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THE SUNBIRD

Volume 23 No. 1

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HYBRID EGRET AT TOWNSVILLE

R.J. SWABY and I. BOYD

On 29 April 1992, when the freshwater swamps at Blakey's Crossing adjoining the Townsville Town Common Environmental Park (19°15'S, 146°48'E) were fast drying up, several observers saw a single, partially melanistic egret amongst many Great Egrets *Egretta alba*, Intermediate Egrets *E. intermedia*, Little Egrets *E. garzetta* and White-faced Herons *Ardea novaehollandiae*. Various photographs were taken at this time using an 800 mm telescopic lens (see Fig. 1).

Subsequently, heavy showers filling the pools prompted dispersal, but this unusual bird was still easily recognised with 10x binoculars and various telescopes until 24 May, when it disappeared. It was not seen again up to the end of July, either here or on neighbouring freshwater swamps.

Hancock & Kushlan (1984) mention melanistic forms of the Little Egret reported from East Africa, Madagascar and islands of the Indian Ocean, and intermediate forms of both morphs of the Western Reef Egret *E. gularis* in the Northern Tropics. In New Zealand, Heather (1983) photographed albinistic examples of the White-faced Heron. Marchant & Higgins (1990) make no reference to hybrid egrets and/or herons in Australia. Maddock (1991) reported a White-faced Heron with a completely white neck, similar to that of the Pacific Heron *A. pacifica*. J. Crowhurst (pers. comm.) observed a pied, black and white, Little Egret on the Cairns waterfront in October 1976 and December 1989.

The hybrid involved in the present case was unlike any of the above descriptions, being mostly white, but partially slate-grey over the back and wings, not pied with black feathers and showing no bronzed plumage. Its head, upper neck, lower body and underwings appeared white, although photographs show some greyish coloration on the face and back of the neck. The bill was dark brown, lighter at the base, with the lower mandible being slightly shorter than the upper. The eyes were dark brown or black,

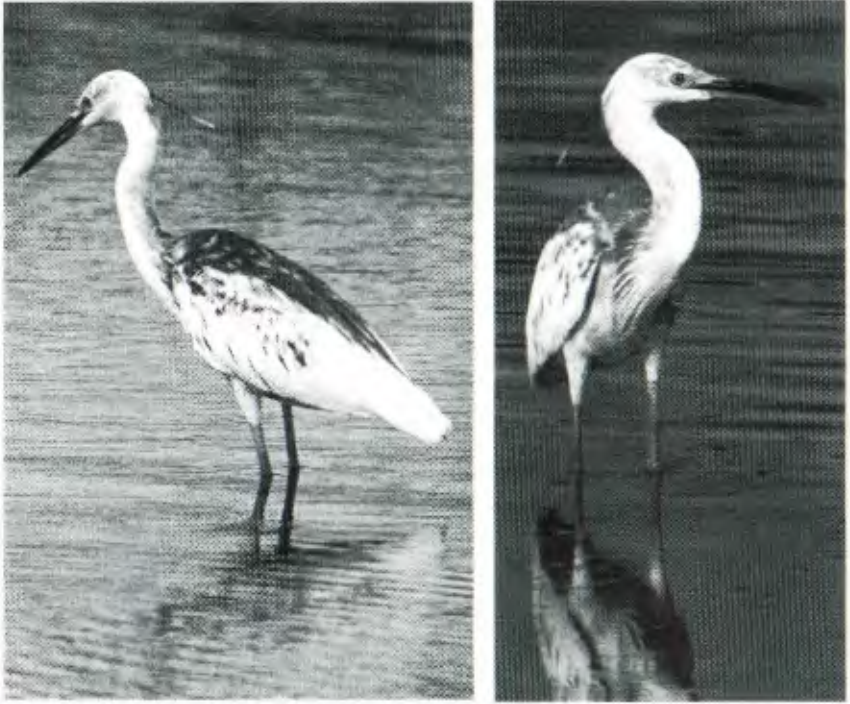


Fig. 1. Two views of the hybrid egret at Blakey's Crossing, Townsville

surrounded by off-white feathers. The mantle, base of the neck and the top half of the upper wings were covered with slate-grey lanceolate feathers, which elongated during May. The bird had a single nuchal plume, which was slate-grey tipped white and grew longer during the period of observation; no aigrettes were visible, as occurred on some other egrets present. Both feet and legs were yellow, not yellow-green or black.

The hybrid tended to feed alone in shallow water, quietly walking or actively running while stabbing its prey, in the manner of a Little Egret, and occasionally it foot-stirred the mud. Prey was swallowed with a toss of the head and a gulp, but none of the prey was turned before swallowing. When observed at rest on the muddy margins of the swamp, the bird was either hunched or had neck extended. Its flight was not laboured, like that of a White-faced Heron, being quick at take-off, then slower and regular at about four flaps per three seconds. Unlike other egrets and herons present,

it uttered no call, either at the start or end of its flight. It often landed amongst feeding flocks of other egrets or alongside solitary herons, Sacred Ibis *Threskiornis aethiopica* or Pacific Black Duck *Anas superciliosa*. No interactions, either friendly or antagonistic, were seen. When these flocks flew off in alarm at the approach of aeroplanes or helicopters, this bird sometimes joined them, though it often stayed behind as if it were a 'loner', deaf to their alarm cries. On landing it stood hunched sometimes with bill agape, as if panting, then straightened its neck.

The hybrid occasionally perched on fence posts, when the yellow colour of its legs and feet was easily seen, and its size could be compared with that of nearby egrets and herons. It appeared slightly larger than Little Egret, slightly smaller than White-faced Heron, and much smaller than Intermediate Egret. No Eastern Reef Egret *E. sacra* or Pacific Heron was ever present to compare sizes. We concluded that it was not a pied Little Egret, because dark feathers were slate-grey rather than black, while its legs and feet uppers were yellow, not black. Neither was it considered to be an albinistic White-faced Heron, for it had a nuchal plume. Evidence suggests that it is a hybrid of a Little Egret with a grey heron or egret, possibly with yellow legs, such as White-faced Heron or Eastern Reef Egret. (As the other possible parent, the Pacific Heron was eliminated because the hybrid was so much smaller, had yellow legs, lacked bronzed feathers and black spots on the foreneck, and showed no white patches on its forewings.)

The White-faced Heron could have contributed the presence of lanceolate slate-grey plumage, yellow legs and feet, and yellow pigment to the bill (making it brown, not black). Such parentage might have suppressed the formation of the second nuchal plume and aigrettes. A grey phase Eastern Reef Egret could have accounted for the slate-grey colour of both the mantle and the nuchal plume, and the yellow legs and feet; while its yellow bill pigment mixed with black might have given brown. Little Egret and Eastern Reef Egret often rest and feed in close proximity in littoral habitats, where mating might occur rarely. They usually nest in widely separate colonies, though data in Beruldsen (1992) show that breeding sites are not necessarily segregated. Marchant & Higgins (1990) state that White-faced Herons breed solitarily, whereas Little Egrets breed in simple pairs or colonially, often with other species. Nevertheless, White-faced Heron has been recorded nesting "in the company of other species" (Braithwaite & Clayton 1976), or only 100 m from an active colony of several hundred egrets (Marchant & Higgins 1990).

Thus, either of these two other species could potentially have been the hybrid's second parent. However, the fact that the hybrid fed successfully

for almost a month at an inland freshwater swamp, rather than a littoral site, suggests that the second parent was indeed a White-faced Heron rather than an Eastern Reef Egret.

