreover, *saudiae* may not be diagnosable from nominate *rupicola* as Bond & Meyer de Schauensee admitted later that *saudiae* was probably not distinct (see comments under *saudiae* in Forshaw 1989) or represents a population intermediate between *rupicola* and *molinae*. More field work and genetic data are required to clarify this puzzlingly diverse *Pyrrhura* complex.

CLOUD-FOREST SCREECH OWL *Megascops marshalli*

Although not recorded in 1980, a single individual thought to be of this species was recorded, but not seen, by DFL on 14 June 2007 (XC92487). At least four were heard in stunted forest along the crest at the Maruncunca pass during the 2009 expedition (ML148255, 148287). A male, which was with a presumed female, was sound-recorded and collected on 2 November (CORBIDI uncatalogued; ML148287). The other vocalising birds did not respond to playback and called infrequently; this coupled with the relatively small testes, 5×3 mm, of the male, leads us to believe that November was not the breeding season. This may also explain why the species was unrecorded in November–December 1980. In the Cordillera Vilcabamba, Weske & Terborgh (1981) believed breeding occurred from late June to mid August, and a male collected on 31 August 2001 in the Cordillera Cocapata, dpto. Cochabamba, Bolivia (Herzog *et al.* 2009) had testes very similar in size to the Maruncunca male. The species is not unexpected given that it is now known from Bolivia (Herzog *et al.* 2009), but our records extend the range south in Peru from the type locality in the Cordillera Vilcabamba, dpto. Cusco (Weske & Terborgh 1981, Herzog *et al.* 2009, Schulenberg *et al.* 2010). The Maruncunca specimen is very similar to the colour rendition and description of the holotype and paratypes (Weske & Terborgh 1981). Additional data for the CORBIDI specimen: mass: 105 g; light fat.

SUBTROPICAL PYGMY OWL *Glaucidium parkeri*

Only discovered upon reviewing field sound-recordings, DFL documented this species in the distant background of a recording made on 14 June 2007 at *c.*2,050 m on the flanks of the large mountain (Fig. 2) just north of the road at Maruncunca (XC92486). This is the southernmost record in Peru, the highest elevation known for the species, and bridges the gap, of *c.*500 km, between records from the Pantiacolla Ridge in dpto. Madre de Dios, Peru

(Walker *et al.* 2006) and Serranía Eslabón and Serranía Bellavista, dpto. La Paz, Bolivia (Hennessey *et al.* 2003a).

BUFF-FRONTED OWL *Aegolius harrisi*

A female in non-breeding condition that was mist-netted in stunted forest along the ridge at Maruncuna Pass on 3 November 2009 (CORBIDI uncatalogued) represents the first record for dpto. Puno (Schulenberg *et al.* 2010). Like *Megascops marshalli*, this species is probably more numerous and widespread than the few Peruvian records indicate.

OCELLATED POORWILL *Nyctiphrynus ocellatus*

Several were regularly heard in the valley just below our 1,925 m camp and on slopes immediately west of Abra Maruncunca during the 2009 survey. This further extends the upper known elevation for the species, which was recently found at 1,700 m in dpto. Cusco (Robbins *et al.* 2011). It appears that this nightjar occurs at much higher elevations in southern Peru than in the north of its range, where the species is primarily known from below 900 m (Hilty & Brown 1986, Robbins & Ridgely 1992, Ridgely & Greenfield 2001).

WHITE-BELLIED HUMMINGBIRD *Amazilia chionogaster*

At Maruncunca, only the southern subspecies of *chionogaster*, *A. c. hypoleuca*, was documented. This taxon was first documented in Peru by three male specimens taken at Oconeque, Puno, in late May 1931 (Zimmer 1950; ANSP 103666–68). Two males (with slightly enlarged testes) were collected on 1–2 November 1980, along the río Huari Huari, north-east of Sandia (LSUMZ 98124–25). In 2007, the species was common in drier open habitats along the río Huari Huari, west of Maruncunca, with some along the north side of Abra Maruncunca in bracken scrub and drier second growth. No specimens were taken, but recordings were made (XC92478–80, 92482). A non-breeding male mist-netted in taller secondary forest on 2 November 2009 was identified as *hypoleuca* (CORBIDI uncatalogued). Below our 2009 camp, in younger, drier roadside scrub, several males were observed and sound-recorded singing from exposed, leafless branches c.5–8 m above ground. None of these was collected, thus definitive characterisation of tail pattern was not made. However, sound-recordings of a displaying male's song (ML148234), a series of loud, single notes, are very similar to those of *A. c. hypoleuca* recorded in Bolivia (online recordings at ML and XC).

The status, distribution and potential interactions between *A. chionogaster* and Green-and-white Hummingbird *A. viridicauda* in south-east Peru are complicated and require

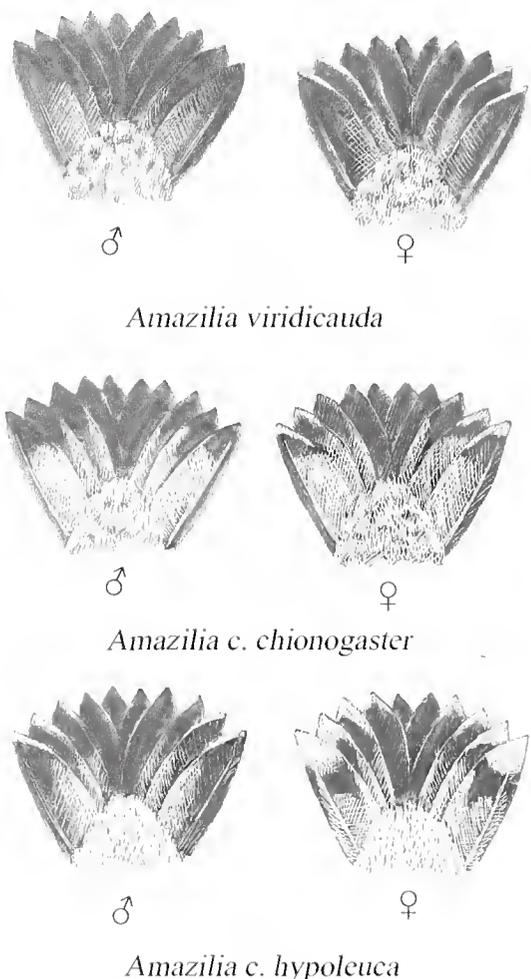


Figure 5. Undertail patterns of Green-and-white Hummingbird *Amazilia viridicauda* and White-bellied Hummingbird *A. chionogaster* and *A. c. hypoleuca* (Daniel F. Lane)

clarification. The range of *A. viridicauda* overlaps completely with that of *chionogaster*, although usually *viridicauda* occurs at sites with more extensive humid forest cover, and *chionogaster* is prevalent in more arid or deforested sites. Although very poorly understood, seasonal movements appear to occur in the relatively well-known Urubamba Valley, dpto. Cusco, where nominate *chionogaster* usually occurs at higher, drier localities (such as Ollantaytambo), whereas *viridicauda* is more characteristic of more humid sites (e.g., Aguas Calientes). Each species can be found at the other site, however, probably as a result of tracking food resources (DFL pers. obs.).

Distinguishing the two species is an infamous problem, both in the field and in the museum. Body plumage is effectively the same among the three taxa that comprise the complex (*A. c. chionogaster*, *A. c. hypoleuca* and *A. viridicauda*), with the main morphological characters separating the three being undertail pattern and bill length (*viridicauda* averaging c.1–2 mm shorter than nominate *chionogaster*, and c.1 mm shorter than *hypoleuca*, sex for sex). Fig. 5 compares the undertail patterns of males and females of the three taxa (based on ‘average-looking’ specimens at LSUMZ). Notice that females have more white on the undertail, particularly at the tips of the outer three rectrices. Some male *A. c. hypoleuca* can appear nearly as dark-tailed as *A. viridicauda*, which may be a cause for confusion between the two forms.

The vocal repertoires of these three taxa are poorly understood. Nominate *chionogaster* is found from the Utcubamba Valley (dpto. Amazonas) south to the Urubamba Valley (and possibly further, as there are records from the Manu Road; Walker *et al.* 2006). This taxon exhibits local dialects in its songs and calls over this range, but they are still recognisably similar in structure among all populations. Furthermore, these vocalisations are remarkably similar to those of *A. viridicauda*, with which *A. c. chionogaster* is locally syntopic (and nearly identical morphologically!). We wonder how *A. c. chionogaster* and *A. viridicauda* maintain species status given their near-identical plumage and voice in syntopy. By contrast, *A. c. hypoleuca*, distributed from central Puno east to Bolivia and northern Argentina (Fjeldså & Krabbe 1990), has an entirely different song and call repertoire compared to both *A. c. chionogaster* and *A. viridicauda*, which, despite some dialect-forming, is still remarkably constrained within the taxon. Based on voice and the minor plumage differences described above, *A. c. hypoleuca* appears sufficiently distinct to suggest that it might be best considered a separate species from nominate *chionogaster*. Clearly, these taxa require detailed studies to make sense of these issues.

OCHRE-CHEEKED SPINETAIL *Synallaxis scutata*

First discovered in Peru by G. Engblom (post to Birding Peru listserv 2 June 2005) near San Juan de Oro, the 2007 survey found the species to be uncommon in brushy second growth from around San Juan de Oro, at c.1,500 m, and below, collecting six specimens (LSUMZ 179654–55, 179656, CORBIDI AV-003269-71), with sound-recordings (e.g., XC103877). These are the first specimens for the country and based on plumage appear to represent a new taxon, which will be described elsewhere.

OLIVACEOUS WOODCREEPER *Sittasomus griseicapillus*

One male collected on 10 November 1980 (LSUMZ 98216) is identified as *S. g. viridis* and represents the first record of this taxon from Peru. Sound-recordings from Maruncunca (c.2,100 m) and foothill areas at lower elevations nearby (ML, XC) agree with this taxonomic identification, as *viridis* is easily distinguished by voice from *amazonus*, which is widespread throughout the rest of eastern Peru (Marantz *et al.* 2003). Based on available sound-recordings the two forms seem to replace each other between the foothills of dpto. Puno and the lowlands of dpto. Madre de Dios (compare ML24111 and XC92484).

YELLOW-RUMPED ANTWRN *Euchrepomis sharpei*

A single of this low-density and poorly known antwren was sound-recorded (XC92527) on 14 June 2007 by DFL. The bird was part of a mixed-species foraging flock moving through the canopy and midstorey of tall montane forest on the flank of the large mountain north of Maruncunca. This is only the third site for the species in Peru (Inca Mine, Puno, Zimmer 1932; Manu Road, Cusco, Walker *et al.* 2006).

ANTWRN SP. *Herpsilochmus* sp.

F. Schmitt first discovered this taxon in September 2004 in the Huari Huari Valley on the north side of the Maruncunca massif, near the town of Masiapo (14°06.000'S, 69°12.960'W; 1,267 m). At least three territories were found by the LSU team on 9 June 2007 below Putina Punco, c.25 km north-east of San Juan de Oro (14°06.000'S, 69°00.960'W; 1,175–1,200 m), where two were collected and sound-recorded (XC105018); the male showed no sign of breeding condition, the female with only slightly enlarged ova (LSUMZ 179661, CORBIDI uncatalogued). These birds were primarily found in drier, but not deciduous, ridgetop woodland (canopy 15–25 m). In 2009, at least three pairs were heard singing sporadically (ML148252, 148254) in secondary forest from 1,850 m and the slopes below. Neither the male nor female that were taken from different pairs in 2009 was in breeding condition (male, CORBIDI AV-2010-995; female, KUBI 115587). These specimens apparently represent an undescribed taxon in the Black-capped Antwren *H. atricapillus* group; in plumage and natural history it most closely resembles Ash-throated Antwren *H. parkeri* of northern Peru. It will be formally described elsewhere.

BUFF-BANDED TYRANNULET *Mecocerculus hellmayri*

Since one collected by M. A. Carriker at La Pampa, dpto. Puno, on 2 July 1931 (ANSP 103002), there were no additional Peruvian records until DFL collected one (with sound-recordings; XC85953–54) on the slopes of the mountain north of Abra Maruncunca on 15 June 2007. This bird was encountered c.7–15 m up in humid forest interior with moderate *Chusquea* bamboo understorey at an elevation of c.2,150 m. Subsequently, DFL found singing birds considerably further north on the Manu Road in dpto. Cusco (13°07.980'S, 71°34.998'W; c.2,165 m), on 28 July 2011, where he documented one with sound-recordings (XC85952) and photographs. In Bolivia, the species is fairly common in the humid Yungas, where it occurs at 500–3,100 m (Hennessey *et al.* 2003b). Schulenberg *et al.* (2010) suggested that the species may be an austral migrant to Peru, and there is anecdotal evidence that it is present only seasonally in Argentina (M. Pearman post to Birding Peru listserv 11 February 2002). Whether the species is only present in Peru during the austral winter or resident year-around will require more field work at other seasons.

YUNGAS TODY-TYRANT *Hemitriccus spodiops*

Fairly common in second growth, especially in stands of bamboo, from our 2009 camp at 1,925 m (extending the upper elevational range) down to as far as we worked, 1,800 m. Birds sporadically called from 2–6 m above ground (ML148144, 148236, 148310) and did not appear to be breeding. This tody-tyrant may have become more common and widespread between 1980 and 2009 as a result of the continued conversion of tall and wet forest to short-stature, secondary forest. The species is known in Peru only from the upper Inambari Valley, and was included in Schulenberg *et al.* (2010) on the basis of unpublished sightings (first by B. Walker in 1999) and specimens from this region taken in 2002 by T. Valqui.

FUSCOUS FLYCATCHER *Cnemotriccus fuscatus*

This species was documented above San Juan de Oro on 14 June 2007 by AMC (CORBIDI uncatalogued), and another was seen on 9 June 2007 below Putina Punco, c.25 km north-east of San Juan de Oro (14°06.000'S, 69°00.960'W; 1,175–1,200 m). The form found here is vocally distinctive and is believed to represent an undescribed taxon, perhaps best considered a species (S. Cardiff & D. Dittmann pers. comm.; Mayer 1996). This foothill taxon was initially recognised in dpto. La Paz, Bolivia, by an LSUMZ field team in 1993. S. K. Herzog *et al.* will present elsewhere their investigation into the classification of this taxon and species limits in *Cnemotriccus*.

