

Threatened Birds of Asia:

The BirdLife International Red Data Book

Editors

N. J. COLLAR (Editor-in-chief),
A. V. ANDREEV, S. CHAN, M. J. CROSBY, S. SUBRAMANYA and J. A. TOBIAS

Maps by

RUDYANTO and M. J. CROSBY

Principal compilers and data contributors

■ **BANGLADESH** P. Thompson ■ **BHUTAN** R. Pradhan; C. Inskipp, T. Inskipp ■ **CAMBODIA** Sun Huan; C. M. Poole ■ **CHINA** ■ **MAINLAND CHINA** Zheng Guangmei; Ding Changqing, Gao Wei, Gao Yuren, Li Fulai, Liu Naifa, Ma Zhijun, the late Tan Yaokuang, Wang Qishan, Xu Weishu, Yang Lan, Yu Zhiwei, Zhang Zhengwang. ■ **HONG KONG** Hong Kong Bird Watching Society (BirdLife Affiliate); H. F. Cheung; F. N. Y. Lock, C. K. W. Ma, Y. T. Yu. ■ **TAIWAN** Wild Bird Federation of Taiwan (BirdLife Partner); L. Liu Severinghaus; Chang Chin-lung, Chiang Ming-liang, Fang Woei-horng, Ho Yi-hsian, Hwang Kwang-yin, Lin Wei-yuan, Lin Wen-horn, Lo Hung-ren, Sha Chian-chung, Yau Cheng-teh. ■ **INDIA** Bombay Natural History Society (BirdLife Partner Designate) and Sálím Ali Centre for Ornithology and Natural History; L. Vijayan and V. S. Vijayan; S. Balachandran, R. Bhargava, P. C. Bhattacharjee, S. Bhupathy, A. Chaudhury, P. Gole, S. A. Hussain, R. Kaul, U. Lachungpa, R. Naroji, S. Pandey, A. Pittie, V. Prakash, A. Rahmani, P. Saikia, R. Sankaran, P. Singh, R. Sugathan, Zafar-ul Islam ■ **INDONESIA** BirdLife International Indonesia Country Programme; Ria Saryanthi; D. Agista, S. van Balen, Y. Cahyadin, R. F. A. Grimmett, F. R. Lambert, M. Poulsen, Rudyanto, I. Setiawan, C. Trainor ■ **JAPAN** Wild Bird Society of Japan (BirdLife Partner); Y. Fujimaki; Y. Kanai, H. Morioka, K. Ono, H. Uchida, M. Ueta, N. Yanagisawa ■ **KOREA** ■ **NORTH KOREA** Pak U-il; Chong Jong-ryol, Rim Chuyon. ■ **SOUTH KOREA** Lee Woo-shin; Han Sang-hoon, Kim Jin-han, Lee Ki-sup, Park Jin-young ■ **LAOS** K. Khounbolin; W. J. Duckworth ■ **MALAYSIA** Malaysian Nature Society (BirdLife Partner); K. Kumar; G. Noramly, M. J. Kohler ■ **MONGOLIA** D. Batdelger; A. Bräunlich, N. Tseveenmyadag ■ **MYANMAR** Khin Ma Ma Thwin ■ **NEPAL** Bird Conservation Nepal (BirdLife Affiliate); H. S. Baral; C. Inskipp, T. P. Inskipp ■ **PAKISTAN** Ornithological Society of Pakistan (BirdLife Affiliate) ■ **PHILIPPINES** Haribon Foundation for Conservation of Natural Resources (BirdLife Partner); N. A. D. Mallari, B. R. Tabaranza, Jr. ■ **RUSSIA** Russian Bird Conservation Union (BirdLife Partner Designate); A. V. Andreev; A. G. Degtyarev, V. G. Degtyarev, V. A. Dugintsov, N. N. Gerasimov, Yu. N. Gerasimov, N. I. Germogenov, O. A. Goroshko, A. V. Kondrat'ev, Yu. V. Labutin, N. M. Litvinenko, Yu. N. Nazarov, V. A. Nechaev, V. I. Perfil'ev, R. V. Ryabtsev, Yu. V. Shibaev, S. G. Surmach, E. E. Tkachenko, O. P. Val'chuk, B. A. Voronov. ■ **SINGAPORE** The Nature Society (Singapore) (BirdLife Partner); Lim Kim Seng ■ **SRI LANKA** Field Ornithology Group of Sri Lanka (BirdLife Affiliate); S. Kotagama; S. Aryaprema, S. Corea, J. P. G. Jones, U. Fernando, R. Perera, M. Siriwardhane, K. Weerakoon ■ **THAILAND** Bird Conservation Society of Thailand (BirdLife Partner); U. Treesucon; R. Jugmongkol, V. Kongthong, P. Poonswad, P. D. Round, S. Supparatvikhorn ■ **VIETNAM** BirdLife International Vietnam Country Programme; Nguyen Cu; J. C. Eames, A. W. Tordoff, Le Trong Trai, Nguyen Duc Tu.