ACKNOWLEDGEMENTS

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**MUSEUM SPECIMENS OF THE RED GOSHAWK
ERYTHROTRIORCHIS RADIATUS. I. ANNOTATED LIST OF
SPECIMENS**

S.J.S. DEBUS, I.A.W. McALLAN and D.A. MEAD

SUMMARY

A catalogue of at least 48, possibly 50, museum specimens of the Red Goshawk *Erythrotriorchis radiatus* is presented: 46 skins in collections (22 in Australian, 24 in overseas museums), plus two illustrative records, plus a further two literature records of specimens that were not traced. More than half of these were collected before 1900, and 90% before 1950. A third of the total came from south-east Queensland (10-11) and north-east New South Wales (6-7) in the 19th Century; the remainder came from north-east Queensland (11), Gulf of Carpentaria (5), Top End of the Northern Territory (8), and Kimberley region of Western Australia (4). In the sample, 24 were adults (13 males, 11 females) and 20 were juvenile/immature (8 males, 12 females): an almost even ratio of sex classes (23 males, 25 females) and age classes. Age and sex criteria are discussed briefly.

INTRODUCTION

The status of the Red Goshawk *Erythrotriorchis radiatus* is of considerable concern, the species having been the subject of a recent RAOU/WWF conservation project which classified it as vulnerable (Aumann & Baker-Gabb 1991, Garnett 1992). Other studies have demonstrated that it has declined in abundance and breeding distribution in eastern and south-eastern parts of its range (Debus & Czechura 1988b; Debus 1991a, 1993). The goshawk is also of considerable taxonomic and zoogeographic interest, being one of the "old endemic" raptor genera whose relationships beyond Australasia are obscure (Mathews 1915-16, preface to Vol. 5; Debus & Czechura 1988b, 1989; Olsen & Olsen 1989; Kemp & Crowe 1990; Debus 1991b; Holdaway 1991; Schodde 1993).

During recent work on the Red Goshawk, and in the course of work on a raptor field-guide (Ferguson-Lees *et al.* in press), we found that there are many more Red Goshawk specimens in overseas museums than hitherto realised; in fact, more than in Australian museums. Details on all these specimens are presented here, in order to make the data available to Australian workers and to shed further light on the species' historical status in parts of its present and former distribution. Available morphological characters of these specimens are also presented, to supplement data on age and sex characters in Baker-Gabb (1984) and Aumann & Baker-Gabb

(1991). This may enable museum curators to assign age classes to Red Goshawk skins in their care.

In this paper we list Red Goshawk skins, and clutches of eggs not previously enumerated by Favaloro (1981) or Debus (1991a). We also amend the conclusions of Debus (1991a) on the identity of four specimens: two "Moreton Bay" specimens formerly in The Australian Museum; Australian Museum specimen P1863; and *Astur testaceus* (Kaup 1847). In a second paper we shall present biological data derived from these specimens and associated literature, and compare the Red Goshawk's historical and present status in Queensland (Debus *et al.* 1993).

METHODS

All Red Goshawk specimens in Australian museums were examined by SJSJ (and some by IAWM), except for one in the Northern Territory Museum; information on that bird was supplied by S.A. Parker. Specimens in British museums were examined and measured by DAM, and colour photographs of these were examined by SJSJ. Information on overseas specimens was sought from the major zoological museums in Europe and North America, and from relevant literature. In the annotated list, the following abbreviations are used: Australian Museum (AM); Queensland Museum (QM); Mitchell Library, State Library of New South Wales (ML); Museum of Victoria (MV), H.L. White collection (HLW); South Australian Museum (SAM); Northern Territory Museum (NTM); Western Australian Museum (WAM); British Museum of Natural History (BMNH); American Museum of Natural History (AMNH).

Institutions contacted, but which did not house Red Goshawk specimens, were: Australian National Wildlife Collection, CSIRO, Canberra; Tasmanian Museum, Hobart; Queen Victoria Museum, Launceston; University of Michigan Zoological Museum, Ann Arbor; Natural History Museum, Basel; Museum of Vertebrate Zoology, University of California, Berkeley; Institut Royal des Sciences Naturelles de Belgique, Brussels; Zoologik Museum, Copenhagen; National Museum of Ireland, Dublin; Royal Albert Memorial Museum, Exeter; University of Oslo Zoological Museum, Oslo; Canadian Museum of Nature, Ottawa; Museum d'Histoire Naturelle, Rouen; Zoology Institute, Academy of Sciences, St Petersburg; Swedish Museum of Natural History, Stockholm; Royal Ontario Museum, Toronto; Naturhistorisches Museum, Vienna. We received no replies from German Museums other than the Staatliches Museum für Tierkunde, Dresden, but a colleague (J. Frank) has advised that there are no specimens in other German or Austrian institutions. Similarly, there are apparently no

specimens in Italian or Canadian museums (C. Violani and B. Millen *in litt.*). The specimen in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts was formerly at the Academy of Natural Sciences, Philadelphia and is discussed as such below.

Where possible, specimens were aged and sexed according to the criteria in Baker-Gabb (1984) and Aumann & Baker-Gabb (1991), and plumage criteria independently derived by DAM from his examination of specimens in British museums (details incorporated in the list below). Age classes of BMNH specimens were independently confirmed by C. Edelstam from his examination of them for moult and wear of remiges and rectrices. Morphological data presented by Baker-Gabb (1984) and Aumann & Baker-Gabb (1991) on specimens examined by them, are not repeated here. Plumage characters and wing measurements of AMNH specimens were supplied by M. LeCroy (*in litt.*) and D. Amadon (*in litt.*) respectively; wing and tail measurements of some of these were given by Condon & Amadon (1954; slight discrepancies noted in the list below may relate to flattened versus unflattened wing-chord measurements). On specimens in British museums measured by DAM, wing length was taken as the unflattened chord from the carpal flexure to the tip of the longest primary and tail length was from the tip of the pygostyle to the tip of the longest rectrix. Linear measurements are given in millimetres.

RESULTS

Age criteria

The plumage of the Red Goshawk has been, and will be, illustrated and described in detail elsewhere (North 1911, Mathews 1915-16, Brown & Amadon 1968, Cupper & Cupper 1981, Hollands 1984, Schodde & Tidemann 1986, Ferguson-Lees *et al.* in press, Marchant & Higgins in press). In addition to those identified by Aumann & Baker-Gabb (1991), age criteria identified by DAM and tested on Australian specimens by SJSD and IAWM were the width of rufous edging in the dorsal plumage (back/scapulars/wing coverts), the nature of dark barring and tipping on the underside of the outer primaries, and the presence of rufous edging on the basal half of the rectrices. These characters are addressed in the annotated list of specimens, below. It was found that brown eyes, rufous head, broad and extensive dorsal rufous edging (including scapulars and greater wing coverts), solid ventral rufous, obscurely barred primaries with diffuse, long dark tips, and basal rufous edging to the rectrices, go together and denote juvenility or immaturity. Conversely yellow eyes, grey face, ventral white streaking (to fully white belly in females), narrow dorsal rufous edging,

boldly barred primaries with crisp dark tips, and lack of basal rufous edging on the rectrices, also go together and denote adulthood. We note that some adult males have brown or hazel eyes, and that some breeding females may have much ventral rufous (Aumann & Baker-Gabb 1991). Differences between breeding adults and dependent juveniles are readily apparent (see Aumann & Baker-Gabb 1991), but in series of museum skins some of these characters are not always clear-cut. Anomalous (intermediate?) plumages and exceptions to these general rules were found in a few of the specimens discussed below. Examples are noted where sex criteria in adults (eye colour, rectrix colour and barring) or age criteria in males (rectrix barring) differed from those given in Aumann & Baker-Gabb (1991).

Annotated list

Specimens are listed chronologically within regions. Clutches of eggs not discussed by Favalaro (1981) or Debus (1991a) are inserted accordingly. Colour of the head or face (cheeks, ear coverts) refers to the background colour, which is heavily and darkly streaked in all age classes.