SCIMITAR-WINGED PIHA *Lipaugus uropygialis*

The first Peruvian records of this range-restricted cloud-forest cotinga were obtained when adult females were collected at Abra Maruncunca on 15 and 25 November 1980 (LSUMZ 98424–25), a male was collected on 7 January 2001 by T. Valqui (MUSM 24135) and an adult male taken on 15 June 2007 (CORBIDI uncatalogued). Despite playback of primary vocalisations, the species was not recorded in 2009. The only other Peruvian locality known is >500 km to the north in the Zona Reservada Megantoni, dpto. Cusco, where it was discovered in May 2004 (D. Lane & T. Pequeño *in* Vriesendorp *et al.* 2004). Although this piha is now known as far north as dpto. Cusco, it certainly still deserves Vulnerable designation due to ongoing deforestation within its range (Bryce *et al.* 2005, BirdLife International 2012).

MOUSTACHED WREN *Pheugopedius genibarbis*

Of note was the presence of this usually lowland species in the subtropical Yungas of Maruncunca (up to 2,050 m). It is found at similar elevations in dpto. La Paz, Bolivia (DFL pers. obs.), particularly where there is *Chusquea* bamboo. Probably, in the absence of a member of the *P. euophrys* superspecies (including Whiskered *P. mystacalis* and Inca Wrens *P. eisenmanni*), *P. genibarbis* extends its elevational range in Puno and Bolivia. Specimens are deposited at all three institutions, and sound-recordings at ML, XC.

WHITE-NECKED THRUSH *Turdus albicollis*

Three specimens collected c.25 km north-east of San Juan de Oro (14°06.000'S, 69°00.960'W; 900 m) on 7 June 2007 (CORBIDI, uncatalogued) and above San Juan de Oro (14°13.860'S, 69°11.640'W; 1,925 m) on 25 and 29 October 2009 (KUBI 115457, CORBIDI, uncatalogued) are the first documentation for Peru of *T. a. contemptus*, a taxon found in the foothills of Bolivia and south into Argentina, which differs from the more widespread *T. a. spodiolaemus* of south-west Amazonia by having some olive or yellow on the mandible and cutting edge of the maxilla, and warm brown flanks. The voices of the two forms are strikingly different as well (Mayer 1996). *T. a. contemptus* appears to be at least partially migratory, with birds moving through the foothills at the 'bend of the Andes' near Bermejo, dpto. Santa Cruz, Bolivia, in mid or late September (DFL pers. obs.). This might suggest that some birds in Puno and / or the Bolivian Yungas are wintering, but the October specimens were males with enlarged testes and seminal vesicles indicating local breeding. Further year-round research is necessary to confirm the resident status of *T. a. contemptus* in Peru.

GREEN-CAPPED TANAGER *Tangara meyerdesschauenseei*

Schulenberg & Binford (1985) described this species based on four adult specimens taken in November 1980 from the outskirts of Sandia, in the dry valley of the río Inambari. During the 1980 inventory, the same authors noted that it was fairly common at the edge

of cleared areas west of Abra Maruncunca. In 2009, 2–3 pairs / day were recorded in young second growth from our camp down to the lower limit of our surveys at 1,800 m. Like other *Tangara* species, *meyerdeschauenseei* was breeding during the October–November 2009 survey (males, enlarged testes and seminal vesicles; females, collapsed follicles and enlarged and convoluted oviducts that indicated recent laying). In contrast, five adults collected near Sandia in June 2007 had reduced (inactive) gonads. A juvenile female (skull unossified, bursa 6 × 4 mm; LSUMZ 179687), was collected on 2 June 2007 below Huancahuasi (14°14.400'S, 69°24.840'W; c.1,685 m). We provide a brief description of this specimen for the first time (Hilty 2011). It resembles the adult female in size and coloration but is decidedly duller overall, especially over the upperparts. Outer webs of primaries and rectrices buff to drab green, instead of the dark blue-green of the adult. Crown and forehead duller and less contrasting with back. Lores and eye-ring much paler, tinged dull green, producing a less conspicuous mask in the juvenile. Wing-coverts had dark buff and dull green feathers. Listed as Vulnerable (Birdlife International 2012) because of its very small range, but the species probably has increased considerably in this region as a result of the conversion of tall, wet forest to lower stature, drier scrub. We presume that, prior to large-scale deforestation in the region, the species formerly had a much more limited distribution, perhaps being restricted to the narrow dry upper río Inambari Valley.

BLUE-BROWED TANAGER *Tangara cyanotis*

An adult male (KUBI 115639) taken on 4 November 2009 at 2,100 m is the first documentation of the southern, nominate subspecies for Peru.

WHITE-BROWED BRUSH FINCH *Arremon torquatus*

With the recent revision of the *A. torquatus* complex, in which eight species are now recognised (Cadena & Cuervo 2010), *A. torquatus (sensu stricto)* is restricted to extreme southern Peru south to Argentina. At Abra Maruncunca it was found during the 1980 and 2009 inventories. These records represent the first and the northernmost records for this species in Peru. Just prior to the 2009 Abra Maruncunca survey, the KUBI / CORBIDI team also encountered this species at c.2,900 m just below Siná (14°29.400'S, 69°16.800'W), c.30 km south-west of Abra Maruncunca. The boundary between the ranges of *A. t. torquatus* and the adjacent Grey-browed Brush Finch *A. assimilis poliophrys* is not known due to a lack of sampling from intervening areas and the absence of a clear geographic barrier that may separate the two. Records north and west of Abra Maruncunca in Limbani, Carabaya, dpto. Puno, and from dpto. Cusco correspond to *A. a. poliophrys* (Cadena & Cuervo 2010).

YELLOW-BELLIED SISKIN *Sporagra xanthogastra*

Four specimens (LSUMZ 98913–16) collected during the 1980 expedition represent the first records for Peru. All were fat and in non-breeding condition, which coupled with the species not being recorded during the 2007 and 2009 surveys and being known to make altitudinal and erratic movements in Bolivia (S. K. Herzog pers. comm.) may indicate that this siskin is only seasonally present in the Maruncunca region.

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Appendix: List of species recorded at Abra Maruncunca, dpto. Puno, Peru.

Relative abundance criteria for 1980 and 2009 surveys (no relative abundance designations were assigned for the 2007 survey; however, an 'x' in this column denotes that the species was recorded during the period). C = common; >20 individuals / day; F = fairly common; 5–20 individuals / day; U = uncommon; present in small numbers (<5 individuals / day); R = rare; only occasionally encountered in small numbers; X = single record. Documentation: s = specimen; v = sound-recording; 0 = sight observation only.

English name	Scientific name	1980	Breeding evidence for 1980		2009	Breeding evidence for 2009	Documentation
			2007				
TINAMIDAE							
Hooded Tinamou	<i>Nothocercus nigrocapillus</i>	R	b	x	F	b	s
Brown Tinamou	<i>Crypturellus obsoletus</i>	U		x	F	b	v
CRACIDAE							
Andean Guan	<i>Penelope montagnii</i>	R		x	F	b	s
Speckled Chachalaca	<i>Ortalis guttata</i>	R	b	x	C		s
ODONTOPHORIDAE							
Rufous-breasted Wood Quail	<i>Odontophorus speciosus</i>	U	b	x	X		s
CATHARTIDAE							
Turkey Vulture	<i>Cathartes aura</i>	R		x	U		o
Black Vulture	<i>Coragyps atratus</i>			x			o
ACCIPITRIDAE							
Swallow-tailed Kite	<i>Elanoides forficatus</i>	R					o
Black-and-white Hawk-Eagle	<i>Spizaetus melanoleucus</i>				X		o
Black-and-chestnut Eagle	<i>Spizaetus isidori</i>	X					o
Plumbeous Kite	<i>Ictinia plumbea</i>	X					o
Sharp-shinned Hawk	<i>Accipiter striatus</i>	R					o
Solitary Eagle	<i>Buteogallus solitarius</i>	X					o
Roadside Hawk	<i>Rupornis magnirostris</i>	R		x	U		s
White-rumped Hawk	<i>Parabuteo leucorrhous</i>	X					o
White-tailed / Variable Hawk	<i>Geranoaetus albicaudatus / polyosoma</i>				X		o
COLUMBIDAE							
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	R		x	R		s
Pale-vented Pigeon	<i>Patagioenas cayemiensis</i>				C		v
Plumbeous Pigeon	<i>Patagioenas plumbea</i>	U		x	F	b	s
White-tipped Dove	<i>Leptotila verreauxi</i>			x	C		s
White-throated Quail-Dove	<i>Geotrygon frenata</i>	U	b		U	b	s
CUCULIDAE							
Squirrel Cuckoo	<i>Piaya cayana</i>	U		x	U	b	v
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	X					s
TYTONIDAE							
Barn Owl	<i>Tyto alba</i>				X		o
STRIGIDAE							
Rufescent Screech Owl	<i>Megascops ingens</i>	U		x	R		s
Cloud-forest Screech Owl	<i>Megascops marshalli</i>			x	U		s
Band-bellied Owl	<i>Pulsatrix melanota</i>				R		o
Rufous-banded Owl	<i>Ciccaba albitarsis</i>	R		x	R		s
Subtropical Pygmy Owl	<i>Glaucidium parkeri</i>			x			v
pygmy owl sp.	<i>Glaucidium</i> sp.				X		o
Buff-fronted Owl	<i>Aegolius harrisii</i>				X		s
STEATORNITHIDAE							
Oilbird	<i>Steatornis caripensis</i>	X					o
NYCTIBIIDAE							
Common Potoo	<i>Nyctibius griseus</i>				F		s
CAPRIMULGIDAE							
Rufous-bellied Nighthawk	<i>Lurocalis rufiventris</i>	U					o
Band-winged Nightjar	<i>Systellura longirostris</i>			x			s
Swallow-tailed Nightjar	<i>Uropsalis segmentata</i>			x			v
Scissor-tailed Nightjar	<i>Hydropsalis torquata</i>				U	b	s
Ocellated Poorwill	<i>Nyctiphrynus ocellatus</i>				F		v
APODIDAE							
White-chinned Swift	<i>Cypseloides cryptus</i>	X					s
Chestnut-collared Swift	<i>Streptoprocne rutila</i>	U		x	C		s
White-collared Swift	<i>Streptoprocne zonaris</i>	U			C		s
White-tipped Swift	<i>Aeronautes montivagus</i>	R			X		s

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TROCHILIDAE								
Buff-tailed Sicklebill	<i>Eutoxeres condamini</i>	R						s
Great-billed Hermit	<i>Phaethornis malaris</i>			x	R	b		s
Green-fronted Lancebill	<i>Doryfera ludovicae</i>	X		x				o
Wedge-billed Hummingbird	<i>Schistes geoffroyi</i>	R						s
Green Violetear	<i>Colibri thalassinus</i>			x				v
Sparkling Violetear	<i>Colibri coruscans</i>			x	U	b		s
Speckled Hummingbird	<i>Adelomyia melanogenys</i>	F		x	U			s
Long-tailed Sylph	<i>Agelaiocercus kingi</i>	U		x	R			s
Rufous-capped Thornbill	<i>Chalcostigma ruficeps</i>				R			s
Tyrian Metaltail	<i>Metallura tyrianthina</i>				F			s
Greenish Puffleg	<i>Haplophacidia aureliae</i>	F		x	F			s
Bronzy Inca	<i>Coeligena coeligena</i>	U		x	U			s
Collared Inca	<i>Coeligena torquata</i>	U		x				s
Booted Racket-tail	<i>Ocreatus underwoodii</i>			x	R			s
Violet-fronted Brilliant	<i>Heliodoxa leadbeateri</i>	R		x	R			s
White-bellied Hummingbird	<i>Amazilia chionogaster</i>			x	U	b		v
TROGONIDE								
Golden-headed Quetzal	<i>Pharomachrus auriceps</i>	R			X	b		s
Crested Quetzal	<i>Pharomachrus antisianus</i>	F	b					s
Masked Trogon	<i>Trogon personatus</i>	U	b	x	F			s
CAPITONIDAE								
Versicoloured Barbet	<i>Eubucco versicolor</i>	U		x	F			s
RAMPHASTIDAE								
Chestnut-tipped Toucanet	<i>Aulacorhynchus derbianus</i>				F	b		s
Blue-banded Toucanet	<i>Aulacorhynchus coeruleicinctis</i>	F		x	X			s
PICIDAE								
Bar-breasted Piculet	<i>Picumnus aurifrons</i>			x	R			s
Smoky-brown Woodpecker	<i>Picoides fumigatus</i>	R		x	R			s
Golden-olive Woodpecker	<i>Colaptes rubiginosus</i>	U		x	R			s
FALCONIDAE								
Barred Forest Falcon	<i>Micrastur ruficollis</i>	R		x	U			s
Bat Falcon	<i>Falco rufigularis</i>				X			o
falcon sp.	large <i>Falco</i> sp.	X						o
PSITTACIDAE								
parakeet sp.	<i>Pyrhura</i> sp.	U		x	F			s
Barred Parakeet	<i>Bolborhynchus lincola</i>			x				v
Blue-headed Parrot	<i>Pionus menstruus</i>	R			U			o
Scaly-naped Parrot	<i>Amazona mercenaria</i>	R		x	U			v
THAMNOPHILIDAE								
Rufous-capped Antshrike	<i>Thamnophilus ruficapillus</i>	R		x	F			s
Chestnut-backed Antshrike	<i>Thamnophilus palliatus</i>				F	b		s
Variable Antshrike	<i>Thamnophilus caerulescens</i>	F	b	x	F	b		s
Slaty Antwren	<i>Myrmotherula schisticolor</i>			x				o
antwren sp.	<i>Herpsilochmus</i> sp.				U			s
Streak-headed Antwren	<i>Drymophila striaticeps</i>	R		x	R			s
Yellow-rumped Antwren	<i>Euchrepomis sharpei</i>			x				v
White-backed Fire-eye	<i>Pyriglena leuconota</i>	R	b	x	F	b		s
CONOPOPHAGIDAE								
Slaty Gnateater	<i>Conopophaga ardesiaca</i>	F	b	x	F	b		s
GRALLARIDAE								
White-throated Antpitta	<i>Grallaria albigula</i>	F	b	x	F	b		s
Ochre-breasted Antpitta	<i>Grallaricula flavirostris</i>	F	b	x				s
Rusty-breasted Antpitta	<i>Grallaricula ferrugineiceps</i>			x				o
RHINOCRYPTIDAE								
Trilling Tapaculo	<i>Scytalopus parvirostris</i>	R	b	x	R	b		s
Bolivian Tapaculo	<i>Scytalopus bolivianus</i>	R		x	F	b		s