With contributions from: S. H. M. Butchart, D. S. Butler (maps), P. Davidson, J. C. Lowen, G. C. L. Dutson, N. B. Peet, T. Vetta (maps), J. M. Villasper (maps), M. G. Wilson

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Wellbrook Court, Girton Road, Cambridge, CB3 0NA, United Kingdom

Tel: +44 1223 277318 Fax: +44 1223 277200 Email: birdlife@birdlife.org.uk

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GURNEY'S PITTA

Pitta gurneyi

Critical A2b,c,d; B1+2a,b,c,e; C1; C2b; D1
Endangered A1a,c,d
Vulnerable D2



This pitta is classified as Critical, but only just survives and is on the verge of extinction. It has a single, tiny, declining population, which occupies an extremely small, declining range. Its rate of decline is predicted to increase as a result of the continued destruction of its remaining forest habitat, compounded by trapping for the cagebird trade.

DISTRIBUTION Gurney's or the Black-breasted Pitta was historically restricted to the "semi-evergreen" rainforest biome of southernmost Myanmar and southern (peninsular) Thailand, and is now known with certainty from a single small site, Khao Nor Chuchi, in Krabi province, Thailand (in this respect the accompanying map, by showing localities at which the species has been recorded in the past 20 years, could be misunderstood as indicating a wider range and stronger situation than is in fact the case). Records, arranged north to south within country, are as follows:

■ **MYANMAR** **Lenya** ("Laynah"), Tenasserim, May 1875 (Hume and Davison 1878; male in BMNH); **Sungei Baleihgyi** ("Sungei Balik"), Tenasserim, February 1904 (Riley 1938, Collar *et al.* 1986); **Telok Besar** (presumably "large bay"; see Remarks 1), March 1904 (Riley 1938, Collar *et al.* 1986); **Maliwun** ("Malewoon"), Tenasserim, March–April 1875 (Hume and Davison 1878; two specimens in BMNH), February 1877 (Oates 1883, female in RMNH); **Bankachon** ("Bankasoon"), Tenasserim, February–April and December 1875, April–June 1877 (Hume and Davison 1878; 30 specimens in BMNH), January 1914 (Abdulali 1968–1996, Collar *et al.* 1986); **Kampong Pulo Tonton** ("Palaw-ton-ton"), Tenasserim, April 1875 (Hume and Davison 1878, Collar *et al.* 1986; female in BMNH); unspecified site in Tenasserim, undated (Harington 1909a);