New South Wales

"Watling" specimen: nailed to a settler's hut around the settlement of Sydney c. 1790; a painting of this specimen was the type of *Falco radiatus* Latham 1801 (North 1911, Mathews 1915-16, Hindwood 1970; further discussion in Debus 1991a). Female by published measurement (total length). Only two paintings survive, both in the BMNH; monochrome prints in ML, Sydney, and one of these paintings reproduced in colour in Smith & Wheeler (1988) and Pearce (1989). These reproductions show the bird to be extensively rufous on the head, back and entire underparts, i.e. juvenile or immature (probably juvenile).

BMNH 1863.7.7.6: collected by George Caley within c. 150 km of Sydney (Parramatta, Hawkesbury/Nepean, lower Blue Mountains or Hunter Valley) between 1800 and 1810. This specimen is the type of *Haliaeetus caleyi* Vigors & Horsfield 1827. Field notes assumed to apply to this specimen by North (1911) and others actually apply to *Haliaeetus canorus* [= *Haliastur sphenurus*, Whistling Kite], cf. Vigors & Horsfield (1827). The source of this error appears to be Gould (1838), wherein the text of *Haliaeetus canorus* is opposite a plate labelled "*Haliaeetus Caleyi*"; further discussion in Debus (1991a). Outer primaries below: diffuse dark tips, well barred, intermediate between juvenile and adult. Tail above: rufous outer edges basally. Scapulars narrowly edged rufous. Upperwing coverts more broadly edged rufous. Body: almost solid rufous, some paler streaks, narrow dark shaft streaks. Face, chin and throat warm buff-rufous. Immature, possibly second-year female. Wing 420, tail 280.

Academy of Natural Sciences, Philadelphia (USA), ANSP 1401 and 1402: two specimens (male and female) acquired from New South Wales by John Gould's collectors c. 1840. They are most probably Gould's (1843) Manning and Clarence River records, although their original labels were removed (see further discussion in Debus 1991a). The female is now housed in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA. Gould's (1843) plate and plumage description, presumably of these two specimens, shows/describes a pair of birds in juvenile or immature plumage but in the absence of plumage notes on these skins we have not assigned age classes to them.

Merseyside Museum, Liverpool (UK), D368: Clarence River. "Purchased Mr Williams, Sept. 1844" (label); donated by T.M. Williams in September 1844 to the 13th Earl of Derby (C. Fisher *in litt.*). Juvenile female, wing 410, tail 276. Outer primaries below: diffuse dark tips, barring becomes obscure basally. Tail above: thin rufous edges basally except on outer pair which are browner than others. Scapulars and upperwing coverts distinctly edged rufous. Body: almost solid dark rufous; heavy black streaks become arrowheads and bars on flanks; thighs with thin black streaks. Chin and throat dark buff-grey. In most of its markings it is virtually identical to BMNH 1955.6.N.20.3216 (listed below), but is by far the darkest of the UK skins.

AM O.18250: adult male collected by E.P. Ramsay (later to be curator of The Australian Museum) 4 miles (6 km) north of Grafton, in the Clarence Valley, in September 1866 (see Ramsay 1867 and Debus 1991a for further discussion). One (= "Richmond River") of the five Red Goshawk specimens listed as in the AM by North (1911), the others being Dawson River (O.18249), Cooktown (O.13206), "Cairns" (P1863?) and Wide Bay (gallery mount?), all discussed below. Plumage of O.18250 described by Ramsay (1876), and examined by us: it has a grey face, white throat, white and grey streaks on the rufous underparts, no basal rufous edging on the rectrices (which are barred dorsally), and boldly barred undersides of primaries with crisp, dark tips. It had yellow eyes.

BMNH "Bourke" specimen: this missing mounted specimen was discussed in detail in Debus (1991a). Ramsay's references to the Red Goshawk being found in the "interior" could refer to this specimen (Ramsay 1876, 1888). Ramsay knew of this alleged specimen via Sharpe (1874), which was the inspiration for his own raptor catalogue (Ramsay 1876). However, "interior" could refer to J.B. White's specimens from the "interior of Queensland" (see below), and Sharpe (1875) later admitted to an error of scholarship on a related matter. Therefore, it is not certain that this specimen really existed.

Southern Queensland

National Museums of Scotland, Edinburgh (UK), NMS 1835-36.1: Moreton Bay, registered in 1835. Given to the NMS by Captain Clunie. Captain J.O. Clunie was the second Commandant of the Moreton Bay penal settlement, from October 1830 to November 1835 (see Pike 1966); the specimen therefore probably came from the vicinity of Brisbane. Juvenile/immature (possibly second-year) male. Wing 357, tail 222, tarsus 72 (*contra* error on label). Primaries below: dark tips same length as on BMNH adult male (75.4.19.12x, below) but less clear-cut; broken dark bars broader, more widely spaced (therefore fewer), becoming mottled with white and obscure basally. Tail above: some rufous edging basally, less extensive than on BMNH juveniles; broken bars/spots (i.e. incompletely barred). Scapulars damaged but apparently quite broadly edged rufous; upperwing coverts edged rufous. Body: damaged but apparently solid dark rufous (darker than any BMNH skins); fairly thin dark streaks. Chin/throat warm, pale buff-rufous. From registration date, clearly not one of the two Moreton Bay specimens listed as in the AM in 1837 by G. Bennett.

Museum d'Histoire Naturelle, Paris, 1846.1836: immature male, from Moreton Bay before 1846 (purchased from the Verreaux firm in Paris). All quills juvenile and worn, many new body feathers emerging, thighs and vent nearly in second plumage (C. Edelstam *in litt.*). Jules Verreaux spent five years in Australia from 1842, acquiring thousands of natural history specimens for his emporium (Whittell 1954). Therefore, this specimen may have been one of the two "Moreton Bay" Red Goshawks listed as in the AM in 1837 (*cf.* Bennett 1837; also AM P1863, listed below).

AM P1863: mounted adult female, presumably the "adult female, mounted" from "New South Wales", listed by Ramsay (1876). Original label removed from base of sole on which specimen is mounted. Face grey; underparts rufous and white; undersides of outer primaries boldly barred; no basal rufous edging on rectrices; two generations of remiges and rectrices. Collected before 1875 (see Debus 1991a for discussion on date). If collected before 1859, it may have come from Queensland (formerly the "Moreton Bay District of New South Wales") which separated from NSW in that year. Apparently one of five specimens listed as in the AM by North (1911) but, if so, there is a problem with provenance (see AM "Cairns" specimen, below). *Contra* Debus (1991a), there is a strong possibility that P1863 is one of the two "Moreton Bay" specimens listed as being in the AM in 1837 by Bennett. We speculate that of the only two Red Goshawks in the AM at the time, Bennett (as curator) permitted one to go to Paris with Verreaux in the 1840s but wished to retain the other, which would subsequently have been listed

in the Palmer Register (the "P" series: specimens in the AM before 1875, the commencement of E.P. Ramsay's curatorship).

BMNH 75.4.19.11 and 75.4.19.12x: registered in 1875; described by Sharpe (1875). Collected in the "interior of Queensland" by J.B. White, "purchased of Mr E. Gerrard" (per tags, BMNH register). Adult male and female.

No. 11 (female, from "Mitchell district"): Face grey. Primaries below have clear-cut dark tips, boldly barred. Tail: no rufous edging. Scapulars have no paler or rufous edging. Lesser upperwing coverts edged rufous; medians and greateres have some narrow rufous edges but less noticeable than on adult male. Body: much white down centre of underparts from chin to vent, with heavy black streaking. Moulting adult to adult. Wing 405, tail 265.

No. 12x (male): Face grey. Primaries below have clear-cut dark tips, boldly barred. Tail: completely barred dorsally, no rufous edging. Scapulars narrowly edged rufous or buff; upperwing coverts edged rufous. Body: rufous, streaked paler; narrow dark shaft streaks; chin, throat whitish buff. Moulting adult to adult. Wing 360, tail 225.