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FORMICARIIDAE							
Short-tailed Anthrush	<i>Chamaeza campanisona</i>	R		x	U		v
Barred Anthrush	<i>Chamaeza mollissima</i>	U		x	R		s
FURNARIIDAE							
Olivaceous Woodcreeper	<i>Sittasomus griseicapillus</i>	R	b	x	F	b	s
Strong-billed Woodcreeper	<i>Xiphocolaptes promeropirhynchus</i>	R			X		v
Ocellated Woodcreeper	<i>Xiphorhynchus ocellatus</i>				R		s
Olive-backed Woodcreeper	<i>Xiphorhynchus triangularis</i>	F		x	X		s
Red-billed Scythebill	<i>Campylorhamphus trochilirostris</i>			x	X		v
Montane Woodcreeper	<i>Lepidocolaptes lacrymiger</i>	R	b	x	U	b	s
Streaked Xenops	<i>Xenops rutilans</i>	R		x	R		s
Rusty-winged Barbtail	<i>Premmornis guttuliger</i>	F	b	x	R		s
Sharp-tailed Streamcreeper	<i>Lochmias nematura</i>	U		x			s
Spotted Barbtail	<i>Premnoplex brunnescens</i>	F	b	x	U	b	s
Pearled Treerunner	<i>Margarornis squamiger</i>			x			o
Ash-browed Spinetail	<i>Cranioleuca curtata</i>	R		x	U		s
Ochre-cheeked Spinetail	<i>Synallaxis scutata</i>			x			s
Plain-crowned Spinetail	<i>Synallaxis gujanensis</i>			x			s
Azara's Spinetail	<i>Synallaxis azarae</i>	F		x	C		s
Montane Foliage-gleaner	<i>Anabacerthia striaticollis</i>	F		x	U		s
Buff-browed Foliage-gleaner	<i>Syndactyla rufosuperciliata</i>	R		x	R	b	s
Streaked Treehunter	<i>Thripadectes holostictus</i>	R	b	x			s
TYRANNIDAE							
Sclater's Tyrannulet	<i>Phyllomyias sclateri</i>	R		x			s
Ashy-headed Tyrannulet	<i>Phyllomyias cinereiceps</i>	X					s
White-crested Elaenia	<i>Elaenia albiceps</i>	X		x	U		s
Mottle-backed Elaenia	<i>Elaenia gigas</i>				R	b	s
Highland Elaenia	<i>Elaenia obscura</i>	U		x	C	b	s
Southern Beardless Tyrannulet	<i>Camptostoma obsoletum</i>			x	F		s
Buff-banded Tyrannulet	<i>Mecocerculus hellmayri</i>			x			s
White-throated Tyrannulet	<i>Mecocerculus leucoplirys</i>			x	X		s
Torrent Tyrannulet	<i>Serpophaga cinerea</i>			x			o
Hazel-fronted Pygmy Tyrant	<i>Pseudotriccus simplex</i>	F		x			s
Bolivian Tyrannulet	<i>Zimmerius bolivianus</i>	U		x	F	b	s
Variiegated Bristle Tyrant	<i>Phylloscartes poecilotis</i>	U					s
Marble-faced Bristle Tyrant	<i>Phylloscartes ophthalmicus</i>	R		x			s
Mottle-cheeked Tyrannulet	<i>Phylloscartes ventralis</i>	R		x	F		s
Streak-necked Flycatcher	<i>Mionectes striaticollis</i>	F	b	x	F	b	s
Slaty-capped Flycatcher	<i>Leptopogon superciliaris</i>	U		x	F	b	s
Yungas Tody-Tyrant	<i>Hemitriccus spodiops</i>			x	F	b	s
Ochre-faced Tody-Flycatcher	<i>Poecilatriccus plumbeiceps</i>	U		x	F	b	s
Yellow-olive Flycatcher	<i>Tolmomyias sulphurescens</i>	U		x	R		s
White-throated Spadebill	<i>Platyrinchus mystaceus</i>	R			X		s
Unadorned Flycatcher	<i>Myiophobus inornatus</i>	U	b	x	R		s
Bran-coloured Flycatcher	<i>Myiophobus fasciatus</i>				F	b	s
Tawny-breasted Flycatcher	<i>Myiobius villosus</i>	F	b		X		s
Cinnamon Flycatcher	<i>Pyrhomyias cinnamomeus</i>	F	b	x	F	b	s
Fuscous Flycatcher	<i>Cnemotriccus fuscatus</i>			x			s
Alder Flycatcher	<i>Empidonax alnorum</i>				X		s
Olive-sided Flycatcher	<i>Contopus cooperi</i>	R			R		o
Smoke-coloured Pewee	<i>Contopus fumigatus</i>	F	b	x	U		s
Western Wood Pewee	<i>Contopus sordidulus</i>				U		o
Tufted Flycatcher	<i>Mitrephanes phaeocercus</i>	F	b	x			s
Black Phoebe	<i>Sayornis nigricans</i>			x			o
White-winged Black Tyrant	<i>Knipolegus aterrimus</i>	R		x	F	b	s
Little Ground Tyrant	<i>Muscisaxicola fluviatilis</i>			x			photo
Streak-throated Bush Tyrant	<i>Myiotheretes striaticollis</i>			x			v
Golden-browed Chat-Tyrant	<i>Ochthoeca pulchella</i>	R	b				s
Slaty-backed Chat-Tyrant	<i>Ochthoeca cinnamomeiventris</i>	R		x			s
Long-tailed Tyrant	<i>Colonia colonus</i>			x	U	b	s

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Piratic Flycatcher	<i>Legatus leucophtaius</i>				F	b v
Social Flycatcher	<i>Myiozetetes similis</i>			x	U	o
Golden-crowned Flycatcher	<i>Myiodynastes chrysocephalus</i>	R	b		R	s
Streaked Flycatcher	<i>Myiodynastes maculatus</i>	R			U	b s
Variagated Flycatcher	<i>Empidonomus varius</i>				U	b o
Tropical Kingbird	<i>Tyrannus melancholicus</i>	R		x	C	v
Pale-edged Flycatcher	<i>Myiarchus cephalotes</i>				U	s
COTINGIDAE						
Band-tailed Fruiteater	<i>Pipreola intermedia</i>	F	b	x	X	b s
Scarlet-breasted Fruiteater	<i>Pipreola frontalis</i>	R	b	x	U	b s
Chestnut-crested Cotinga	<i>Ampelion rufaxilla</i>	R				s
Andean Cock-of-the-Rock	<i>Rupicola peruvianus</i>	R		x	U	s
Scimitar-winged Piha	<i>Lipangus uropygialis</i>	R	b	x		s
PIPRIDAE						
Yungas Manakin	<i>Chiroxiphia boliviana</i>	F		x	C	b s
Jet Manakin	<i>Xenopipo unicolor</i>	F	b			s
TITYRIDAE						
Masked Tityra	<i>Tityra semifasciata</i>	R			X	b s
Barred Becard	<i>Pachyrhamphus versicolor</i>	U	b			s
VIREONIDAE						
Rufous-browed Peppershrike	<i>Cyclarhis gujanensis</i>			x	X	v
Brown-capped Vireo	<i>Vireo leucophrys</i>	U		x	U	s
CORVIDAE						
Violaceous Jay	<i>Cyanocorax violaceus</i>			x	U	s
Green Jay	<i>Cyanocorax yncas</i>	F		x	U	s
HIRUNDINIDAE						
Blue-and-white Swallow	<i>Pygochelidon cyanoleuca</i>	R		x	C	b s
Southern Rough-winged Swallow	<i>Stelgidopteryx ruficollis</i>			x		o
TROGLODYTIDAE						
Grey-mantled Wren	<i>Odontorchilus branickii</i>	U	b	x		s
House Wren	<i>Troglodytes aedon</i>	F	b	x	F	b s
Mountain Wren	<i>Troglodytes solstitialis</i>	F	b	x	X	s
Moustached Wren	<i>Phenagopiedius genibarbis</i>	X		x	F	b s
Fulvous Wren	<i>Cinnycerthia fulva</i>	X				s
Grey-breasted Wood Wren	<i>Hemicorhina leucophrys</i>	F		x	U	s
Chestnut-breasted Wren	<i>Cyphorhinus thoracicus</i>	R		x		s
CINCLIDAE						
White-capped Dipper	<i>Cinclus leucocephalus</i>	X				s
TURDIDAE						
Andean Solitaire	<i>Myadestes ralloides</i>	U	b	x	X	s
Spotted Nightingale-Thrush	<i>Catharus dryas</i>	R	b	x		s
Swainson's Thrush	<i>Catharus ustulatus</i>	F			F	s
White-eared Solitaire	<i>Entomodestes leucotis</i>	F	b	x	F	b s
Pale-eyed Thrush	<i>Turdus leucops</i>	F	b			s
Glossy-black Thrush	<i>Turdus serranus</i>	R	b			s
White-necked Thrush	<i>Turdus albicollis</i>				F	b s
THRAUPIDAE						
Magpie Tanager	<i>Cissopis leverianus</i>				X	o
Slaty Tanager	<i>Creurgops dentatus</i>	U	b	x		s
Black-eared Hemispingus	<i>Hemispingus melanotis</i>	F	b	x	F	b s
Rust-and-yellow Tanager	<i>Thlypopsis ruficeps</i>	X		x		o
Black-goggled Tanager	<i>Trichothraupis melanops</i>				X	b s
Silver-beaked Tanager	<i>Ramphocelus carbo</i>				C	s
Blue-winged Mountain Tanager	<i>Anisognathus somptuosus</i>	F	b	x	C	b s
Yellow-throated Tanager	<i>Iridosornis analis</i>	U		x	F	b s
Orange-eared Tanager	<i>Chlorochrysa calliparaea</i>	R			X	b s
Blue-grey Tanager	<i>Thraupis episcopus</i>	R	b	x	C	b s

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Palm Tanager	<i>Thraupis palmarum</i>	U				F	b	s	
Blue-capped Tanager	<i>Thraupis cyanocephala</i>	F		x		F	b	s	
Golden-naped Tanager	<i>Tangara ruficervix</i>	U	b			U		s	
Silvery Tanager	<i>Tangara viridicollis</i>	U				X	b	s	
Green-capped Tanager	<i>Tangara meyerdeschauenseei</i>	U		x		U	b	s	
Blue-necked Tanager	<i>Tangara cyanicollis</i>	R				F	b	s	
Spotted Tanager	<i>Tangara punctata</i>			x		F	b	s	
Blue-and-black Tanager	<i>Tangara vassorii</i>	F	b	x		F	b	s	
Beryl-spangled Tanager	<i>Tangara nigroviridis</i>	F	b	x		F		s	
Blue-browed Tanager	<i>Tangara cyanotis</i>					X		s	
Saffron-crowned Tanager	<i>Tangara xanthocephala</i>	F		x		U	b	s	
Swallow Tanager	<i>Tersina viridis</i>					F	b	s	
Blue Dacnis	<i>Dacnis cayana</i>			x		F		o	
Capped Conebill	<i>Conirostrum albifrons</i>	R		x				s	
Rusty Flowerpiercer	<i>Diglossa sittoides</i>			x				o	
Deep-blue Flowerpiercer	<i>Diglossa glauca</i>	U	b	x				s	
Bluish Flowerpiercer	<i>Diglossa caeruleus</i>	F	b	x		F	b	s	
Masked Flowerpiercer	<i>Diglossa cyanea</i>	F		x		F		s	
Black-and-white Seedeater	<i>Sporophila luctuosa</i>	R		x		F		s	
Double-collared Seedeater	<i>Sporophila caeruleus</i>					X		o	
Chestnut-bellied Seedeater	<i>Sporophila castaneiventris</i>			x				o	
Chestnut-bellied Seed Finch	<i>Oryzoborus angolensis</i>			x		F	b	s	
Bananaquit	<i>Coereba flaveola</i>			x		F	b	s	
Dull-coloured Grassquit	<i>Tiaris obscurus</i>			x		F		v	
Buff-throated Saltator	<i>Saltator maximus</i>			x		F		v	
EMBERIZIDAE									
Rufous-collared Sparrow	<i>Zonotrichia capensis</i>	R		x		C	b	s	
Yellow-browed Sparrow	<i>Ammodramus aurifrons</i>			x				o	
Chestnut-capped Brush Finch	<i>Arremon brunneinucha</i>	U		x				s	
White-browed Brush Finch	<i>Arremon torquatus</i>	F	b			F	b	s	
Black-faced Brush Finch	<i>Atlapetes melanolaemus</i>	F	b	x		F	b	s	
Common Bush Tanager	<i>Chlorospingus flavopectus</i>	F	b	x		C	b	s	
Short-billed Bush Tanager	<i>Chlorospingus parvirostris</i>	X						s	
CARDINALIDAE									
Summer Tanager	<i>Piranga rubra</i>	R						o	
Scarlet Tanager	<i>Piranga olivacea</i>					R		o	
Black-backed Grosbeak	<i>Pheucticus aureoventris</i>			x				v	
PARULIDAE									
Tropical Parula	<i>Setophaga pitiayumi</i>	R		x		F	b	s	
Blackburnian Warbler	<i>Setophaga fusca</i>	U				X		s	
Masked Yellowthroat	<i>Geothlypis aequinoctialis</i>					U	b	s	
Slate-throated Redstart	<i>Myioborus miniatus</i>	F	b	x		F		s	
Spectacled Redstart	<i>Myioborus melanocephalus</i>	R	b	x				s	
Three-banded Warbler	<i>Basileuterus tristriatus</i>	F				C	b	s	
Two-banded Warbler	<i>Myiothlypis bivittata</i>					F	b	s	
Pale-legged Warbler	<i>Myiothlypis signata</i>	F	b	x		F	b	s	
Russet-crowned Warbler	<i>Myiothlypis coronata</i>	F	b	x		F	b	s	
Buff-rumped Warbler	<i>Myiothlypis fulvicauda</i>			x				o	
ICTERIDAE									
Russet-backed Oropendula	<i>Psarocolius angustifrons</i>	U		x		U		v	
Dusky-green Oropendula	<i>Psarocolius atrovirens</i>			x				v	
Crested Oropendula	<i>Psarocolius decumanus</i>			x		U		v	
FRINGILLIDAE									
Hooded Siskin	<i>Sporagra magellanica</i>	R		x		C	b	s	
Yellow-bellied Siskin	<i>Sporagra xanthogastra</i>	U						s	
Golden-rumped Euphonia	<i>Euphonia cyanocephala</i>	X				U	b	s	
Bronze-green Euphonia	<i>Euphonia mesochrysa</i>					X		v	
Orange-bellied Euphonia	<i>Euphonia xanthogaster</i>	U		x		U		s	
Blue-naped Chlorophonia	<i>Chlorophonia cyanea</i>	U				F	b	s	

A parrot of the Caribbean? A remarkable find from a 17th-century Spanish shipwreck

Joanne H. Cooper & Philip L. Armitage

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SUMMARY.—Two small bird bones retrieved from a 17th-century shipwreck off the Florida Keys are identifiable as those of a small parrot, referred to *Aratinga / Pionus*. The shipwreck is one of the small merchant vessels of the Spanish Tierra Firme fleet lost in a hurricane in 1622, homeward bound after loading cargo in Spanish colonial ports around the northern South American coast and Caribbean. The remarkable discovery of parrot remains provides unique evidence of a probably thriving 17th-century transatlantic trade in small parrots from the New World, for which, despite appearing in contemporary art and literature, no archaeological record appears to exist in Europe.