■ **THAILAND** inland of **Prachuap Khirikhan** (previously Koh Lak) by the border with Myanmar at about 11°50'N 99°40'E, immature male, December 1914 (Gyldenstolpe 1916, Collar *et al.* 1986); **Ban Khlua Klang**, **Huai Yang**, Prachuap Khiri Khan, December 1952 (Collar *et al.* 1986; see Remarks 2); **Ban Saphan** district, Prachuap Khiri Khan, before 1983 (Collar *et al.* 1986; see Remarks 3); **Sathani Map Ammarit** ("Maprit"), January 1916 (Baker 1919–1920, Collar *et al.* 1986); **Klong Bang Lai** (apparently also Ban Salui), January 1916 (Baker 1919–1920, Collar *et al.* 1986); **Ban Tha San** ("Tasan"), Chumphon, March 1919 (Robinson and Kloss 1921–1924, Collar *et al.* 1986); **Ranong**, 1875 or 1877 (Hume and Davison 1878; see Remarks 4); **Tha Chana**, Khlung Yan, a single male heard, January 1987, with one pair and a single male, 1988 (Gretton *et al.* 1993, P. D. Round *in litt* 1998); **Ban Han Not** ("Hannaat"), May 1916 (Collar *et al.* 1986); **Ban Kok Klap**, Surat Thani, June and July 1913, "very common indeed" (Robinson 1915), with an unspecific record from the province (formerly "Bandon"), July 1929 (Collar *et al.* 1986); **Khlung Yan** valley, Khiri Rattthanikhom district, two pairs in a tiny forest patch 20–30 ha in area, 1988 (Gretton *et al.* 1993); **Khlung Phraya Wildlife Sanctuary**, at four sites just outside the protected area, 1987, but not relocated there in 1988 (Gretton *et al.* 1993; see Threats), although one male was present in June 1992 (P. D. Round and U. Treesucon *in litt.* 1997); **Klong Wang Hip** ("Klong Wahip") north of Thung Song, Nakhon Si Thammarat, a nesting pair, October 1915 (Herbert 1923–1926, Collar *et al.* 1986); **Khao Phanom Bencha** (Khao Bhanam Bencha) Wildlife Sanctuary, two females, an immature female and a male nestling collected, August 1936 (Meyer de Schauensee 1946;

see Remarks 5), with several calling males along the eastern margins (but outside the boundary of) this protected area during 1987–1988, in small lowland forest patches (Gretton *et al.* 1993); **Ban Suan Maphrao** (=Ta Maphrao, i.e. “Tapraw”; see Remarks 6), April 1879 (Collar *et al.* 1986); **Klong Tung Sai** (Klongtun Sai), Phuket Island, one male, December 1917 (one in BMNH; Robinson and Kloss 1918b); **Khao Nor Chuchi** (Khao Pra-Bang Khram Wildlife Sanctuary and Bang Khram National Reserve Forest), near Ban Bang Tiew, Khlong Thom district, June 1986 (Round and Treesucon 1986a), and present there and in surrounding areas (see, e.g., under Migration) until the present (Gretton *et al.* 1993, many observers *in litt.* 1990–2000) and Tambol Aow Tong, Wang Wisaiet district (the other side of Khao Nor Chuchi), Trang, one pair (but probably 5–6 pairs), December 1986, with at least four territories, 1987–1988, and small numbers also present 1989–1991 (Gretton *et al.* 1993; also P. D. Round *in litt.* 1998); **Khlong Muan** (“Krong Mon”), apparently in February 1910, since this is the date of a Giant Ibis *Thaumatibis gigantea* (see relevant account) taken in the course of the same explorations at this locality (Robinson and Kloss 1910–1911, Collar *et al.* 1986); **Ban Lamphu La** (“Lam-ra”), eight collected, January and February 1910 (Robinson and Kloss 1910–1911, Collar *et al.* 1986; see Remarks 7); **Ban Khuan Khan** (“Ko Khan”), January 1910 (Robinson and Kloss 1910–1911, Collar *et al.* 1986; see Remarks 8); **Khao Kachong** (“Chong”), Trang, four collected, at least one at 75 m, December 1909 (Robinson and Kloss 1910–1911, Collar *et al.* 1986).

POPULATION This species has one of the very lowest known populations of bird (or any animal) species on the planet, with just 11 pairs (originally thought to be 12) and two spare males counted in a survey at Khao Nor Chuchi in mid-2000 (Y. Meekaeo *in litt.* 2000, P. D. Round *in litt.* 2000). There is a clear possibility that another population exists in Myanmar,