Mathews (1915-16, Appendix to Vol. 5) discussed J.B. White's notes (written in about 1875) on these two specimens, and on a third specimen which White also collected. The British Museum received only two of the three specimens (Sharpe 1875). Mathews, in his Red Goshawk text (Vol. 5, Part I, published in 1915), said "I have received no notes about this [species]", but in his Appendix (with Part IV, published in August 1916) said "In the preparation of this volume a bundle of notes was overlooked... [the two White specimens] were presented to the British Museum and reported on by Sharpe before the notes came to hand". The museum did not acquire White's notes, as they are not in the BMNH nor listed as being held anywhere in the UK (F.E. Warr pers. comm.). Therefore, Mathews may have acquired the notes with the third specimen from another collection.

J.B. White obviously used the term "Mitchell district" loosely, as he actually resided at Springsure (Whittell 1954), some 250 km north of Mitchell. His first Red Goshawk specimen was an adult female on a nest on the banks of Mimosa Creek, a tributary of the Dawson River, on 11 November 1870. A second female was collected at a nest on the banks of Spring Creek, a tributary of the Nogoa River, on 12 November 1873; White reared the downy nestling until it died when almost fledged. He also collected a male on 19 November 1872, but did not say from where it came (other than his broad "Mitchell district"). Two of these are clearly the male and female shown to Sharpe (1875) when White visited England, and which were purchased by the British Museum via natural history dealer Edward Gerrard who handled White's specimens (see Whittell 1954). The BMNH female (no. 11)

is probably the Mimosa Creek bird: Mimosa Creek rises in the Expedition Range and flows south-eastwards to the middle Dawson near Moura, some 300 km north-east of Mitchell. We have been unable to trace the third (female) specimen, which presumably went (with White's notes?) via Gerrard to another collection; it is possibly the "Comet River" female (AMNH 536050, discussed below). White's tail measurements almost agree with the two BMNH specimens, but his wing measurements are excessive and do not tally with BMNH and AMNH data (nor with Aumann & Baker-Gabb 1991). His method may have differed: female wings "17 inches" (432 mm) and "17½ inches" (451 mm), tails "10 inches" (254 mm); male wing "15½ inches" (387 mm), tail "9 inches" (229 mm). He described one (presumably the male) as having brownish-yellow eyes, bluish-lead cere and orbital skin, and lemon-yellow legs and feet. The captive, feathered nestling's eyes were dusky, cere and orbital skin pale blue, legs and feet pale lemon-yellow. Regrettably, White did not say whether he preserved the skin of the juvenile, and the possibility of its existence in a British collection seems remote; a known fledgling would have been a valuable reference specimen.

AM, mounted specimen in public gallery: no registration details. Juvenile female, with rufous face and underparts; evenly worn, single generation of remiges and rectrices; obscurely barred primaries with diffuse, long dark tips; slight basal rufous edging on rectrices. Apparently the "Wide Bay" specimen listed by Ramsay & North (1898) and North (1911), as some of Ramsay's material in the AM, ex Dobroyde Collection, was from the Wide Bay area. Most of the Dobroyde material was registered in 1912, long after receipt by the AM, and some display mounts may never have been registered. Ramsay and his younger brothers attempted to run a sugar-cane plantation in the late 1860s and early 1870s on the Mary River (Etheridge 1917). The specimen was probably collected after 1871, as the Red Goshawk is not on Ramsay's Wide Bay list written in late 1871 ("List of birds seen in the Wide Bay district", E.P. Ramsay diaries, ML, Sydney). As it was not listed by Ramsay (1876), it may have been collected later by his brothers. P1863 (discussed above) is probably not the Wide Bay specimen, because P1863 was already in the AM when Ramsay became curator in 1875 (see Debus 1991a).

AM O.18249: Dawson River, received by the AM in March 1883. Adult female, with grey face, some ventral white, boldly barred undersides of outer primaries, no basal rufous edging on rectrices. One of the Red Goshawk "skins" forwarded to the AM in 1883 by G. Barnard of Coomoolaroo (North 1911). North's commentary is slightly confused as to how many birds and eggs were collected by the Barnards, but suggests that at least a pair and a further "male" or even two additional "males" were

shot (cf. Favalaro 1981). North noted that George Barnard had sent Ramsay "skins" in 1883. Ramsay was overseas from early March 1883 to March 1884 (Etheridge 1917). Ramsay's notebook, dated May 1884, reveals that: "During my absence two small lots of Birds skins & Eggs for naming have been sent by Mr George Barnard of Coomoolaroo near Duarina, Queensland" (Ramsay diaries, ML, Sydney). He then lists only one Red Goshawk specimen, a female, undoubtedly this one. According to Ramsay & North (1898) there was a "male" specimen from the Dawson River in the AM, but it is no longer in the Museum and was not traced by us; it was possibly one of the Macleay Museum specimens listed below. It is possible that the "males" reported by North were actually females, and that both are in the Macleay Museum (note other cases of mis-sexing elsewhere in this list).

Macleay Museum (Sydney University), B3160 and B3161: collected in "Queensland" (from tags written by George Masters, curator of W.J. Macleay's collection). Macleay began to collect bird specimens in 1875 and passed his collection to Sydney University in 1888 (Stanbury & Holland 1988). Most of the specimens in the collection come from this period. These two goshawk specimens most probably came from E.P. Ramsay, curator of the AM. In Ramsay's diary dated 25 September 1885 he noted, "Mr Barnard has send [sic] by his son 'Tim' (=Wilfred) a small collection of birds obtained since his last consignment as follows... 2 spms of *Astur radiatus*

(α) one with narrow shaft lines and

(β) other with broad black lines down the centre of the breast feathers."

Neither of these specimens was registered in the AM, though there was an additional "male" specimen from the Dawson River recorded as being in the AM by Ramsay & North (1898). Both Macleay Museum specimens are females, wing 396 (B3161) and >400 (very worn, B3160). B3161 is an adult (sub-adult?), in moult (with new and old rectrices): face grey; extensive ventral rufous (buff on belly), with broad black streaks on breast; outer primaries boldly barred (mottled basally); rectrices lack basal rufous edging except for old feather second outermost on right, which has slight rufous on outer edge of basal quarter. Fresh and growing rectrices are slate-grey (not brown, cf. Aumann & Baker-Gabb 1991). B3160 is a faded and worn juvenile: face rufous; extensively rufous ventrally, with fine black streaks; rufous edges to basal half of rectrices; tips of outer primaries barred (but duller than B3161, mottled basally); single generation of evenly worn remiges and rectrices. B3160 could be Ramsay's α and B3161 could be β ; we now consider that (*contra* Debus 1991a) these are not the two Moreton Bay specimens listed by Bennett (1837). It is possible that the two Macleay specimens are mis-sexed "males" collected by the Barnards (see AM O.18249, above).

AMNH 536050: "Comet River" on original label (no further data), ex Mathews collection. Adult female, wing 417. Face grey; ventral plumage rufous and white; clear barring on undersides of outer primaries; no basal rufous edging on rectrices. Apparently from an annotation on the tag, D. Amadon (*in litt.*) noted that "Mathews had evidently called it *Circus assimilis* [Spotted Harrier]".