In 1989, a suspected 17th-century shipwreck was discovered at a depth of 400 m off the Dry Tortugas islands in the Florida Keys. Subsequent excavation of the wreck in 1990–91 by G. Stemm and J. Morris of Seahawk Deep Ocean Technology pioneered the use of a remotely operated vehicle fitted with a sediment removal and filtration system, making it the first shipwreck to be excavated scientifically by a robot. Some 16,900 artefacts were recovered from the wreck, including gold and silver mined in the New World and pearls, leading to the identification of the ship as one of the vessels of the homeward-bound Spanish Tierra Firme treasure fleet of 1622, several of which foundered one day out of Cuba in a hurricane off the Florida Keys (Stemm *et al.* 2012). An assemblage of 165 animal bones was also recovered. Re-examination of these bones in 2011 identified remains of pig, sheep, cattle and chickens consumed onboard. However, considerably smaller faunal remains were also successfully retrieved, including Black Rat *Rattus rattus* and domestic cat *Felis catus* (Armitage 2012). Most remarkable of all, given the location of the wreck and the nature of its excavation, was the discovery of two bones belonging to a small parrot. We report here on the identification of these finds and their significance as evidence of 17th-century trade in New World parrots.

Material and Methods

TOR-90-00216-BN is a largely intact left femur, with some damage to its articular surfaces, most notably the trochanter is damaged and, distally, the external condyle is largely absent.

TOR-90-00170-BN is a left tarsometatarsus, also with damage to its articular surfaces. Notably, the hypotarsus and much of the trochleae are missing.

The femur was compared to a range of small and medium-sized South American, Caribbean and Afrotropical parrot taxa held in the avian osteological collection of the Natural History Museum, Tring (Table 1). Measurements were taken with calipers accurate to 0.1 mm. Osteological terminology follows Howard (1929). Only photographs were available for comparison of the tarsometatarsus with specimens.

Both specimens are now deposited in the collections of Odyssey Marine Exploration Inc., Tampa, Florida (USA).

TABLE 1

Comparative measurements of Tortugas wreck specimens with a selection of key species. Note that the shipwreck specimens' greatest length, proximal width and distal width are surviving dimensions—they are reduced by damage, albeit only slightly. All measurements in mm.

Taxon/specimen	Greatest length min.–max. mean	Proximal width min.–max. mean	Distal width min.–max. mean	Minimum shaft width min.–max. mean
Femur				
Tortugas wreck TOR-90-00216-BN	38.35	6.9	6.4	2.9
<i>Pionus menstruus</i> (<i>n</i> = 3)	36.5–38.2 37.4	7.1 7.1	7.1–7.4 7.3	2.9–3.0 2.9
<i>Aratinga wagleri</i> (<i>n</i> = 4)	36.0–38.0 37.25	7.1–7.8 7.49	6.95–7.4 7.14	2.8–3.1 2.98
<i>A. holochlora</i> (<i>n</i> = 2)	32.5–34.0 33.25	6.5–7.0 6.75	6.3–6.5 6.4	2.8 2.8
<i>A. solstitialis</i> (<i>n</i> = 2)	26.6–27.8 27.2	5.6 5.6	5.4 5.1	2.4 2.4
<i>Diopsittaca nobilis</i> (<i>n</i> = 4)	30.7–34.4 32.05	6.4–7.3 6.675	5.8–6.9 6.25	2.7–3.1 2.85
Tarsometatarsus				
Tortugas wreck TOR-90-00170-BN	17.3	7.0	8.8	4.0
<i>Pionus menstruus</i> (<i>n</i> = 2)	17.2 17.2	7.6–7.7 7.65	8.9–9.4 9.15	4.1 4.1
<i>Aratinga wagleri</i> (<i>n</i> = 4)	18.7–19.7 19.2	7.1–7.4 7.23	8.1–8.7 8.48	3.5–3.6 3.55
<i>A. holochlora</i> (<i>n</i> = 2)	16.5–18.1 17.3	6.2–6.5 6.35	7.8–8.0 7.9	3.0–3.1 3.05
<i>A. solstitialis</i> (<i>n</i> = 2)	14.6 14.6	5.1–5.4 5.25	6.5–6.7 6.6	2.8–2.9 2.85
<i>Diopsittaca nobilis</i> (<i>n</i> = 4)	15.8–17.7 16.35	5.9–6.8 6.225	7.1–8.0 7.4	3.3–3.8 3.5

Specimens examined:

Pionus menstruus BMNH 1896.6.9.2; 1925.1.27.1; 1996.57.1

Aratinga wagleri BMNH S/2002.4.1; S/2002.4.5; S/2006.51.2; S/2006.56.2

A. holochlora BMNH S/1991.1.32; S/1991.44.10

A. solstitialis BMNH S/1983.5.2; S/1989.29.2

Diopsittaca nobilis BMNH 1903.12.20.239; S/1989.27.6; S/1989.27.7; S/1992.28.1

Results

The femur is referred to family Psittacidae on the basis of the long, straight shaft, with a pronounced deflection medially of the internal condyle. In caudal view, the medial profile thus created is distinctive. Proximally, the head is proportionately large, with a simple, shallow trochanter.

The tarsometatarsus may be referred to Psittacidae based on its highly distinctive morphology, being very short and flattened, with a splayed arrangement of trochleae. The remains of the diagnostic divided and posteriorly deflected lateral trochlea are apparent. Although not available for direct comparison with modern specimens, the tarsometatarsus is sufficiently consistent in size and preservation to be considered as associated with the femur.

In terms of morphology and proportions, the specimens compare extremely closely with smaller species in the genera *Aratinga* and *Pionus* (Figs. 1–2). However, due to the

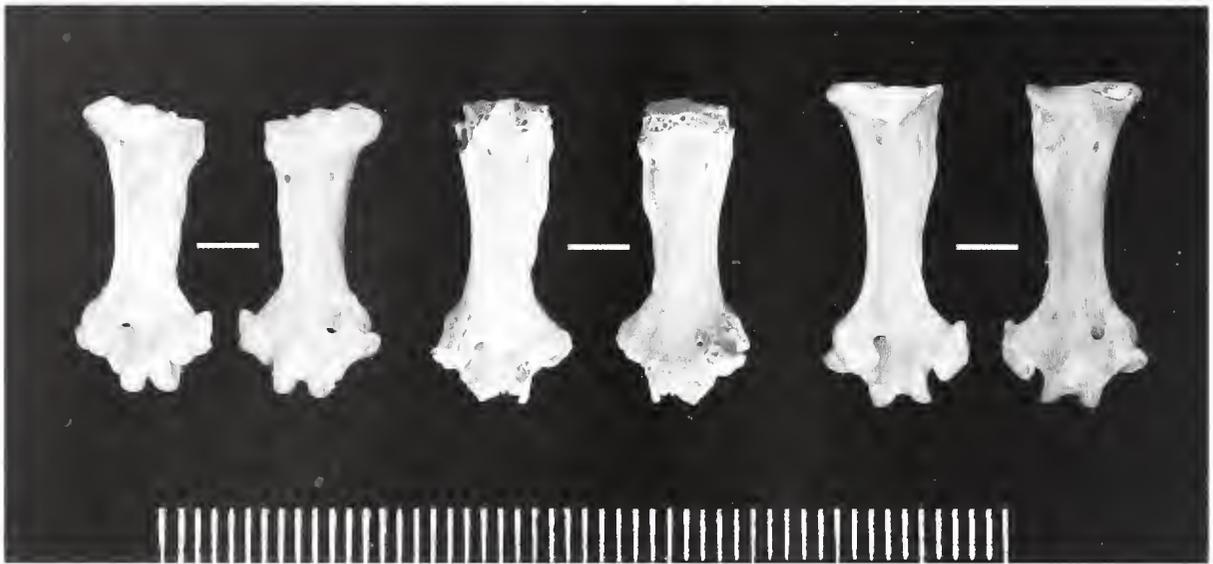


Figure 1. Tortugas wreck tarsometatarsus (centre) compared with modern specimens of left, *Pionus menstruus* (S/1996.57.1) and right, *Aratinga wagleri* (BMNH S/2002.57.1). Composite image, scale in mm (Natural History Museum, Tring, with permission of Odyssey Marine Exploration Inc.)



Figure 2. Tortugas wreck femur (centre) compared with modern specimens of left, *Pionus menstruus* (S/1996.57.1) and right, *Aratinga wagleri* (BMNH S/2002.57.1). Composite image, scale in mm (Natural History Museum, Tring, with permission of Odyssey Marine Exploration Inc.)

incomplete preservation of the specimens and the extremely wide range of potential species present in the Caribbean, Central America and northern South America (including extinct taxa), precise identification is impossible. Consequently, we recommend identification as *Aratinga* / *Pionus*.

Discussion

Based on its location, dimensions and comparison of its artefacts to other Florida wrecks known to have been part of the 1622 Tierra Firme treasure fleet, the Tortugas wreck has been identified as a Portuguese-built and Spanish-operated merchant ship sailing in the fleet, most likely the 117-ton *El Buen Jesús y Nuestra Señora del Rosario* (Kingsley 2012).

The Spanish treasure fleet system was firmly established by the mid 1500s, with two key fleets dispatched annually from Spain to its New World colonies to collect rich cargoes and return them to Spain. The fleets comprised merchant vessels, *naos*, accompanied by several large armed galleons for protection.

The 1622 Tierra Firme fleet sailed from Spain in early spring, bound for a traditional route including Cartagena, Colombia; Portobello, Panama; and the coast of Venezuela. Ships would load gold and silver from Peru, Ecuador, Venezuela and Colombia, but would also take aboard agricultural cargo. Having made the required circuit, the Tierra Firme fleet headed for Havana, Cuba, in July to rejoin the other treasure fleet, the Nueva España, and be refitted and provisioned before heading for Spain.

However, the fleets' rendezvous in Havana was delayed until late August, well into the Caribbean hurricane season. The Nueva España fleet sailed immediately, but the Tierra Firme ships did not depart until 4 September, some six weeks behind schedule. One day out, the fleet encountered a hurricane as it headed towards Florida. In the storm, several ships were lost, including three of the great treasure galleons, and the remainder of the fleet was scattered (Mathewson 1986: 22–24). Human casualties numbered over 500. Another casualty on one small merchant vessel appears to have been the small parrot, presumably confined below decks.

There are several possibilities for the presence of a parrot onboard ship. Firstly, parrots were hunted as food by 15th and 16th-century explorers; eating parrots was also common amongst native peoples of the South American and Caribbean regions visited by the Tierra Firme fleet (Boehrer 2004). However, consumption of parrots by Europeans frequently seems to have occurred when explorers were *in extremis* and was certainly not embraced in Europe, perhaps due to its perceived association with native cannibalistic habits (Boehrer 2004). For Europeans, parrots became principally valued as pets and curiosities, and were valuable in trade. The parrot of the Dry Tortugas wreck was therefore most likely either a pet of one of the passengers or crew, or was perhaps being shipped for sale in Spain.

Trade in parrots from the New World became established from the late 15th century, led by Spanish and Portuguese explorers and merchants. Transatlantic shipment of parrots to Spain for trading is recorded as early as 1494, when 60 'long-tailed parrots (macaws)' were brought from Hispaniola to Cadiz (George 1980: 80). By 1526, New World parrots were so familiar that Gonzalo Fernandez de Oviedo was able to remark in his *General and natural history of the Indies* that 'so many species have been carried to Spain, it is hardly worth while to take time to describe them here' (Boehrer 2004: 57). Exotic and expensive, parrots were commonly featured in paintings of the 1500s and 1600s, perhaps as inhabitants of paradise or as status symbols in portraits with their owners. A review of the art collections of the Museo del Prado, Madrid, reveals that macaws and amazons were the most frequently depicted during this time, with smaller parrots rarely shown (Gomez Cano *et al.* 2010).

Evidence of parrots from the art record appears somewhat overlooked, despite its potential significance in revealing early ornithological records in Europe. For example, a relatively well-known painting of a parrot by Herman Henstenburgh (1667–1726), believed to have been painted in Hoorn, Holland c.1680, was only recently formally identified by one of us (JHC) prior to its sale at the request of the vendor (Ongpin 2012). The painting depicts

a Sun Parakeet *Aratinga solstitialis*, a taxon that only appeared in formal ornithological literature from the 1730s, but was clearly known to merchants decades earlier. It is worth noting that in Amsterdam at about the time Henstenburgh illustrated the *Aratinga*, the cost of a parrot is recorded as 'roughly sixty guilders' (Margócsy 2010: 67), indicating the potential value of such species.