The distribution of Gurney's *Pitta pitta gurneyi* (but note that only site 23 is currently known to hold the species): (1) Lenya; (2) Sungei Baleihgyi; (3) Telok Besar; (4) Maliwun; (5) Bankachon; (6) Kampong Pulo Tonton; (7) Prachuap Khirikhan; (8) Huai Yang; (9) Ban Saphan; (10) Sathani Map Ammarit; (11) Klong Bang Lai; (12) Ban Tha San; (13) Ranong; (14) Tha Chana; (15) Ban Han Not; (16) Ban Kok Klap; (17) Khlong Yan; (18) Khlong Phraya Wildlife Sanctuary; (19) Klong Wang Hip; (20) Khao Phanom Bencha; (21) Ban Suan Maphrao; (22) Klong Tung Sai; (23) Khao Nor Chuchi; (24) Khlong Muan; (25) Ban Lamphu La; (26) Ban Khuan Khan; (27) Khao Kachong.
○ Historical (pre-1950) ● Fairly recent (1950–1979)
● Recent (1980–present)

but it is crucial that neither the hope for such a population, nor even the fulfilment of that hope, should in any way weaken or compromise the determination to save the species at its one site in Thailand.

Gurney's Pitta has a most remarkable history. It was discovered in 1875, fairly widely collected and reported in the 1910s and 1920s, but (from the scientific literature) last seen in 1936 (Meyer de Schauensee 1946) until its rediscovery in 1986 (Round and Treesucon 1986a). At the start of 1986, therefore, it had appeared to be eligible for listing as extinct under the CITES guideline criterion of not having been seen in the wild for 50 years (having last been seen in Myanmar in 1914: see Distribution), but the previously undocumented 1952 specimen was then discovered in USNM, and in any case captive birds had been reported in Britain up to 1975 (Vince 1980; see Collar *et al.* 1986, also Wilkinson 1992) and in Thailand in the period 1966–1968 and in the early 1980s down to June 1985 (Collar *et al.* 1986); indeed, hitherto unreported birds were available in Thailand from the late 1950s to the early 1970s (see Remarks 9) and reached the USA in the late 1960s (see Remarks 10). Clearly, however, the fact that in the mid-1980s no living field ornithologist was known ever to have seen the species in the wild was a powerful indication that it was probably in serious trouble.

It is clear from recent research and early reports that in the right habitat Gurney's Pitta can and did live at relatively high densities. Although in general in what is today southern Myanmar it was “by no means a common bird even where it does occur” (Hume and Davison 1878), it was nonetheless “common at foot of the hills about the southern extremity of Tenasserim” (Hume 1875c), and locally sufficiently common to be heard, in the mornings and evenings, “answering one another in all directions” (Hume and Davison 1878); and while it was “apparently not nearly so common” on Phuket as on the mainland (Robinson and Kloss 1918b), it was “very common indeed” around Ban Kok Klap (Robinson 1915a), and “equally common” at Ban Thasan (Robinson and Kloss 1921–1924), both in Thailand.

These reports evidently led mid-century reviewers of the species to describe it as occurring “rather commonly” (Riley 1938) and being apparently “fairly plentiful” (Gibson-Hill 1949b) and “fairly common locally” (Glenister 1951). By the 1970s this confidence was starting to wane, however, and Lekagul and Cronin (1974) could only use the adjective “uncommon”, which was presumably the source in King (1978–1979) and Bain and Humphrey (1982) for it being “now scarce over much of its range in Thailand”. It is, of course, ironic that all these comments were made by people with no direct field experience of the species, and in a period (1938–1982) when, apart from the neglected 1952 specimen, nobody else had any either—they were relying entirely on the pronouncements from the period 1875–1925; but it is doubly ironic that each of these generalisations was probably fairly accurate, since the species would have remained at its typical densities—and therefore common—inside its favoured habitat until that habitat itself became so uncommon that no species it contained, however great the local abundance, could be considered anything but scarce. In other words a steady but cumulatively extensive habitat loss ever since the 1920s, with a commensurate decline in numbers of Gurney's Pitta, can be inferred (a) from the fact that 62 skins of the species, none of them dated after 1919, are housed in BMNH, and (b) from the situation encountered in 1986, when every last findable remnant of level lowland forest, the long suspected habitat and one known originally to have clothed the entire range of the species, was being cut down (P. D. Round *in litt.* 1998; see Collar *et al.* 1986, Round and Treesucon 1986a). By the mid-1980s a maximum 4.7% of the original rainforest cover of lowland (under 200 m) peninsular Thailand remained (Round 1988a), and this probably equated to 4.7% of the original population of Gurney's Pitta in the country; and in the past 15 years the situation has deteriorated further (P. D. Round *in litt.* 2000).