The Comet River is to the west of Coomooboolaroo, and this specimen could have been collected by the Barnards or by one of their visitors, e.g. Meek (1913) or Lumholtz (1889) who visited the Comet River. However, there is another possibility. Mathews went to England in 1902 and started his ornithological activities soon thereafter, publishing from 1907 (Mathews 1942, Whittell 1954). He amassed a large skin collection (including several Red Goshawks) in England from pre-existing British and European collections, and from his field collectors in Australia. Given Mathews' (1915-16) involvement with J.B. White's Red Goshawk notes, and his contact with bird collections and with specimen dealer Edward Gerrard, it is possible that the "Comet River" specimen is one of White's three specimens from the Springsure district (only two of which, an adult male and female, went to the British Museum: see BMNH 75.4.19.11 and 12x, discussed above). From the sequence of events concerning those specimens and publication of the parts of Mathews' Volume 5 (1915-16), it is possible that White's notes went with the third specimen via Gerrard to another collection in 1875, and that Mathews subsequently acquired the notes with that third specimen. Such a chain of events would account for the "missing" White specimen, and the missing collection details on the "Comet River" specimen. However, there are no surviving records of Gerrard's transactions and it is unlikely that any were kept (J. Gillett *in litt.*). Both specimens in question were adult females, which adds further support to the supposition that they are the same bird. White's second female was from Spring Creek (12 November 1873), about 30 km north-west of Springsure, which is itself about 50 km west of the Comet River. The Nogoa River, into which Spring Creek flows, meets the Comet River north of Springsure, and it is possible that Mathews gave the Comet as the nearest major geographical feature. Mathews disposed of part of his collection to Rothschild at Tring, and the Rothschild collection subsequently went to the AMNH (see Whittell 1954, Rothschild 1983). Some of Mathews' specimens went to the BMNH, but there were no Red Goshawks among these (per BMNH registers).

MV: one egg collected at Clermont on 5 October 1938, from a clutch of two (Len Harvey diary notes and collection recently acquired by the MV, per R. O'Brien). Measurements (57.95 x 42.92 mm) and shape match known Red Goshawk rather than Little Eagle *Hieraetus*

morphnoides eggs (D. Baker-Gabb and R. O'Brien *in litt.*; cf. Favalaro 1981).

North-east Queensland

BMNH 1965.6.N.20.3215: Rockingham Bay, no date. Ex Norwich Castle Museum (J.H. Gurney) collection, to which the specimen was presented by John Gould. Male, labelled "adult", but actually juvenile in fresh plumage (see below). Wing 358, tail 230. On 10 October 1876 Gurney wrote to E.P. Ramsay (curator, AM), requesting Red Goshawk specimens as his museum had none (Ramsay correspondence, ML, Sydney). On 1 December 1876, Gurney again wrote to Ramsay, informing him that Norwich had acquired an "adult male" of *Erythrotriorchis radiatus* but still needed the "female & young". This is undoubtedly the same specimen, as Gould died less than five years later. The collector was possibly Kendall Broadbent, who collected at Rockingham Bay in 1873 (Whittell 1954). John Macgillivray, who gave specimens to Gould, did not record this species from north-east Queensland (Macgillivray 1852). Undersides of specimen's primaries: diffuse long dark tips (reaching to notch); obscure darker spots rather than bars on whitish basal half of outer five primaries, the remainder becoming more barred but still indistinct. Tail above: broadly edged clear rufous basally; broken bars become sparse spots basally. Body: solid deep rufous, thin dark streaks. Face, chin and throat warm, pale buff-rufous. Scapulars narrowly edged rufous-buff; upperwing coverts edged rufous.

[**BMNH 1872.10.22.9:** Cape York, registered in 1872. Skeleton only, attributed by Sharpe (1874) to the Zoological Society. Examined and measured by one of us (DAM: tarsus 60, middle toe 35) and re-examined in May 1992 by R. Holdaway (*in litt.*); both independently concluded that it is a misidentified Whistling Kite (cf. Holdaway 1991, who accepted the *Erythrotriorchis* label at face value). This negates Holdaway's (1991) conclusions on the affinity of *Erythrotriorchis* with *Buteo*, and the suggestion by Debus (1991b) that *Erythrotriorchis* is related to the South American buteonine radiation.]

[**AM specimen from "Cairns":** "adult female" listed by Ramsay & North (1898) and North (1911) as in the AM; no further details available and no AM specimen currently bears a "Cairns" locality. If the five specimens listed by North were the same five as now in the AM then P1863 (q.v.), collected before 1875, is the most likely contender (see also AM unregistered gallery mount, discussed above). However, Cairns was surveyed and settled in 1876 (Appleton 1988). If P1863 is the "Cairns" specimen, then the "Cairns" label was possibly attached later, i.e. after 1876 (and in error, subsequently removed?). Mr E.J. Cairn was a Museum employee in 1887-1889, i.e. during

E.P. Ramsay's curatorship (Strahan 1979); this may have caused confusion over provenance. We speculate that in updating museum records, Cairn may have amended the label of P1863 from "[Moreton Bay District of?] New South Wales" to "Queensland" and signed it. Such confusion between personal and locality names is common in historical collections (G. Czechura pers. comm.). There is no Cairns specimen ex AM in another collection, nor any other Queensland specimens that could account for such a transaction since 1911. Nor is it likely that "Cairns" was later attached to a specimen collected from that general region by an earlier expedition, because at that time Cooktown (not Cairns) was the major centre (e.g. Meek 1913). "Cairns" specimen omitted from Table 1.]

AMNH 534013: "Cedar Bay" on one (original?) label, "Cardwell" on another. Adult male, wing 359, tail 218 (wing given as 362 by Condon & Amadon 1954). Eyes golden. Face grey; ventral plumage rufous with a few white feathers; clear barring on undersides of outer primaries; no basal rufous edging on rectrices. Ex Mathews collection, collected by A.S. Meek. Type of *E.r. queenslandicus* Mathews 1917. Cedar Bay is actually some 275 km north of Cardwell; Meek (1913) collected at both localities in 1890. Mathews (1917) stated that this specimen "differs from *E.r. rufotibia* [adult female, HLW 5369] in lacking the white abdomen", despite its trace of ventral white and the fact that ventral plumage is a sex character in adults (as well as an age character within sex classes). From label details, clearly not the AM "Cairns" specimen (q.v.): Meek was Rothschild's field collector, and specimens changed hands between Mathews and Rothschild (Mathews 1942, Rothschild 1983).

AMNH 216399: "northern Queensland", no date. Adult male, wing 357. Ex Rothschild collection, collected by A.S. Meek and therefore probably before 1900; received by AMNH in exchange before the Rothschild collection went to the AMNH (i.e. before 1932, see Rothschild 1983). Face grey; ventral plumage rufous; clear barring on undersides of outer primaries; no basal rufous edging on rectrices. As Meek was Rothschild's field collector (Rothschild 1983), this specimen cannot be the AM "Cairns" specimen (q.v.).

AMNH 534016: "north Queensland". Adult female, eyes golden. "Probably another Meek specimen" (D. Amadon *in litt.*), presumably from label characteristics. Face grey; ventral plumage rufous and white; clear barring on undersides of outer primaries; slight basal rufous edging on central two rectrices. Ex Rothschild or ex Mathews collection, and therefore not the AM "Cairns" specimen (q.v.): Rothschild employed Meek as his field collector (Rothschild 1983), and Mathews acquired specimens from European collections and from field collectors in Australia but none from the AM (Mathews 1942).

Staatliches Museum für Tierkunde, Dresden (Germany): Cooktown, 19 August 1899, purchased from H.C. Robinson 1901. Male, wing 360. "Iris yellow", i.e. adult; undersides of primaries not [boldly?] barred (S. Eck *in litt.*). Contrary to the label, H.C. Robinson collected at Cooktown in 1896 (see Whittell 1954).

AMNH 534015: Cooktown, probably collected by E. Olive (same original tag type as AMNH 534014, listed below), September 1899. Juvenile/immature male, wing 367. Eyes brown, feet yellow. Face and throat buff (some facial feathers on both sides missing or dirty and matted); ventral plumage rufous; diffuse barring on undersides of outer primaries; basal rufous edging on rectrices present. Resembles a colour photograph of juvenile male BMNH 42.1.13.2 (M. LeCroy *in litt.*). Presumably ex Mathews collection, as Mathews (1942) purchased specimens collected by Olive and later disposed of his collection to Rothschild (whose collection went to the AMNH).