Information on trade in New World parrots seems more abundant in literature, though there is considerably more to be gleaned from historic art concerning contemporary knowledge of exotic species. An excellent insight into the late 17th-century parrot trade through the Caribbean, and also the many uses of parrots, is given by Sir Hans Sloane (1725) in his descriptions of the flora and fauna of Jamaica during his residency in 1687–88. Accurately identifying all seven parrot species recorded by Sloane is difficult due to his use of taxonomic names from contemporary literature that cannot be satisfactorily resolved or may be misapplied. English names are given to only a few species.

Sloane's list evidences trade between Caribbean islands and from further afield. A species identifiable as Cuban Parrot *Amazon leucocephala* is said to be 'brought from Cuba to Jamaica frequently, and are found likewise in Hispaniola'. (In fact the Hispaniolan birds were almost certainly the closely related Hispaniolan Parrot *A. ventralis*.) Another species identifiable as the smallest of macaws, Red-shouldered Macaw *Diopsittaca nobilis*, is 'brought from the Spanish Main, or continent of America frequently hither'. Interestingly, transatlantic trade from Africa is also noted; birds identifiable as Grey Parrot *Psittacus erithacus* 'are brought to the Island of Jamaica in great Quantities from Guinea' (all Sloane 1725: 297).

Sloane also recorded that various species were kept as pets, and might be trained to speak; 'the Great Maccaw', clearly Blue-and-yellow Macaw *Ara ararauna* was, according to Sloane 'more Articulate than any Bird I ever heard' (Sloane 1725: 296). He also noted that native species were eaten as well; the 'common parrot of Jamaica' aka Yellow-billed Parrot *Amazona collaria* is recorded as being 'eaten bak'd in Pyes' and tasting of pigeon (Sloane 1725: 297). Another species called by Sloane 'the Small Maccaw' and described as being 'very common in the Woods' (Sloane 1725: 297) is not readily identifiable as the name given, '*Maracaua altera Brasiliensibus*', cannot be reliably resolved (*cf.* Salvadori 1891). Whatever they were, they were 'eaten as Pigeons; but when young, ... tamed, and kept as Parrots' (Sloane 1725: 297).

Sloane's list is dominated by larger parrots, but one *Aratinga* is included, noted as being 'very common in the Island of Jamaica. And in Espanola.' (Sloane 1725: 297). Sloane did not provide a description, but his name is traceable as Peach-fronted Parakeet *A. aurea*, a small conure native to central and eastern South America, but not usually found in Central America or the Caribbean. It is possible this was another species in trade, but Sloane's conure may be one of the native Caribbean species such as Brown-throated Parakeet *A. pertinax*, the name being misapplied by Sloane due to similarities of his observed species with the descriptions given by the literature he was consulting.

Of particular significance to late 17th and early 18th-century ornithologists were the South American parrot descriptions of Georg Marcgraf (1610–44) from his explorations of Brazil in 1638, published posthumously in the *Historia naturalis Brasiliae* (Piso & Marcgraf 1648). His descriptions were incorporated almost verbatim into the works of Francis Willughby (1635–72) and John Ray (1627–1705) (Willughby 1676, Ray 1713), and were cited subsequently by Sloane (1725). Drawing on both Marcgraf and Sloane, Linnaeus (1758) provided a useful benchmark of early–mid 17th-century scientific knowledge of small South American parrots. Recognised in the tenth edition of the *Systema naturae* were three conures now in *Aratinga* (four originally described, but two have been lumped subsequently)

and only one parrot now recognised in *Pionus* (Linnaeus 1758, Dickinson 2003). Notably, these species, i.e. *Aratinga pertinax pertinax*, *A. p. aeruginosus*, Orange-fronted Parakeet *A. canicularis*, *A. solstitialis* and Red-billed Parrot *Pionus sordidus*, are all from Central America, the southern Caribbean and northern South America, their distributions overlapping with the prime traditional trading areas for merchant and treasure fleets.

For the 1622 Tierra Firme Fleet, key stops would have been the historic Spanish ports of Portobello, Panama, and Cartagena, Colombia. The significant cargo of pearls recovered from the Tortugas wreck also connects the *El Buen Jesús y Nuestra Señora del Rosario* to the historic port of Nueva Cordoba, now Cumaná, on north-east Venezuela's pearl coast (Kinsley 2012). Any of these ports would have potentially offered opportunities to trade for a wide range of mainland parrot species, and it is entirely feasible that the small parrot of the Tortugas wreck was acquired during the ship's layover at one of these ports. Cuba itself may have offered further opportunities, including the native Cuban Parakeet *Aratinga euops*. Both *Aratinga* and *Pionus* species would have undoubtedly been good subjects for trade, making attractive and amenable pets (Low 1992).

Despite the abundance of macaws, amazons and other taxa in contemporary art, literature and other documentation, physical evidence of any parrot species in 16th and 17th-century Europe is almost non-existent. Only one European archaeological find appears to have been widely reported; remains of an undetermined medium-large species similar in size to *Psittacus erithacus* found amongst 17th-century rubbish in Norwich, England (Albarella *et al.* 1997: 51–52, Bohrer 2004, Serjeantson 2009: 333). In the UK, despite the unprecedented explosion of organised archaeological excavations since 1990 following revisions of planning law, no parrots have been reported in any subsequent faunal analyses. Where are they? Their abundance in art and literature strongly suggests that there should be an associated physical record. One strong possible reason for their absence is that they may be simply going unrecognised; a known problem for other archaeologically invisible taxa such as the important horse-donkey hybrid, mule (Johnstone 2004, 2010) or Common Pheasant *Phasianus colchicus*, which are also significantly under-reported (Poole 2010). Based on our experience, for parrots this is probably due to a combination of a lack of zooarchaeologists' familiarity with parrot remains, a lack of comparative specimens readily available in archaeological units or institutes where much initial analysis is conducted and, particularly in the case of developer-funded excavation projects, a lower prioritisation of comprehensive analysis of bird remains due to perceived lack of additional interpretative value and / or lack of commissioned time.

Conclusions

The remarkable discovery of the remains of an *Aratinga* / *Pionus* parrot on the wreck identified as the *El Buen Jesús y Nuestra Señora del Rosario* from the 1622 Tierra Firme fleet provides a unique insight into the previously largely invisible 17th-century trade and movement of smaller parrot species from the New World to Europe. It is physical evidence of colonial Spain's trading connections with the Caribbean and mainland South America, potentially adding valuable live exotic birds to the more famous precious cargos transported by the treasure fleets.

In terms of understanding contemporary ornithological knowledge, it appears to be the earliest record of a small South American parrot species in trade, representing a group of taxa largely overlooked in ornithological literature until the early to mid 1700s.

Given its context, recovered from a shipwreck at a depth of > 400 m, the Tortugas wreck parrot highlights the surprising paucity of European archaeological remains from terrestrial

sites. In the absence of physical remains, the historic fine art record provides an as yet under-used resource for recording the presence of exotic species in Europe.

However, discovery of further archaeological remains in Europe would shed valuable light on the timing of discovery and arrival of parrot species in Europe, prior to the compilation of more comprehensive scientific literature. Additionally, new finds would add to our understanding of early trade in parrots and perhaps other exotic birds, not only from the New World, but potentially also from other major trading destinations across Africa, Asia and, in particular, Indonesia. We hope that the recovery of the ill-fated parrot from the Dry Tortugas wreck will encourage new vigilance amongst zooarchaeological researchers and lead to further finds of historic parrots.

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Tracking Cook's third voyage (1776–79) Hawaiian Rails *Porzana sandwichensis*, with some comments on their type status

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SUMMARY.—Hawaiian Rail *Porzana sandwichensis* is an extinct species of crane from the Hawaiian archipelago that was endemic to the island of Hawaii. The provenance of the two types in Leiden and Vienna is shrouded in mystery, as their early history is incomplete and both changed hands before reaching their current destinations. Furthermore, one or both specimens were originally described as *Rallus obscurus*, a synonym of *Porzana sandwichensis*. The known history of both specimens is reviewed, and the results of recent research are collated in order to critically review some persistent uncertainties as to their provenance.

The first account of Hawaiian Rail *Porzana sandwichensis* appears in Cook & King (1784) the official account of Captain James Cook's third circumnavigation of the globe. The Hawaiian Islands were discovered during this voyage, which visited Kauai in January 1778 and Hawaii on 17 January–4 February 1779, returning on 11 February to make repairs, before departing again on 23 February (during which time Cook was killed, on 14 February) (Stresemann 1950, Medway 1979, 1981). Cook's two ships anchored at Kealahou Bay in Kona district, where specimens of 11 bird species were collected, including at least two of Hawaiian Rail, although the precise number has never been determined (Stresemann 1950, Medway 1981).

A section describing the avifauna of Hawaii in the manuscript journal of Charles Clerke (captain of the *Discovery*) was quoted in Cook & King (1784). In it, Clerke described 'a Rail with short wings and no tail, which on that account we named, *Rallus ecaudatus*.' William Ellis, the expedition's surgeon, also depicted the rail in a painting now in the Natural History Museum (NHM), London (Folio 70) (Medway 1979, Knox & Walters 1994).

Upon the expedition's return to England, two specimens of the rail were acquired by Joseph Banks and are recorded in two catalogues of his collection compiled by Jonas Dryander. In one, the Solander Catalogue (Medway 1979), the rails comprise entry no. 110; in the other (comprising four lists), they are entry no. 125, list 3 (Medway 1979, 1981). In the latter, Dryander referred to them as *Rallus obscurus* (Medway 1981). Latham, in his *General synopsis of birds* (1785), recorded seeing specimens in the Banks collection and the Leverian Museum: apparently not realising they were the same species, he described the Banks specimen as 'Sandwich Rail' (pt. 1, p. 236) and the Leverian specimen as 'Dusky Rail' (pt. 1, p. 237). The Leverian specimen's origin is unknown, but could have been one of Banks' specimens that he had donated to the Leverian Museum. J. F. Gmelin (1789) subsequently described *Rallus sandwichensis* (p. 717) and *Rallus obscurus* (p. 718) based on Latham's 'Sandwich Rail' and 'Dusky Rail,' respectively.

In van den Hoek Ostende *et al.* (1997) the type (RMNH 87450) of *Rallus sandwichensis* J. F. Gmelin, 1789, is listed as being held at the Naturalis Biodiversity Center, Leiden, the Netherlands (hereafter Naturalis) (Fig. 1), while Schifter *et al.* (2007) listed the type (NMW 50.728) of *Rallus obscurus* J. F. Gmelin, 1789, as being in the Naturhistorisches Museum Wien (NMW) (Fig. 2). Here we summarise the known history of both specimens.



Figure 1. Specimen of Hawaii Rail *Rallus sandwichensis*, Naturalis Biodiversity Centre (NCB), Leiden (Justin J. F. J. Jansen / © NCB)

History 1789–1821

The Banks specimens.—In 1792, Banks divided his collection of zoological specimens between the British Museum and John Hunter's collection (Whitehead 1978, Medway 1981). Hunter's collection was purchased in 1799 for the Company of Surgeons, which became the Royal College of Surgeons in 1800 (Cope 1959, Medway 1981). In 1809, the college purchased a large number of specimens from the British Museum, many of them reportedly part of the 1792 Banks donation. In 1813 William Bullock received some birds in an exchange of specimens with the college. Most, if not all, were apparently part of the 1792 Banks donation to the British Museum (Medway 1981). Bullock auctioned his museum in 1819 and several of Banks' specimens were sold. Although Sharpe (1906) suggested the Bullock Museum as the origin of the Naturalis rail, no rail from the Hawaiian Islands was apparently exhibited in the Bullock Museum (Bullock 1809, 1811, 1812, 1813).

In 1845, the Royal College of Surgeons donated 348 natural history specimens, including 135 birds, to the British Museum (Medway 1981). At least 72 of the birds can be identified as those Banks donated to Hunter in 1792. Unfortunately, only two are known to survive, an Iiwi *Vestiaria coccinea* from Hawaii and Saddleback *Philesturnus carunculatus* from New Zealand (Medway 1981). Neither the RMNH nor NMW rails can be identified in these transactions.

Leverian Museum auction.—In 1806 the contents of the Leverian Museum were auctioned and an unknown number of specimens from Cook's voyages were sold. However, there is no mention of the 'Dusky Rail' that Latham saw in the Leverian Museum in the auction catalogue (King & Locheé 1979).



Figure 2. Specimen of Hawaii Rail *Rallus sandwichensis*, Naturhistorisches Museum Wien (NMW) (Justin J. F. J. Jansen / © NMW)

Bullock Museum auction.—According to the auction catalogue of the Bullock Museum (Anon. 1819), Lot 68, sold on the 17th day of the sale (27 May 1819), comprised a ‘Pair of Dusky Rails’, and Lot 68*, sold the same day, was a ‘Dusky Rail, R. Obscurus, and another; from New Zealand’ (Anon. 1819). Lord Ledbrooke purchased Lot 68 (Anon. 1819—in the Balfour & Newton Libraries, Cambridge, UK: Johnson & Hewett 1979), who was bidding for Richard Grenville, first Duke of Buckingham and Chandos (Lee 1903). The whereabouts of these birds are unknown.

Four complete copies of the Bullock auction catalogue survive, in NHM (two), in Cambridge, UK, and at Naturalis. A fifth catalogue is also known, but only from a facsimile reprinted in 1979; the original’s current location is unknown. Except for one of the NHM catalogues, all were annotated by their owners with the names of buyers next to the lots they purchased. Although the persons responsible for the annotations in the second NHM catalogue and the 1979 reprint are unknown, the Cambridge catalogue was reportedly annotated by John Latham (Newton 1891), while the Naturalis catalogue, which belonged to Coenraad Jacob Temminck, is annotated in Temminck’s own hand.