The population at Khao Nor Chuchi at the time of the rediscovery in 1986 was at least 39 pairs in Bang Khram (the area now covered partly by the wildlife sanctuary and mostly by the forest reserve), with a further 5–6 pairs in Tambol Aow Tong (P. D. Round *in litt.* 1998).

Following the clarification that the species was, as suspected, a lowland specialist (this finding being obstructed by the elevations from Khao Phanom Bencha: see Remarks 5), a series of surveys in the period 1987–1989 led to an estimate of a total of 24–48 pairs (or territories) throughout peninsular Thailand, of which 20–30 pairs were in or around Khao Nor Chuchi (Gretton *et al.* 1993). In the 250 ha core study area at Khao Pra-Bang Khram there were seven confirmed territories in 1987 and nine in 1988 (Gretton *et al.* 1993). During the same seasons there were a further six unconfirmed territories in the core area (only two of which remained the same between the two years), i.e. 9–15 pairs, equating to a density of 3.6–6.0 pairs per km² (Gretton *et al.* 1993). The majority of territories located in 1987 were still present in 1988 (in some cases in adjacent areas): only one confirmed 1987 territory was not occupied the following year (Gretton *et al.* 1993). In 1988 and 1992, a significant number of territories were located away from the study area, some in very degraded and fragmented forest, but by 1992 much of the secondary forest had been cleared and there were only 21 pairs to be found in 30 km², with a single singing male at the south end of Khlong Phraya Wildlife Sanctuary in June 1992 (Gretton *et al.* 1993).

Despite the triumph of the rediscovery, therefore, areas of forest were very rapidly being lost at the main site (Bang Khram) in the late 1980s, enough for at least nine and possibly c.20 pairs to disappear in the five years from 1988 to 1992, i.e. 25–50% of what was to prove to be the last known salvageable population on the planet, since researchers in the years 1987–1989 also found that most birds at sites outside Khao Nor Chuchi were doomed by impending clearance (e.g. Collar 1987, Gretton *et al.* 1993, Lambert 1996).

The population has since declined further owing to loss of habitat. No more than 14 pairs could be located (16 pairs estimated) in Bang Khram National Reserve Forest in 1995, falling to about nine pairs in 1997 (Aow Tong was not surveyed during these times) (P. D. Round *in litt.* 1998, Round ms). No birds have reliably been reported from Aow Tong since 1992, although the area has not been recently surveyed, some small patches of suitable habitat remain, and at least one unconfirmed aural report was made in 1996 (P. D. Round *in litt.* 1998). As noted above—claims for larger numbers notwithstanding (see Remarks 11)—the total known population in 2000 was 24 birds.

ECOLOGY *Habitat* Gurney's *Pitta* is and almost certainly always was restricted to extreme lowland semi-evergreen rainforest as represented in peninsular Myanmar and Thailand by the "Thai-type" seasonal forest that exists between 7°N and 12°N—indeed it is the only bird species endemic to this area and forest type (see Round 1988a). It never ventures into open land or even into gardens (except when in transit: P. D. Round *in litt.* 1998), and favoured localities (unsurprisingly for a *pitta*) are narrow, densely wooded but virtually undergrowth-free valleys lying between hills (Hume and Davison 1878). In recent years the link has been confirmed with gully systems where moist conditions prevail year-round, usually with access to water in small streamlets, such features forming the central element of territories (Gretton *et al.* 1993); and a low density of undergrowth was apparent in all territories visited with Y. Meekao in 2000 (B. R. Sykes verbally 2001). However, one breeding territory in July–August 1987 was situated on a small (c.2 ha) mound joined by a narrow neck of land to nearby forest but otherwise surrounded by rice paddies, the only available water being rain puddles (Gretton *et al.* 1993). The species appears to be chiefly associated with secondary, regenerating forest (P. D. Round in Lambert 1996; see Remarks 12), often with palms present, and often in areas close to the forest edge (Gretton *et al.* 1993); 85% of territories in 1988 contained small streams or gullies and spiny palms over 1 m tall (Gretton 1988). However, there is no truth in the view made by some Royal Forest Department (RFD) officials that Gurney's *Pitta* is positively associated with human habitation or plantations (Round ms). Moisture and shade appear to be crucial: since almost all feeding takes place on the forest floor, the nature of the understorey vegetation, the humidity and composition of the leaf-litter, and the availability of