AMNH 534014: Cooktown, collected by E. Olive, September 1900. Adult (subadult?) male, wing 351. Eyes brown; feet greenish yellow; cere slate. Face grey; ventral plumage rufous and white; clear barring on undersides of outer primaries; small amount of basal rufous edging on rectrices. Presumably ex Mathews and later ex Rothschild collections (see above).

HLW 5375: Kamerunga, Cairns, 18 November 1902, ex R. Grant collection. Juvenile (yearling) male, starting moult. Head and underparts rich rufous; undersides of outer primaries obscurely barred, with diffuse dark tips; basal rufous edging on rectrices. From collection date, cannot be the AM "Cairns" specimen (q.v.) which was in the AM in 1898.

AM O.13206: Cooktown, collected by E.A.C. Olive, registered in 1903. One of the five Red Goshawk specimens listed as in the AM by North (1911). Juvenile male (*contra* Condon & Amadon 1954, who called it "adult"). Head and underparts rufous; undersides of outer primaries virtually unbarred, with diffuse dark tips; rufous edges to bases of rectrices (which are completely barred); tarsal scutes unfused (unlike adult fused condition).

WAM A14803: 37 km SW of Chillagoe, 17 April 1976, collectors J.R. Ford & A. Greensmith. Adult male in fresh plumage. Cere grey; palate fleshy blue-grey; eyes dark greenish lemon-yellow; bare skin around eye greyish green; legs yellow. This specimen has richer rufous underparts, darker reddish-brown edges to the wing coverts and some back feathers, and is darker and much greyer dorsally than the three juvenile females in the same collection; it has a grey face, bold primary barring and no basal rufous edging on rectrices. Discussed by Ford *et al.* (1980).

QM: three colour transparencies only, of a bird collected by a QNPWS survey team at Whiphandle Creek, Port Stewart (near McIlwraith Range) on 25 March 1979 (photographs supplied by QM). Juvenile female. Cere and facial skin pale blue; eyes apparently dark (brown?); legs pale creamy yellow. Head and underparts rufous (paler on belly); undersides of outer primaries barred; no basal rufous edging on rectrices visible in photos. The specimen was shot for identification purposes then discarded, without a written record of its measurements, weight, soft parts or stomach contents. There has been no published report of this faunal survey, and the only information available is that the bird was collected in tall paperbark riverine forest (D. McFarland *in litt.*).

Gulf of Carpentaria

SAM B20019: Byrimine (Qld), 8 April 1910, collected by W. Macgillivray. Immature female, apparently moulting into second-year plumage. Eyes olive-brown. Head and underparts rufous; undersides of primaries barred (outer primaries being renewed descendently); basal rufous edging on rectrices (on old and new feathers). Originally considered by Macgillivray (1914) to be an adult male.

HLW 5371: Borroloola, Macarthur River (NT), 24 May 1913, collector H.G. Barnard. Adult female. Eyes bright yellow. Underparts extensively rufous, but paler (almost white) on belly. Undersides of outer primaries barred, with dark tips; no basal rufous edging on rectrices. This and the next two specimens were discussed by Barnard (1914).

HLW 5372: Borroloola, Macarthur River (NT), 19 September 1913, collector H.G. Barnard. Adult female. Eyes pale yellowish brown. Plumage similar to HLW 5371. This and the next bird were breeding birds, their eggs also collected (see Favaloro 1981).

HLW 5373: Borroloola, Macarthur River (NT), 14 September 1913, collector H.G. Barnard. Adult male (*contra* Condon & Amadon 1954, who regarded it as immature). Eyes "pale lemonish yellow". Undersides of outer primaries boldly barred; rectrices barred dorsally (though incompletely), with slight trace of basal rufous (fine, pale edges).

WAM A14804: 18 km E of Croydon (Qld), 10 May 1976, collector J.R. Ford. Juvenile female in evenly worn plumage, no moult or new feathers. Gape, bare facial skin (including cere) and palate pale blue; eyes brown; legs pale greenish grey. Head and underparts rufous (paler on belly); undersides of outer primaries obscurely barred with diffuse long, dark tips; rectrices have basal rufous edging. Discussed by Ford *et al.* (1980).

Northern Territory

BMNH 42.1.13.2: Port Essington, collected by Capt. W. Chambers, RN. Registered in 1842 and listed by Sharpe (1874). Chambers was at Port Essington from November 1839 to March 1841 (Whittell 1954). Juvenile male in fresh plumage, wing 354, tail 223. Face rufous; underparts solid deep rufous; chin/throat warm, pale buff-rufous. Undersides of primaries: diffuse long, dark tips (reaching to notch); obscure darker spots rather than bars on white basal half of outer primaries, the remainder becoming barred but still indistinct. Tail above: broadly edged clear rufous basally; sparse and broken bars become spots basally. Scapulars and all upperwing coverts broadly edged deep rufous.

Rijksmuseum van Natuurlijke Historie, Leiden (Netherlands): Port Essington. According to a label under the socle, in Temminck's hand, the specimen was "présenté par Mr Wilson" (G.F. Mees *in litt.*). The specimen dates from before January 1858, as Temminck died during that month. Schlegel (1862) noted that the donor was H. Wilson. Mr H. Wilson may have been an intermediary, as there was no person of this name associated with Port Essington (Calaby in Frith & Calaby 1974; Spillett 1972). Female, wing 385; possibly juvenile/immature: primaries with grey, not very pronounced bands on the undersurface, underparts with narrow black streaks (G.F. Mees *in litt.*).

AMNH 534012: Katherine River, July 1895, collector Knut Dahl. Adult male, wing 350, tail 220 (wing given as 353 by Condon & Amadon 1954). Type of *E.r. katherine* Mathews 1916. Hartert's emendation to *E.r. katherinae* as given by Greenway (1973) is incorrect. Mathews' name was a noun in apposition and thus need not be changed. Age class of specimen confirmed by Mathews' (1915-16) description and colour plate (opposite his p. 87); it had yellow eyes. Diffuse barring on undersides of outer primaries; no basal rufous edging on rectrices. Specimen presumably ex Mathews collection, as he acquired Dahl specimens (Mathews 1942), and subsequently ex Rothschild collection (see other AMNH specimens, discussed above).

[National Museums of Scotland, Edinburgh (UK), NMSZ 1925.9 527: clutch of two eggs in the McEacharn Collection, taken on 2 October 1899 on the Finke River; as well as the date, the figure "16" is pencilled on both eggs which measure 54.6 x 44.7 and 56.2 x 44.7 (B. McGowan *in litt.*). Presumably misidentified Little Eagle eggs, which are very similar in dimensions and appearance to Red Goshawk eggs (see Favaloro 1981).]

AM O.61260: additional Red Goshawk clutch recently acquired by the museum, in the Bettington Collection (Bettington being a friend of oologist H.L. White). One egg taken by "E.J. Newman" at Darwin, 30 May 1902. Possibly an error for J.H. Neimann, who collected other Red Goshawk eggs in the area at that time (see Favaloro 1981).

SAM B1451: Bathurst Island, 10 September 1913, collector W.D. Dodd. Apparently immature male, in very faded and worn plumage. Head and underparts rufous; undersides of primaries boldly barred; no basal rufous edging on rectrices. This specimen was discussed by Zeitz (1914).

HLW 5374: King River, 9 November 1915, collector W. McLennan. Adult male (*contra* Condon & Amadon 1954, who regarded it as immature). Cere dull blue; eyes yellowish olive. Undersides of outer primaries obscurely barred; dorsal tail barring faint, no basal rufous edging to rectrices. This specimen was discussed by White (1917a,b).