According to Sharpe (1906, citing the Cambridge catalogue), Johnson & Hewett (1979), and the NHM annotated catalogue, Lot 68* was purchased by Temminck, and Temminck’s own notes in the Naturalis catalogue also indicate that he purchased Lot 68*. However there is no reference of this in *Achats Oiseaux et Mammifères / Nota van aankopen mammaliën en vogelen in de publieke veiling van de heer Bullock in London*, a seven-page list in the Naturalis

archives, undated but also in Temminck's hand, of the specimens he purchased at the auction. Its absence from the 'Nota' does not necessarily prove that Temminck did not purchase Lot 68*, as the 'Nota' only lists nine purchases made on 27 May, while the annotated NHM catalogue and Temminck's catalogue indicate that he bought 22 lots (the Cambridge catalogue indicates fewer purchases). The difference in the number of purchases recorded in the 'Nota' and copies of the auction catalogue is a mystery that cannot presently be explained.

On the 21st day of the sale (3 June 1819), Temminck purchased Lot 37 (Fig. 3). According to the catalogue this comprised a 'Rail, undescribed; from the voyage of Captain Cook.' Although Medway (1981) believed this is the Hawaiian Rail now at Naturalis, Temminck's 'Nota' identifies Lot 37 as *Rallus longirostris*, indicating that it was actually a Clapper Rail, which is native to North and South America. However, Cook only visited one area within the latter's range, a stopover at Rio de Janeiro, Brazil, on his first voyage in November 1768. Interestingly, Lot 66, sold on 27 May (the same day as the two pairs of 'Dusky Rails') also involved a 'Long-billed Rail, *R. Longirostris*'. But, according to the annotated NHM and Cambridge catalogues, Lord Stanley bought it; Temminck's copy does not suggest that he was the purchaser.

103	<i>Falco catenatus</i>	1
105	<i>Smurcius 2721000</i>	1
127	<i>12721000</i>	1
Aug 13.		
30	<i>Tetras senegalensis</i>	1
33	<i>Phalaropus spinosus</i>	1
33	<i>Phalaropus spinosus</i>	1
37	<i>Rallus longirostris</i>	1
40	<i>Phalaropus nigricollis</i>	1
40	<i>Phalaropus nigricollis</i>	1
July 4.		
113	<i>a few containing twenty lots of spina</i>	16

Figure 3: Part of Temminck's memo held in the archives at the Naturalis Biodiversity Centre (NCB), Leiden, describing the specimens accessioned on 3 June 1819 (Justin J. F. J. Jansen / © NCB)

Discussion

The missing years: 1785–1821.—After Dryander compiled the Solander Catalogue, listing the zoological specimens in the Banks collection procured during Cook's third voyage, shortly after its return (Medway 1979), and Latham's mention of specimens of the rail in the Banks and Leverian collections, the specimens do not surface until 1821 at Naturalis. In the intervening period, they are not definitively identified anywhere, including the above-mentioned Bullock auction catalogues, nor were they in Temminck's private collection in 1807 (Temminck 1807).

Temminck at the Bullock auction.—Although it is generally believed that Temminck bid at the Bullock auction on his own behalf (Stresemann 1951), the lack of any documentation concerning his private collection in the Naturalis archives, and the existence of the 'Nota,' indicate that his purchases were made for another source, probably Leiden University. The 'Nota' is undated, but the handwriting indicates it was written c.1820 (some additions to the memo were made with a different pencil but are from the same period). In April 1819 H. Kuhl and M. H. C. Lichtenstein travelled with Temminck to London for the auction, and to study birds and mammals in the Bullock Museum and in other collections prior to the sale (Klaver 2007). The memo contains scientific names for most species, both generic and specific.

Formation of Naturalis.—Of the three collections that were merged when Naturalis was founded, only a single list (Naturalis archives) exists for one, 's Land Kabinet of Natuurlijke Historie (144 species and 200 specimens of birds), the government cabinet founded during the brief reign of King Louis Napoleon (Holthuis 1995, Farber 1997); the rails do not feature. The size and species composition of the others, Temminck's private

collection and the Leiden University collection (Holthuis 1995), on 9 August 1820 (when Naturalis was founded), are unknown. Thereafter only a 'book of presents' was kept until August 1881, when all specimens entering the collection were recorded.

1821 exchange.—Two specimens of the rail were at Naturalis in early 1821, but were separated on 27 February 1821, when Temminck, the museum's first director, included one in an exchange of specimens with NMW (73 items arrived in May 1821). Temminck's goal for the new museum was to make it the most complete collection, and he was satisfied with just one specimen of each species, or a male and female of sexually dimorphic species. Duplicates were exchanged to acquire species not yet in the Leiden collection (Gijzen 1938). As Temminck obviously would never have exchanged unique specimens in the Leiden collection, the specimen sent to NMW must have been a duplicate.

It is unclear if the two rails came from Temminck's private collection or from Leiden University. The role Temminck's private collection played in the formation of the Naturalis is unknown. According to Holthuis (1999) Temminck's collection came to Naturalis in 1830 but much of it remained packed until at least 1838. However, Temminck stated in his first annual report for Naturalis on 1 August 1821 that he exchanged specimens from his private collection with the local merchant Reindert Draak and others collected by Caspar Georg Carl Reinwardt in Indonesia. Temminck also mentioned a third collection in the same report, possibly purchases made at the Bullock auction.

Regarding the Naturalis rail, Finsch (1898) stated that there is no record of where and when Temminck acquired it. The same is true for *Prosobonia leucoptera*, Tahiti (or White-winged) Sandpiper, known only from a single specimen collected by Forster in 1773 during Cook's second voyage, which also reached Naturalis via an unknown route (Fuller 1999).

Cook specimens.—Finsch (1898) doubted that any of Cook's specimens had survived and quoted Alfred Newton: 'Cook's specimens were not skins but dried examples and have long since perished.' However, Newton was incorrect, as several specimens from Cook's voyages survive (Stresemann 1951, Steinheimer 2005). The NMW specimen retains its skull, as well as wing and leg bones, as do other Cook specimens. Furthermore, probably both rails were skins, not dried specimens, when they arrived in the Netherlands. The NWM specimen is a study skin but that at Naturalis is mounted. According to Finsch (1898), the latter was re-mounted by the museum's taxidermist, and it has artificial glass eyes with red irides and wire mounts frequently used by Leiden taxidermists at this period.

Extant data on NMW 50.728.—In the list of specimens written in Temminck's hand, sent to NMW on 27 February 1821, the rail is listed as '*Gallinula obscura* Nov. Holl.' (Fig. 4). Its label (Fig. 2), prepared by J. Natterer, was added after the specimen arrived at NMW.

Temminck's use of 'Nov. Holl.' is puzzling. He wrote mostly in French and 'Nouvelle Hollande' ('New Holland' = Australia) was used for many years at Naturalis. Given that Temminck identified the NMW bird as Latham's 'Dusky Rail' (described by Latham as *Rallus obscurus* in 1790, as Gmelin had done the year before) and that Latham (in 1785) noted that it 'Inhabits the Sandwich Islands,' Temminck's ascribing it to 'Nov. Holl.' on the NMW list is incomprehensible, as he was aware that the bird was not from Australia. A possible, but perhaps unlikely,

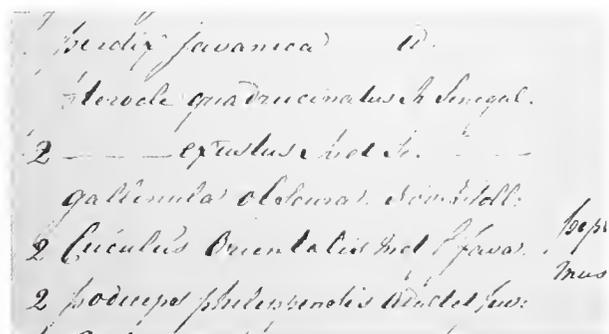


Figure 4. List of specimens sent to Naturhistorisches Museum Wien on 27 February 1821 by C. J. Temminck, from the archives at the Naturalis Biodiversity Centre (NCB), Leiden (Justin J. F. Jansen / © NCB)

explanation is that it refers to 'The New Holland Division' in Shaw's 1806 catalog of the Hunter Museum. As discussed above, Banks donated part of his collection to John Hunter in 1792, and Shaw referred to the contents of that donation in his catalogue as 'The New Holland Division' (Medway 1981). Was Temminck indicating that the NMW bird was part of that donation?

RMNH 87450.—When H. Schlegel (director of Naturalis following Temminck's death in 1858) began work on his inventory of Naturalis specimens (1862–81), there was at least some original information associated with most of them (Jansen in prep.). These data were subsequently transcribed by Schlegel and F. H. O. Finsch (curator in 1897–1904) onto new labels, during which process many mistakes were made (Jansen in prep.). After transcribing them, Schlegel and Finsch discarded the original labels and they were lost. Hence, of those specimens known to have been purchased at the Bullock auction, no information is recorded in Temminck's hand; what is available was added later by Schlegel and Finsch.

Under the base on which the Naturalis bird is mounted Temminck wrote: '*Gallinula obscura*, *Rallus* – Lath, Sandwich' ('Sandwich' was added later, in a different hand). Schlegel added: '*Crex sandwichensis*, Cat. N: 1, Cook' (Fig. 5). It is probable that '*Rallus* – Lath' was Temminck's shorthand for, '*Rallus* according to Latham,' as Temminck assigned it to *Gallinula*. Schlegel not only assigned it to a different genus again, but changed the species name from *obscurus* to *sandwichensis*, which has priority. In his *Ralli* and *Scolopaces*, pt. V (1864–65), he noted under *Crex sandwichensis* 'adulte, iles Sandwich, voyage de Cook'; he probably added the information on the specimen's base at the same time.

The bases of the Tahiti Sandpiper and Hawaiian Rail at Naturalis are very distinct from those of other small birds in the museum from the same period in having two thin wooden crosspieces nailed to the underside, which clearly link the two specimens. However, as larger birds (penguins and other seabirds) have apparently identical bases yet date from the 1870s, it is difficult to date those of the sandpiper and rail.

How many birds?—As mentioned, Dryander listed two specimens of Hawaiian Rail in Banks' private collection prior to 1782 (Medway 1979) and Latham saw two specimens (described under different names) in the Leverian Museum. However, four 'Dusky Rails' were sold at the Bullock auction on 27 May 1819 in Lots 68 and 68*. If these four specimens were Hawaiian Rails, then it is unclear how many were collected during Cook's third voyage. An analogous case is that of Tahiti Sandpiper. Dryander listed just one specimen in the Banks collection (Medway 1979), but Latham saw at least three specimens from Tahiti and Moorea (where the closely related *Prosobonia ellisi* occurred) (Latham 1781–85). Only one specimen of *P. leucoptera* survives today, in Naturalis, while *P. ellisi* is known only from two paintings, by Ellis and Webber (both of whom accompanied Cook on his third voyage), at NHM, as is a painting of *P. leucoptera* by Forster. Although two pairs of 'Dusky Rails' comprised Lots 68 and 68* at the Bullock auction, for some reason those in Lot 68 were stated to be from New Zealand in the auction catalogue, indicating that they may have been



Figure 5. The base of the mounted Hawaii Rail *Rallus sandwichensis*, Naturalis Biodiversity Centre (NCB), Leiden (Justin J. F. J. Jansen / © NCB)

Spotless Crakes *Porzana tabuensis*, rather than Hawaiian Rails. If they were Hawaiian Rails, the (anonymous) author of the catalogue was wrong.

Paler vs. darker birds.—Both rails were collected in Kona district and have paler dorsal coloration emphasising the darker centres to the feathers than the five other extant specimens (Olson 1999), all of which were collected in the mid-19th century in Puna district. Although it was formerly conjectured (Greenway 1967, Ripley 1977, Taylor 1998) that the paler Kona specimens represented immatures, Olson (1999) proposed that the differences represent geographic variation, and that Kona and Puna birds are different subspecies. The nominate Kona race was presumably paler because it inhabited the drier leeward side of Hawaii, while Puna *P. s. millsii* inhabited the wetter windward side. This accords with Gloger's Rule, which states that within species of endotherms, darker forms occur in more humid environments.

Possible sources.—The rails could have reached Naturalis from sources other than the Bullock auction. Firstly, S. J. Brugmans, director of the natural history collection at Leiden University, had direct contact with Banks in 1791 (Dawson 1958). As Banks sent Brugmans the remains of a native Australian man (www.lumc.nl/rep/0000/att/80813053317221/90928025452222.pdf: accessed 27 September 2012), it is probable that Banks donated other specimens to Brugmans as well.

Either Brugmans or Temminck could have received specimens from Bullock via exchanges. Bullock exchanged specimens with other museums, such as Paris in 1814.

No fewer than 93 ships visited the Hawaii archipelago in 1786–1819 (www.hawaiian-roots.com/shipsB1880.htm: accessed 5 August 2012). It is unknown how many stopped at the island of Hawaii, or whether any bird specimens were collected there.

J. G. A. Forster and A. von Humboldt visited the Netherlands in April 1790 and met Temminck (Raat 1976). Forster is a possible source, as he and his son, Georg, were naturalists on Cook's second voyage, and Georg procured specimens of Iiwi *Vestiaria coccinea* from a third-voyage crew member upon which he based its description in 1780 (Medway 1981).

Specimens could have been secured via the route described by Whitehead (1979); however, some collections are not described therein. Three examples from the Netherlands are worth noting. At the auction of the collection of W. S. Boers on 14 August 1797 (van Cleef & Schreurleer 1797), no fewer than two birds ('*Certhia rubra*' and '*Muscicapa taitensis*') from 'Otaheite' (= Tahiti?) and three Australian parrots were sold, indicating a relationship between Boers and Banks. The L. F. Holthuizen collection, which included seven specimens of four species of Hawaiian birds—Ou *Psittirostra psittacea*, Iiwi, Apapane *Himatione sanguinea* and Hawaii Amakihi *Chlorodrepanis virens* (Meise 1950)—and probably three from Tahiti—Blue-crowned Lorikeet *Vini australis*, Blue Lorikeet *V. peruviana* and Pacific Imperial Pigeon *Ducula pacifica*—originating from Cook's third voyage (Meise & Stresemann 1950), was auctioned in October 1793 (Lichtenstein 1793). A Hawaii Mamo *Drepanis pacifica* held in the 's Lands Kabinet of Natuurlijke Historie, one of the founding collections of Naturalis, was noted in an inventory prepared by Temminck in 1814 (Naturalis archives).