earthworms appear to be of greatest importance in determining the distribution of Gurney's Pitta (Gretton *et al.* 1993, Round ms). Robinson (1915) reported the species as "not extending far up the slopes", and at Khao Pra-Bang Khram all territories lie between 80 and 140 m, with most situated below 100 m (P. D. Round *in litt.* 1998); the presumed wanderer (in April 2000) described by Banwell and Round (2000) was originally thought to be holding a territory at 400 m but the elevation of the area has now been confirmed as 250 m (B. R. Sykes verbally 2001).

Food Adults feed most commonly by tossing the leaf-litter aside with sideways flicks of the bill, sometimes giving short probes into the loose topsoil (Round and Treesucon 1986a). The diet comprises "snails, worms, slugs and insects of all kinds" (Hume and Davison 1878), and a spider was seen being caught (Lambert 1996). Worms, insect grubs (including a 3–4 cm long larva), de-shelled snails, winged insects including locusts, cicadas, beetles, cockroaches and butterflies, and, less commonly, small frogs are amongst the items seen fed to nestlings (with the majority of feeding visits being in the afternoon, presumably once the adults have supplied their own needs in the morning); at one nest earthworms accounted for 46 of 63 (73%) feeds when items were identified, and at another two they formed 79% (as many as eight worms per delivery were recorded, size of prey increasing with age of young), although this may have been biased by the ease with which worms are recognised (Round and Treesucon 1986a, Gretton 1988). Certainly birds watched feeding take a high proportion of unidentifiably small prey, which may be termites and/or forest cockroaches, both of which are abundant in the leaf-litter (Round ms).

Breeding Like other pittas so far studied in Thailand (e.g. Robinson 1915, Herbert 1923–1926, Round and Treesucon 1983), Gurney's is primarily a wet-season or monsoon breeder. The species is most detectable between mid-March and mid-June, with a peak of calling activity around mid-April, thereafter declining with the onset of nesting activity (Gretton *et al.* 1993, Round 1995). Although in Tenasserim "specimens dissected in April, May and June showed no signs of breeding" (Hume and Davison 1878), birds in peninsular Thailand generally breed from late April onwards, with nests being discovered at Khao Nor Chuchi between 23 May and 8 August, the majority in June (P. D. Round *in litt.* 1996, Lambert 1996). However, some pairs may commence breeding in January (Y. Meekao *per* B. R. Sykes verbally 2001), and the first-ever nest was found at Klong Wang Hip, north-east of Thung Song, Thailand, in October (Herbert 1923–1926, Baker 1932–1935), suggesting that the breeding season may be quite protracted or geographically somewhat variable, and indicating the occurrence of several broods in one season or possibly the re-nesting of pairs whose earlier attempts have failed (P. D. Round *in litt.* 1998; but see Remarks 13). This first nest was "made of dry bamboo-leaves, domed, with an entrance on one side, and placed on the ground at the foot of a bamboo clump" (Baker 1932–1935); it contained four eggs, but given that the female was carrying another shelled egg (Herbert 1923–1926) the full clutch must have been five (again see Remarks 13). Nests at Khao Nor Chuchi contained 3–4 eggs and were shallow root-lined cups inside slightly flattened domes of large dead leaves and small sticks built on a base of larger sticks and generally positioned 1–2.4 m up in 3–7 m high spiny palms, including *Salacca rumphii* (six nests), rattan *Daemonorops* or *Calamus longisetus* (four nests) and *Licuala* (one nest); the relatively high clutch-size may reflect the strongly seasonal breeding cycle and the superabundance of earthworms that is triggered by the rains (Round and Treesucon 1986a, Gretton 1988, Lambert 1996, Round ms).