[**AM O.36202:** clutch of two eggs in the A.F. Bassett Hull Collection, collected in the James Ranges, southern NT, on 21 August 1923 by F.L. Whitlock. We could not examine these, but they are presumably misidentified Little Eagle eggs (see other misidentified southern NT clutch, listed above, and Favaloro 1981).]

US National Museum, Washington DC (USA): specimen acquired by Deignan (1964), collected on his behalf by D.H. Johnson on Cobourg Peninsula, 28 September 1948. Adult male, according to Deignan. Wing c. 340; primaries barred beneath (R.L. Zusi *in litt.*).

SAM B26473: Mt Bundy Station (just west of Kakadu National Park), 15 May 1962, collected by SAM party. Adult male. Face grey; underparts rufous with white throat; upperparts with much grey; undersides of outer primaries barred, with clear-cut dark tips. Spread wing registered separately as SAM B25579 (Figure 3 of Debus & Czechura 1988a); no basal rufous edging on rectrices.

NTM 4840: Deaf Adder Creek (now in Kakadu National Park), 26 September 1969, collector B.L. Bolton. Adult male. Eyes golden; skin around eye pale grey; cere light grey; legs and feet pale creamy yellow (per S.A. Parker).

Kimberley

HLW 5370: Napier Broome Bay, 18 December 1909, collector G.F. Hill. Adult female. Described and discussed by Campbell (1911) and Hill (1911); plumage similar to HLW 5369.

HLW 5369: Napier Broome Bay, 21 June 1910, collector G.F. Hill. Adult female. Type of *E. rufotibia* Campbell 1911; described and discussed by Campbell (1911) and Hill (1911). Eyes yellow; cere grey. Face grey; underparts white with heavy brown streaks and rufous thighs; undersides of primaries boldly barred; no basal rufous edging on rectrices. Breeding female, her hatching egg also collected (see Hill 1911, Favalaro 1981).

WAM A6158: Ord River (near main dam), 22 July 1945, collector K.G. Buller. Juvenile female, in evenly worn plumage, no moult or new feathers. Eyes brown (lighter than WAM A5919); cere milky blue; palate flesh-blue; feet pale grey. Plumage similar to WAM A14804 (above). Originally misidentified as Square-tailed Kite *Lophoictinia isura* and mis-sexed as male by Buller (per tag).

WAM A5919: 4¹/₂ miles (7 km) from Broome, 21 April 1948, collector K.G. Buller. Juvenile female in evenly worn plumage, no moult or new feathers. Eyes chocolate-brown; cere and skin around eyes milky blue; palate flesh-pink; legs and feet greyish yellow. Plumage similar to WAM A14804 (above). Originally misidentified as Square-tailed Kite by Buller (per tag).

Unknown provenance

University Museum of Zoology, Cambridge (UK), 13/Acc/18/b/1: "Australia", collected by H.E. Strickland, 1840; "obtained from Arthur Strickland". Strickland purchased 500 specimens around 1838, acquired from dealers (Salvin 1882). Adult (subadult?) female, wing 400, tail 273, tarsus 88. Primaries below: clear-cut dark tips, boldly barred, bars mottled basally. Tail above: no rufous edging. Scapulars have some narrow rufous or buff edging; all upperwing coverts edged rufous. Body: mainly pale rufous, darker on flanks, pale buff on abdomen, giving overall rather streaky appearance; dark streaks thinner, less dense, than on adult female BMNH 75.4.19.11. Face grey; chin/throat buff. Age of individual possibly younger than 75.4.19.11.

Academy of Natural Sciences, Philadelphia (USA), ANSP 1400: "Australia", ex Rivoli Collection. The Rivoli Collection was acquired by T.B. Wilson for the Academy in 1846 (de Schauensee 1957), therefore the specimen was collected before this date. Male, wing 365.

[Grand Ducal Museum, Darmstadt (Germany): According to Mathews (1915-16), an early synonym of *Erythrotriorchis radiatus* was *Astur testaceus* (Kaup 1847: 367) from "New South Wales". Debus (1991a) assumed that this was an original description by Kaup of a third specimen (i.e. not the Watling or Caley specimens, discussed above). However, a reappraisal of Kaup (1847) shows that he did not examine a new Red

Goshawk specimen. Kaup (Part V, col. 367) listed *Astur testaceus* Ernest, Latham and *A. radiatus* Latham, G. Gray, Gould from "Asia, Australia" as synonyms (i.e. Kaup was not the authority for *testaceus*), and (*contra* Mathews 1915-16) he did not mention New South Wales. Kaup then stated (col. 374) that a description of *Falco japonensis* Latham "looks [to Kaup] like *Astur testaceus* or *radiatus* Latham. It is possible that Latham described the juvenile plumage". In his revised systematic list, Kaup (col. 379) then listed *Astur testaceus* Ernest, Latham, *radiatus* Latham and *Sparverius rhombeus* Vieillot as synonyms. Furthermore, it is obvious that his *Astur testaceus* (col. 367) is identical with his *A. radiatus* (description, Part III, cols 195-196); he knew of "only two specimens in the Gouldian and one in the British Museum"; and he examined raptor specimens in "the museums in Frankfurt, Leyden, London, and Mr Gould's private collection" (C. Edelstam *in litt.*). There was much early confusion over the application of names to Red Goshawk and other specimens (*cf.* also Vigors & Horsfield 1827, Gould 1843, Sharpe 1875, Mathews 1915-16), and it appears that *Astur testaceus* Ernest is a synonym for an Asian *Accipiter*. We have been unable to examine Ernest's manuscript.]

AMNH 9761: former "ancient" mount (D. Amadon *in litt.*), "*Buteo*, New Holland", i.e. 19th Century. Ex Maximilian (Prinz zu Wied) collection, presumably one of Rothschild's royal friends. Immature female, wing 420+. Face buff to rufous; ventral plumage rufous and white; clear barring on undersides of outer primaries; slight basal rufous edging on two central rectrices. Resembles a colour photograph of BMNH 1863.7.7.6 (juvenile/immature female), but head paler, throat streaks heavier (M. LeCroy *in litt.*)

BMNH 1955.6.N.20.3216: "Australia", collected by a Mr Barlow, ex Norwich Castle Museum (J.H. Gurney) collection, i.e. collected before 1890 (the date of Gurney's death: see Whittell 1954). Female, wing 400, tail 270. Labelled as adult, but actually juvenile in fresh plumage. Undersides of primaries: well barred, with diffuse dark tips. Obscure rufous edging to bases of rectrices. Scapulars and all upperwing coverts distinctly edged rufous (though this tending to buff on scapulars). Body: solid deep rufous, heavily streaked dark. Face, chin and throat warm, pale buff-rufous.

DISCUSSION

The age criteria identified by us agree with, and can be used to supplement, those of Aumann & Baker-Gabb (1991): underwing barring and basal rufous edging on the rectrices generally fit their criteria concerning facial and ventral colour. The few anomalies may be birds in transitional plumage, with individual variation in the rate of change of the various characters

(ventral plumage, primaries, rectrices). Basal rufous on the rectrices is a trivial and variable character, apparently absent in some juveniles or immatures and traces persisting in some adults. The data suggest that within an age class, females tend to have more heavily barred primaries than males, and that a few adult males may have rather obscurely barred primaries (but more barred than juvenile males). However, the specimens examined by us show that some adult males can have yellow eyes, and completely barred central rectrices dorsally (like adult females), and that some juvenile males can have rather obscurely barred central rectrices dorsally (*cf.* Aumann & Baker-Gabb 1991). Perhaps the eyes of males get progressively paler with age, and take longer to change from brown to yellow than those of females. Primary and rectrix barring appears rather variable within age and sex classes, and rectrix barring may not be a useful age character.