Exchanges made directly with either Ashton Lever or the Royal College of Surgeons can not be eliminated. Although no documentation exists, the rails could also have been obtained via direct exchange with the Paris museum, which has some specimens that clearly came from Banks (e.g., Yellow-tufted Honeyeater *Lichenostomus melanops*).

Conclusion

Since being separated on 21 February 1821 by C. J. Temminck, the history of the Leiden and Vienna rails has been filled with assumptions (Finch 1898, Medway 1981, Olson 1994).

The evidence of Sharpe (1906), that the specimens arrived at Naturalis via Temminck, who acquired them at the Bullock auction, was the most accurate then available.

In his catalogue of the Banks collection, Dryander listed two specimens of the Hawaiian Rail under *Rallus obscurus* (Medway 1979). Latham (1785) described the 'Sandwich Rail' from at least one of these, and Gmelin (1789) based his *R. sandwichensis* on Latham. Latham (1785) also described a bird seen by him in the Leverian Museum as the 'Dusky Rail.' That Latham used Dryander's Anglicised name indicates that it may have been one of Banks' two specimens that had been donated to Lever. Gmelin (1789) described it as *Rallus obscurus*, again based on Latham. Copies of the Bullock auction catalogue reveal that two pairs of 'Dusky Rails' were sold on 27 May 1819. If these were all Hawaiian Rails, then four specimens may have reached England, and therefore it is unknown how many specimens were actually collected on Cook's third voyage. Nor can it be determined which, if any, of the 'Dusky Rails' at the Bullock auction, if they were Hawaiian Rails, were the specimens described by Latham.

Furthermore, it is uncertain whether Temminck purchased the Lot 68* 'Dusky Rails' at the Bullock auction. Although copies of the auction catalogue, including his own, indicate that he did, the 'Nota' at Naturalis, in his own hand, suggests otherwise. As outlined, various other, equally legitimate possibilities could explain how two Hawaiian Rails reached Naturalis in February 1821 without Temminck's involvement. The inevitable conclusion is that their provenance is unclear.

Due to the lack of proper documentation and hence our inability to definitively link either of Latham's original descriptions to a specific specimen, the Naturalis and NMW specimens should henceforth be regarded as syntypes of *Rallus sandwichensis* and *R. obscurus*, and thus also syntypes of *Porzana sandwichensis* (ICZN 1999).

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A new locality and habitat type for Rondônia Bushbird *Clytoctantes atrogularis*

by Edson Guilherme & Geysa Souza Santos

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Rondônia Bushbird *Clytoctantes atrogularis* is an extremely poorly known Amazonian Brazil endemic. Described as recently as 1990, from a female specimen and field observations of two males at Cachoeira Nazaré on the west bank of the rio Ji-Paraná, Rondônia (Lanyon *et al.* 1990), *C. atrogularis* has since been recorded at five other sites (Fig. 1): Alta Floresta, Mato Grosso (Zimmer *et al.* 1997), the rio Sucunduri, Amazonas (Whitney 2005), Jaru Biological Reserve, Rondônia (D. R. C. Buzzetti *in litt.* 2006), Pousada Rio Roosevelt, Amazonas (Whittaker 2009) and Igarapés do Juruena State Park, Mato Grosso (Oliveira *et al.* 2009).

C. atrogularis is very similar to Black Bushbird *Neoctantes niger*. Both possess an upward-curved mandible, which character is unique among Thamnophilidae (Zimmer & Isler 2004, Ridgely & Tudor 2009). While *C. atrogularis* is not considered threatened at national level (IBAMA 2003), globally it is listed as Vulnerable (BirdLife International 2012), primarily due to habitat loss.

On 24 August 2012 we mist-netted a female *C. atrogularis* (Fig. 2) in *campinarana* on the Miratinga transmission line (09°21'31.2"S, 64°39'06.3"W) immediately south of the BR-364 highway, Nova Mutum / Jaci-Paraná, just over 100 km south-west of Porto Velho, the

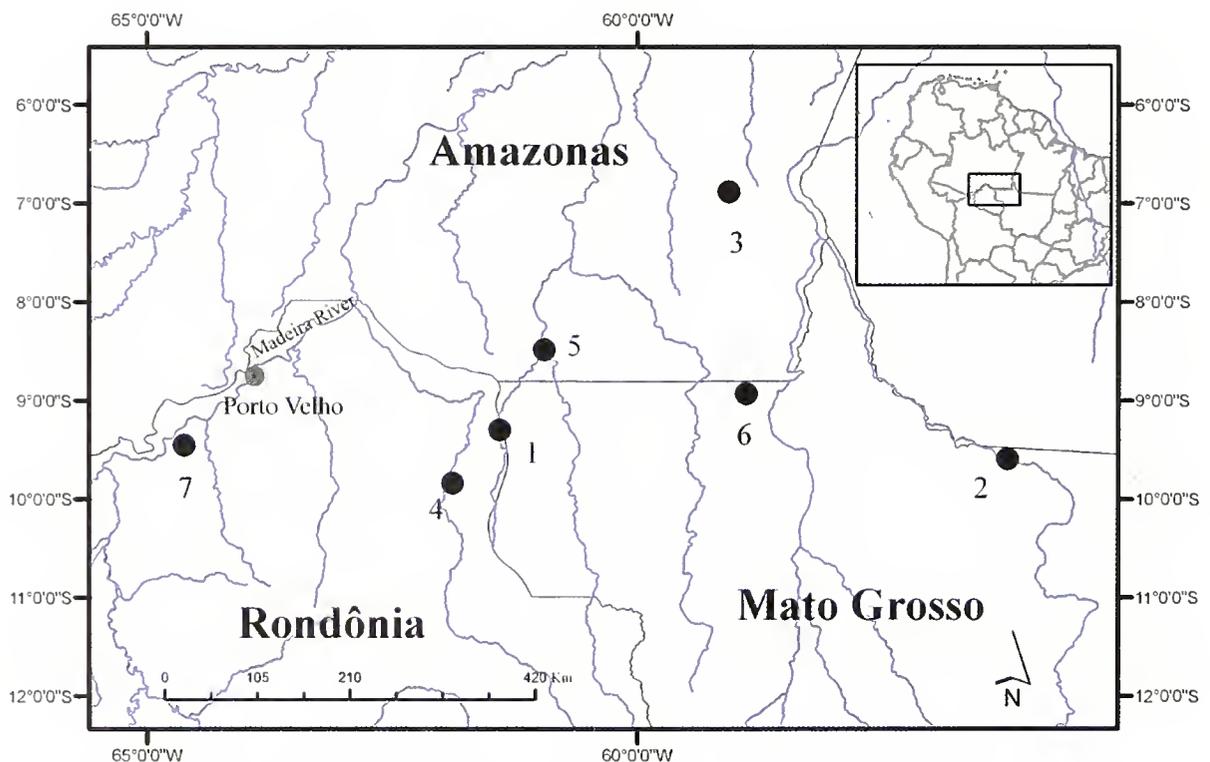


Figure 1. Known distribution of Rondônia Bushbird *Clytoctantes atrogularis*. Sites numbered in chronological order in which records were made. 1: Cachoeira Nazaré, Rondônia (type locality); 2: Alta Floresta, Mato Grosso; 3: rio Sucunduri, Amazonas; 4: Jaru Biological Reserve, Rondônia; 5: Pousada Rio Roosevelt, Amazonas; 6: Igarapés do Juruena State Park, Mato Grosso; and 7: *campinarana* at Miratinga, Nova Mutum / Jaci-Paraná, Rondônia.



Figure 2. Female Rondônia Bushbird *Clytoctantes atrogularis*, captured in *campinarana*, Nova Mutum / Jaci-Paraná, Rondônia, 24 August 2012 (Edson Guilherme)

capital of Rondônia (Fig. 1). The bird was foraging at the edge of a patch of low *campinarana* when it was trapped. It was weighed (33 g), photographed (Fig. 2) and then collected for subsequent analysis. Dissection revealed the presence of granulated ovaries (3 × 3 mm), 100% ossified skull, and fragments of arthropod exoskeletons were found in the gizzard. A tissue sample was taken for subsequent molecular analysis. The specimen (AC 473) has been deposited at the Ornithological Laboratory of the Federal University of Acre.

Rondônia Bushbird has not previously been recorded in *campinarana* habitat. In the Brazilian Amazon, *campinarana* is a unique vegetation type growing on white-sand soils (Anderson 1981). It is characterised by a relatively low canopy, with high densities of trees of reduced stature and girth, and no emergents or lianas (Anderson 1981, Fine *et al.* 2010). The *campinarana* in Nova Mutum / Jaci-Paraná is dense and low (canopy 2–5 m high) with abundant grassy patches (Fig. 3) and *Astrocaryum acaule* and *Mauritiella armata* palms, forming an enclave surrounded by fragments of *terra firme* forest and pasture. This *campinarana* was visited three times since 2010: on 2 June 2010 (60 mist-net hours), 26 February–2 March 2011 (439 net hours) and 20–24 August (400 net hours). Surveys used a combination of mist-netting and observation with binoculars. Vocalisations of some species were recorded, although playback was not employed. Despite the sampling effort, just one *C. atrogularis* was found. The lack of records may relate to the species' rarity (it appears to occur at low densities throughout most of its range) or indicate that the bird we recorded was a transient.

Our record extends the species' range c.300 km west from the nearest locality, Jaru Biological Reserve (Fig. 1). Almost all of the previous records of *C. atrogularis* were in *terra firme* forest with vines and second growth (Lanyon *et al.* 1990, Whitney 2005, Whittaker 2009), and no association with *campinarana* habitats had been reported. The species' presence in this vegetation type has important implications for our knowledge of its



Figure 3 (above). General view of the *campinarana* in the study area (Edson Guilherme)

Figure 4 (right). Patch of *campinarana* vegetation traversed by power lines adjacent to the BR-364 highway which links Porto Velho (Rondônia) and Rio Branco (Acre) in western Brazil (Edson Guilherme)



distribution within the Amazon basin as a whole. *Campinarana* are sparsely distributed and support many habitat-specific bird species (Borges 2004, Polleto & Aleixo 2005, Guilherme & Borges 2011). Such avifaunal elements are also patchily distributed and relatively sparse within the basin (Borges 2004, Whittaker 2004, Zimmer & Isler 2004, Polleto & Aleixo 2005, Ridgely & Tudor 2009, Guilherme & Borges 2011, Guilherme & Lemes 2011). The recent record of *Neotantes niger* (MPEG 74508) by EG *et al.* in *campinarana* in south-west Amazonia and now *C. atrogularis* in the same vegetation in Rondônia reinforce the idea that these two closely related species (Whitney 2005) are associated with white-sand habitats in this region of Amazonia at least.

Conservation

The area in which our record of *C. atrogularis* was made is poorly conserved. Two power lines traverse the *campinarana* we surveyed (Fig. 4) and the area has also been impacted by sand quarrying. In addition, some of the *campinas* / *campinaranas* along the BR-364 highway between Jaci-Paraná and Abunã, where *C. atrogularis* might also be found, will be flooded by hydroelectric dams under construction on the rio Madeira (Jirau and Santo Antônio), although the *campinarana* studied here will not be affected. We recommend this area become a conservation unit to prevent its complete destruction. In addition to *C. atrogularis*, this *campinarana* (and others in the same region) support the rare Buff-cheeked Tody-Flycatcher *Poecilatriccus senex* (Whittaker 2004, Guilherme & Marques 2011), as well as Black Manakin *Xenopipo atronitens*, Pale-bellied Mourner *Rhytipterna immunda*, Fuscous Flycatcher *Cnemotriccus fuscatus duidae* and Green-tailed Goldenthrout *Polytmus theresiae* (Whittaker 2004, Guilherme & Marques 2011), all of which are associated with white-sand vegetation in the Amazonian lowlands.

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On the true identity of Bluntschli's Vanga *Hypositta perdita* Peters, 1996, a presumed extinct species of Vangidae

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Peters (1996) described two bird specimens collected at Eminiminy (24°41'S, 46°48'E) in south-eastern Madagascar by the primatologist Hans Bluntschli (1877–1962), which were found during examination of boxes of unidentified bird skins held in the collections at the Forschungsinstitut Senckenberg Frankfurt (SMF). The birds (Fig. 1A–B), which must have been recently fledged young, resemble juveniles and females of Nuthatch Vanga *Hypositta corallirostris* (Vangidae) by plumage and general appearance, but differ in having a proportionately significantly shorter hind-toe than that species and a longer tarsometatarsus. Proceeding from referring the two specimens to the Vangidae, Peters (1996) assumed that they represented a distinct new species, which was named Bluntschli's Vanga *Hypositta perdita*. Since only *H. corallirostris* was found during recent surveys around Eminiminy and in the adjacent lowlands, including Andehalela National Park (Goodman *et al.* 1997, Hawkins & Goodman 1999) it seemed that *H. perdita* represented a potentially extinct form of nuthatch vanga (Peters 1996, BirdLife International 2012). However, Goodman *et al.* (1997) raised doubts concerning the validity of *H. perdita*, and it was not recognised as a valid species by the *Handbook of the birds of the world* project (Yamagishi & Nakamura 2009). For that reason the species was not included in an otherwise complete analysis of the diversification history of the Malagasy Vangidae (Jønsson *et al.* 2012). However, because of the uncertainty surrounding the status of this named taxon, we decided to undertake a genetic analysis based on toepad or skin samples of the type material. Here we present the result of that analysis, and the taxonomic implication.

Molecular data

We initially used the mitochondrial ND2 primers designed by Jønsson *et al.* (2012) to amplify short fragments (around 200 base pairs) from degraded DNA obtained from museum study skins of the Malagasy Vangidae. However, the amplification success of the syntype of *Hypositta perdita* (SMF 80500) was poor using these primers (only one out of six fragments amplified successfully) and the obtained sequence suggested a sylvoid (warbler) affinity. As this result was both surprising and confusing, we subsequently used a set of cytochrome-*b* primers that work well for a broad selection of oscine passerines. The amplification success with these primers was much higher (three out of four fragments worked well) and all of the independent sequences had a nearly complete match (only one base pair mismatch in one fragment) with the cytochrome-*b* sequence of the sylvoid White-throated Oxylabes *Oxylabes madagascariensis* (previously classified as a babbler but now in the endemic Malagasy family Bernieriidae; see Cibois *et al.* 2001, Fregin *et al.* 2012).