Similarly, the dorsal colour of the central rectrices in adults may not be a useful sex character. On the basis of one live adult of each sex in the hand, Aumann & Baker-Gabb (1991) stated that males have grey and females have brown central rectrices. However, we note that Aumann & Baker-Gabb (1991) meant to say that adult females' rectrices are barred brown and grey dorsally, whereas adult males' are just grey (D. Baker-Gabb *in litt.*). It is apparent from museum specimens, and also published colour photographs (Cupper & Cupper 1981, Hollands 1984), that females in fresh plumage have slate-grey remiges and rectrices, and that in both sexes the fresh slate-grey fades to grey-brown with wear. In some adult specimens, there is no sexual difference in the colour of the central rectrices. In any case, it is a trivial character when compared with more obvious sex characters such as size and ventral plumage.

The specimens suggest that Red Goshawks moult into a second plumage resembling that of their first (juvenile) plumage, though perhaps with bolder primary barring, and that attainment of adult plumage is gradual over two or more moults. Some breeding females, with otherwise adult characters (e.g. grey face, yellow eyes), have extensively rufous underparts, which suggests a progressive loss of ventral rufous over several years. This may apply to a lesser extent to breeding males: most adults have some ventral white streaking, although some are almost entirely rufous ventrally (T. Aumann *in litt.*). The end-point in the gradual acquisition of full adult plumage appears to be extensive ventral white (in females), and a slate-grey cast to the dorsal plumage, with reduction of dorsal rufous edging (particularly on the rump), although these characters may also be individually variable. Caution is required in assigning age classes on the basis of ventral plumage, and further work is required on plumage changes in the Red Goshawk.

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MAGPIE-LARK ATTACK ON BLUE-FACED HONEYEATER

M.D. COBCROFT

At 1030 h on 30 December 1991 I was attracted by a loud cacophony of squawking birds from the footpath of my residence in central Ipswich (27°37'S, 152°46'E). The property is heavily planted with native shrubbery and lies directly opposite the southern boundary of Limestone Park, the main recreational park of Ipswich, which is timbered with mature eucalypts and other trees.

The cause of this disturbance was a Blue-faced Honeyeater *Entomyzon cyanotis*, recognised as being an immature bird by the yellowish green colour around its eye. The young honeyeater was grounded close to the road edge and surrounded by eight squawking adults, either on the ground or in the branches of a low shrub, in a circle about 1 m in radius. Some birds were actually crouched on the roadway, oblivious to the passing traffic. Also centre-stage was a pair of Australian Magpie-larks *Grallina cyanoleuca*, the male vigorously pecking at the head of the distressed honeyeater. The bird was lying semi-prone, barely moving and holding its left wing away from its body, perhaps in self-defence. Contributing as much noise as the Blue-faced Honeyeaters were several Noisy Miners *Manorina melanocephala* sidling along low branches about 3 m from the action in typical head-dipped and bill pointed-up fashion, but taking no direct part. A Common Mynah *Acridotheres tristis* seated a little higher and further off was joining the loud barracking. Two other species, the Silvereye *Zosterops lateralis* and Superb Fairy-wren *Malurus cyaneus*, were observed within a 10 m radius but showed no apparent interest in the commotion.

I rescued the immature bird which quietened the disturbance, for the other birds quickly dispersed. The injured bird was bleeding from some stab-like punctures on its crown but the left wing seemed intact. When I placed it in a high tree it was able to flap easily from one branch to another as it went higher up. It lingered for approximately 30 minutes while one adult remained nearby, making no attempt at approach. They were not seen after this time.

These are the first Blue-faced Honeyeaters I have seen at my property in sixteen years of observation, although they are common in the park opposite. Magpie-larks are resident at the property, while Noisy Miners are infrequent visitors, never seen more than once or twice a year. A pair of the introduced Common Mynah began patrolling my lawns in June 1991.

DISCUSSION

I do not know how this situation arose. Perhaps the immature bird had been caught in the slipstream of a car and dumped on the road edge where its distressed state attracted the attention of the Magpie-larks as well as that of the other birds.

Blue-faced Honeyeaters are noted for their raucous congregations, often in loose association with other honeyeaters, but it is a relationship of some fragility due to the aggressiveness of these birds (Longmore 1991). Vociferous displays by Noisy Miners are the hallmark of the species (MacDonald 1973). The interaction of these two closely allied species is thus nothing unusual. Pugnaciousness is also characteristic of the introduced Common Mynah. Fights between individuals excite much interest within Mynah flocks (Ali & Ripley 1987), and aggression towards other species is common (Blakers *et al.* 1984).

Aggression in the Magpie-lark is usually a territorial imperative directed towards other Magpie-larks, and includes the well-known but misguided attacks upon its own image in windows, car hubcaps, etc. (Kloot *et al.* 1990). Aggressive behaviour in birds is of much complexity, mostly triggered by external stimuli (Campbell & Lack 1985). It seems unlikely that the intrusion of Blue-faced Honeyeaters into the Magpie-larks' territory represented any threat to the latter's food supply, reproductive success (as in the case of cuckoos or rivals), or safety (as with predators such as raptors). It is more likely, perhaps, that the distressed movements and calls of the immature honeyeater triggered a type of aggression akin to the determined assaults on weak or wounded birds by gulls and barnyard fowls. The purpose of this behaviour remains unclear, but it may serve to quickly remove an individual whose continued presence would otherwise attract the unwelcome attention of predators and pose a potential threat to the integrity of the whole flock. I have not been able to find any documented records of attacks by Magpie-larks on any species of honeyeater.

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BOOK REVIEW

WHERE TO FIND BIRDS IN NORTH EAST QUEENSLAND. Jo Wieneke. Published by the author, 22 Bishop St., Belgian Gardens, Townsville, Q 4810, 1992, 124 pages, \$15.00.

Jo Wieneke, a resident of Townsville, is well known from previous publications for her knowledge of the subject. The present book has a colour photograph of a Southern Cassowary on the front cover and another of a Torresian Imperial-Pigeon on the rear cover. Drawings and maps within are in monochrome. Pages are 210 mm x 150 mm, and the spiral bound format can be very useful, particularly if the book is left open on a car seat for travelling reference. The binding is plastic coated wire which does not have the disadvantages of those plastic finger bindings that tend to tear pages.

This book is well organised and includes a map of the total area of concern. In the introduction, there are sections referring to the weather, landforms, suggested visiting months, land tenure and birds in general. Major bird haunts are next grouped into the Townsville area, Mt. Spec to Tully, Mission Beach, Innisfail to Edmonton, Cairns, Atherton Tableland and north of Cairns. Specific places within these groups are discussed and reference to their location can be made in the clear accompanying maps. Useful information is under headings of accommodation, addresses and contacts, QNPWS Information Centres, societies and clubs, and bookshops. The birding spots are described using references to some of the most interesting species and habitats to be found at these places. Much of this is quite detailed, and having used the book in the field I can assure you of its accuracy.

An annotated list of species recorded in the area is valuable in itself. An added bonus is a "Key to Northern Rainforest Possums" compiled by Dr Nicky Goudberg. Finally there are lists of recommended reading, cassette recordings of bird calls, and maps and guides, as well as indices to both bird and place names. Amazingly, Jo has now released a 1993 update, not to correct any of the avifaunal information, but rather to give new addresses of some offices, etc. recently relocated in the area.

This beautifully produced book is invaluable for anyone travelling in the area between the Burdekin and the Daintree. The printing is easy to read and the text is elegantly written. At this price it is a bargain. I have compared it to many books with similar subject matter dealing with other areas. I find it one of the easiest to use and consider the information it contains to be more relevant than that found in most others.

IAN VENABLES, 7 Aberfoyle Street, Kenmore, Q 4069.

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SERVENTY, D., SERVENTY, V.N. & WARHAM, J. 1971. *The Handbook of Australian Sea-birds*. Sydney: Reed.

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