As the laboratory procedures were carried out at a facility exclusively used for old degraded DNA from museum samples at the Swedish Natural History Museum in Stockholm, contamination seemed unlikely, especially because *Oxylabes* tissue had never been analysed there. However, to confirm the result we conducted an independent extraction of a skin sample from the *H. perdita* type specimen (SMF 80499). The sequences obtained from the type confirmed the result as they were identical to those obtained from



Figure 1. Type (SMF 80499, A) and paratype (SMF 80500, B) of Bluntschli's Vanga *Hypositta perdita* compared to an adult White-throated Oxylabes *Oxylabes madagascariensis* (SMF 44603, C); all three specimens collected by Hans Bluntschli on 27 September 1931 at Eminiminy in south-eastern Madagascar. D: a juvenile *O. madagascariensis* specimen from Muséum National d'Histoire Naturelle, Paris, in similar plumage to the *H. perdita* specimens but with fresh yellowish feathers emerging on the throat and breast, collected 8 October 1929 (© Eric Pasquet; not to scale with A–C, masked and placed on a white background)

the syntype. In total, we obtained 773 base pairs cytochrome-*b* from the *H. perdita* specimens (429 from the holotype), of which 698 overlapped with the published GenBank sequence of *O. madagascariensis* (GenBank accession nos.: HQ706179 for *O. madagascariensis* and KC190065 for *H. perdita*). The sequence divergence of 0.1% between the *H. perdita* specimens and *O. madagascariensis* is well within the intraspecific genetic variation found in birds in general (Kerr *et al.* 2007). Considering also the high levels of divergence of cytochrome-*b* sequences among the known species of Bernieridae (Cibois *et al.* 2001), it therefore constitutes strong evidence that the *H. perdita* types are fledglings of *O. madagascariensis*.

Morphology

The external morphology of *H. perdita* is well described by Peters (1996), with special emphasis on the shapes of the bill and feet compared to those of *H. corallirostris*. The birds were recognised as fledglings (with remiges and rectrices still not fully grown), with plumages distinct from all other (examined) Malagasy birds, although most similar to the female and juvenile plumages of *H. corallirostris*. The plumage is described briefly as being dull brown with a blackish forehead, and illustrated by photographs. The main focus of the documentation was on demonstrating the differences in bill and x-ray photos of hind extremities compared to those of *H. corallirostris*. The bill was less distinctly hooked, with a shorter and less well marked gonys, a difference attributed to the young age. However, age

would be insufficient to explain the much longer tarsi and shorter toes, as *H. corallirostris* is characterised by distinct adaptations for scansorial habits with long, strongly curved claws and an extremely long hind-toe.

Juveniles of *Oxylabes* are poorly represented in collections, which makes it understandable that Peters (1996) was unable to make the relevant comparison with that species. The best-known juvenile plumage of *O. madagascariensis* resembles that of an adult but is overall more dull brown and has a yellowish-buff throat and central underparts (e.g., Sharpe 1883, Langrand 1990). However, a distinct dull brown fledgling plumage has also been recognised (Sharpe 1883, Benson *et al.* 1976; based on specimens in Tring and Paris, Fig. 1D). This is wholly dingy olive or dark olive-brown with green-yellow fringes to the wing feathers (eventually also a charcoal-grey head: Morris & Hawkins 1998). The pale buffy or buffy-yellow feathers emerge soon on the throat, neck and breast, and dull rufous feathers then appear on the crown and nape, while the green tinge is lost on the wings (*cf.* Yamagishi & Nakamura 2009). This plumage is finally replaced by the adult plumage, which is rufous-brown to dark brown with a short white supercilium and white throat (Fig. 1C). Except for the restricted blackish area on the lores and rather greyish underparts, the *H. perdita* specimens (Figs. 1 A–B) agree well with the dull brown early plumage of *O. madagascariensis* (Fig. 1D). *Oxylabes* and *Hypositta* share fused basal sections of the second and third toes, but differ in other details such as proportions of the feet and scutellation, and in these respects the *H. perdita* specimens resemble *Oxylabes*.

Conclusion

In the light of these new analyses it is evident that the two specimens referred to as *H. perdita* are fledglings of *O. madagascariensis* in a poorly known dull and nondescript brown plumage. For this reason *Hypositta perdita* Peters, 1996, is here synonymised with *Oxylabes madagascariensis* (J. F. Gmelin, 1789). Both *Hypositta corallirostris* and *O. madagascariensis* are widespread and common in the evergreen forests of eastern Madagascar (Goodman *et al.* 1997), including the Eminiminy / Andohalela area. In fact, H. Bluntschli collected an adult *O. madagascariensis* on the same date and at the same locality as the two '*Hypositta perdita*' specimens (Fig. 1C). Bluntschli may have been aware that the adult and juvenile specimens belonged together, but unlike in other cases, a species identity was not noted on the specimen labels.

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Notice of location of holotypes of two Miocene fossil birds

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Wetmore (1943) described two new species of Miocene Accipitridae, a new species of *Neophrontops*, *N. vetustus*, and a new genus and species, *Palaeastur atavus*, based on specimens provided by Harold J. Cook, from Cook's personal collection, indicated by the prefix HC. Wetmore noted that the *Neophrontops* specimen, HC691, a distal end of a right humerus, was said to have been collected from 'Stonehouse Draw Quarry', Sioux County, Nebraska, USA. The specimen was collected by Cook in March 1938, at which time the only major quarry in Stonehouse Draw was Thomson Quarry (as figured in Skinner *et al.* 1977: Fig. 2). Other quarries in Stonehouse Draw include the North Thomson Quarry (a direct extension of Thomson Quarry) and Target Quarry at the head of the draw, which was discovered in 1947 and so cannot be the source of Wetmore's specimen. Likewise, Buck Quarry in East Stonehouse Draw was not discovered until 1941 so it too cannot be the site of collection. Thomson Quarry is in the middle Sheep Creek Formation (Skinner *et al.* 1977), which dates to the late Hemingfordian North American Land Mammal Age, c.16.5 Ma. The best age estimate for HC691 is 16.4 ± 0.07 Ma (Tedford *et al.* 2004: 220) based on an orthoclase from the Sheep Creek #3 Ash, the most reliably dated of the four Sheep Creek ashes. Thomson Quarry is not far below this ash, so the fauna is slightly older than the 16.4 Ma date.

The specimen of *Palaeastur*, HC693, a distal end of a right tarsometatarsus, was collected at the *Stenomylus* Quarry (also known as the Amherst Quarry), Sioux County, Nebraska. The *Stenomylus* Quarry is in the Harrison Formation, which dates to the late Arikarean North American Land Mammal Age, c.23 Ma. The age of the quarry is based on a 22.9 Ma date for the Agate Ash from the argon⁴⁰/argon³⁹ in sanidine (Izett & Obradovich 2001). *Stenomylus* Quarry is now part of Agate Fossil Beds National Monument, administered by the National Park Service.

Following publication of the descriptions, Wetmore returned the specimens to Cook. Harold Cook died on 29 September 1962, and his fossil collection was subsequently included as part of the estate donated to Agate Fossil Beds National Monument by his widow, Margaret, in 1968. Prior to the transfer, many of the holotypes in the Cook collection were transferred to the American Museum of Natural History (AMNH), New York. Brodkorb (1964) referred to both specimens by the Cook catalogue number given by Wetmore but erroneously reported that they were at AMNH. Recent reorganisation and curation of Cook's fossil collection at Agate Fossil Beds has resulted in the 'rediscovery' of the two holotypes. Both were illustrated as natural-size line drawings in multiple views in Wetmore's paper, and comparison of the specimens with the illustrations confirms their identity as holotypes of the two species. The Cook catalogue numbers referenced by Wetmore also are written on the respective specimens. Subsequent publications referring to these species have cited the Cook catalogue numbers in Wetmore's paper. As part of the Agate Fossil Beds Museum collection, they have been recatalogued. *Neophrontops vetustus*, HC691, is AGFO 18002, and *Palaeastur atavus*, HC693, is AGFO 18003.

Both species are still considered valid and have not been synonymised, e.g. by Brodkorb (1964) and Becker (1987). Chandler (1998) concurred with this determination for *Palaeastur atavus*. Any researcher interested in studying these specimens should contact the superintendent at Agate Fossil Beds to access the specimens.

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The type locality of Plain-breasted Piculet *Picumnus castelnaui* is valid

by Thomas S. Schulenberg

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Plain-breasted Piculet *Picumnus castelnaui* was described by Malherbe in 1862, based on specimens from 'Sarayacou (Amérique méridionale)'. 'Sarayacou' or 'Sarayacu' (the commonest spelling of the site name) is a common Quechuan toponym and refers either to a site on the río Bobonaza now in eastern Ecuador (Paynter 1993) or to a locality on the río Ucayali in what now is eastern Peru (Stephens & Traylor 1983). Both localities feature prominently in collections from Ecuador and Peru in the 19th and early 20th centuries. They were visited by different collectors and, consequently, there usually is no difficulty in determining which locality is associated with a particular record. Perhaps it is inevitable, however, that two sites in the western Amazon Basin, sharing a common name, are confused occasionally (Jenkinson & Tuttle 1976).

Malherbe (1862) specified that the type of *P. castelnaui* was obtained by Castelneau. Francis de LaPorte de Castelneau (c.1812–80), accompanied by Émile Deville (1824–53), traveled extensively in South America, visiting Brazil, Bolivia and Peru. The final portion of their travels in Peru was by river, descending the río Ucayali to its mouth on the Amazon, then following the latter downstream to Belém, in Brazil (Papavero 1971). At no time did Castelneau and Deville ascend the río Bobonaza, and they never entered the current boundaries of Ecuador. Clearly the type of *P. castelnaui* originated from Sarayacu, Peru, formerly just a town, today one of six districts in the Ucayali Valley, Peru (Sarayacu town = 06°44'S, 75°06'W *vide* Stephens & Traylor 1983).

A few workers have correctly associated Sarayacu, Peru, with the Castelneau specimens (Taczanowski 1886, von Seilern 1936; see also Voisin & Voisin 2010, who do not identify the modern country associated with Malherbe's 'Sarayacou', but reiterate that the specimens were obtained by the Castelneau and Deville expedition). Unfortunately other authorities have reported, either implicitly (e.g. Hargitt 1890) or explicitly (Peters 1948), that the type of *castelnaui* originated from Sarayacu, Ecuador. As a result, Ecuador has entered the literature as part of the range of the species in numerous secondary sources (e.g., Meyer de Schauensee 1966, Short 1982). The distribution of *P. castelnaui* otherwise is centred on the río Ucayali and the western Amazon (Schulenberg & Batcheller 2012). In due time the absence of records of *P. castelnaui* from Ecuador attracted notice. Several authors, while accepting Sarayacu, Ecuador, as the type locality, suggested that the types must have originated from somewhere else (e.g. Ridgely & Greenfield 2001, Winkler & Christie 2002). Despite rampant confusion in the recent literature, the type locality of *P. castelnaui* is very well documented, and should not be questioned; suggestions that the type locality of *P. castelnaui* is in error are unwarranted.

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On a possible type specimen of *Tropidorhynchus fuscicapillus* Wallace, 1862, in New York

by Mary LeCroy

Received 11 January 2013

A recent paper on specimens of Dusky Friarbird *Philemon fuscicapillus* from Morotai Island, Indonesia, listed AMNH 697224 as a possible syntype of *Tropidorhynchus fuscicapillus* Wallace, 1862 (Besson 2012: 239). After correspondence with Besson, I did not accept this specimen as a possible syntype of Wallace's name and did not include it in my list of AMNH types (LeCroy 2011). The following are my reasons.

AMNH 697224 came to the American Museum of Natural History (New York) via the Rothschild Collection in 1932. Rothschild was cognisant of the value of prior labels and if this specimen had possessed an original label it would have remained and an additional Rothschild label would have been attached; often the history of his specimens can be unraveled based on their labels. AMNH 697224, in fact, does not even possess a Rothschild label; the single label it does bear is stamped 'Rothschild Collection' with a rubber stamp, which was done either before the specimen was shipped or after it arrived in New York, in order for its provenance to be traceable. It was one of five specimens of the species that came to AMNH with the Rothschild Collection, the other four having been collected by J. M. Dumas on Morotai (LeCroy & Jansen 2011) and were noted on the Rothschild label as having been collected by the former.

There is nothing to connect AMNH 697224 to Allen or to Wallace. There is, in fact, nothing on the label (Fig. 1) that provides a clue as to the collector. The old name '*Tropidorhynchus*' has been substituted with '*Philemon*'. Subsequently, apparently after it had been given its AMNH number, '*fuscicapillus*!' was added in a different hand. There is no locality or date of collection on the label and the reverse is blank.



Figure 1. The single label on AMNH 697224; the reverse is blank (Matthew Shanley / AMNH Staff Photographer)



Figure 2. Ventral (top) and lateral views of AMNH 697224 (Matthew Shanley / AMNH Staff Photographer)

I do not consider the characteristics listed by Besson (2012: 243) as diagnostic of Allen's skinning technique to be unique. Furthermore, the specimen itself does not exhibit the characteristics listed. Fig. 2 shows the two photographs of AMNH 697224 sent to Besson in February 2011. The neck is slightly elongated, but the breast does not bulge, nor is the abdomen very flat, and while the feet are crossed, the legs are not tied to date (see Editorial comment) .

In some cases within the AMNH type lists, I have included specimens for which I considered their type status questionable and have so indicated this in the text. In this case, I have seen no evidence to date that the specimen in question might be a type and therefore do not accept it as such.

Acknowledgements

I thank Robert Prÿs-Jones, Edward Dickinson, Thomas Trombone and Paul Sweet for comments on earlier drafts, and Frank Steinheimer for his remarks on the submitted version.

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EDITORIAL COMMENT.—The author of the paper discussed here, Ludovic Besson (*in litt.* 2013), has requested that we note that the legs of Allen's specimens are not in fact tied, *contra* Besson (2012: 243).

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