Intensive nest observations conducted in 1987 (totalling some 230 hours), involving two broods of a particular male, produced evidence indicating that the species is monogamous: at no time were any extra-pair birds seen during nest observations; however, calling was regularly heard nearby, and the second brood was possibly raised by a different female as, unlike the male, the females had no distinguishing features (Gretton 1998, Gretton *et al.* 1993). The male shared incubation and feeding of young almost equally with the female, but the female contributed significantly less to the second brood, perhaps because she was still

spending time tending fledglings from the first brood, or because she was a different bird with different behavioural traits (Gretton 1988, Gretton *et al.* 1993).

The incubation period is unknown but longer than 10 and probably shorter than 14 days (Gretton 1988, Round *ms*), although evidence from captivity suggests as many as 20 days (see Remarks 10). In one case a clutch of four eggs hatched within a 7.5 hour daylight period; for the first three days incubation is chiefly by the female with occasional stints by the male, with much less constant attendance thereafter although she broods at night for the first week (Gretton 1988; also Round *ms*). In the early stages the male provides most food and may also feed the brooding female; at one nest the male made 82% of visits over a four-day period (Round and Treesucon 1986a), although at another the female made 58% of visits in the second week after the young hatched (Gretton 1988). Nestlings fledge at 14–15 days, when they are still about one-third the size of adults, so that post-fledging dependence is probably at least a month, but as the birds become almost impossible to detect at this stage there are no data (Round and Treesucon 1986a, Gretton 1988, Round *ms*).

There is fairly low rate of breeding success: of three nests found in 1987, the first, containing four eggs, was predated, the second lost at least one chick and one egg while fledging one young, and the third fledged two chicks from a four-egg clutch (Gretton 1988), an average production rate of one chick per nest and an overall mortality rate of 73% (Lambert 1996). Of 14 nests documented (including these three), only 4–5 fledged young (P. D. Round in Lambert 1996). A dog-nosed cat snake *Boiga cynodon* which was killed by researchers as it approached a nest was found to contain a chick which had evidently been taken on the previous day (Gretton 1988).

Migration W. Davison in Hume and Davison (1878) considered Gurney's *Pitta* to be a "seasonal visitant" to southern Tenasserim, occurring as far north as Lenya: he reported its arrival in early February, but it remained scarce until mid-April, after which it became more numerous until the break of the monsoon, when most birds rapidly disappeared, with only a few remaining into July. Robinson and Kloss (1921–1924) were respectful of this view, but could not confirm a similar phenomenon in Thailand, reporting that they had always found it equally common, in Trang (in the south of its range) in December and January, near Chumphon (north-centre) in March, and in Surat Thani (centre) in June and July. Chasen (1939a) regarded these findings as providing "no evidence to show that the bird is migratory in peninsular Siam". Collar *et al.* (1986) speculated that the species's seasonal responses may be complex and dependent on several factors, with such migrations as occur being, for example, age-related or confined to populations in only part of the whole range (Collar *et al.* 1986). However, Round (1995) showed that the seasonal distribution of records from southern Myanmar is similar to that in Thailand, implying that Gurney's *Pitta* is probably resident throughout its range, but simply more silent and difficult to detect in the late nesting and post-nesting period (i.e. that Davison was merely overlooking the species from May onwards). Birds sometimes (usually in April) briefly occupy small habitat patches usually spurned by the species, and are probably wanderers searching for territories (Round *ms*; also Banwell and Round 2000; see Remarks 14).

THREATS Although hunting, disturbance and trade are additional pressures compounding the difficulties faced by the species, the primary threat to Gurney's *Pitta*, and the factor that has brought it to the brink of global extinction, is the extensive deforestation of peninsular Thailand and neighbouring Myanmar. While it probably breeds or bred in Myanmar, it is no less certain to be threatened by forest loss there than in Thailand (although perhaps not to the same degree) following years of exploitation, much of it, ironically, by Thai logging companies; there are, for example, anecdotal reports of huge areas of forest in Pakchan (southernmost Tenasserim) being clear-felled since the logging ban in 1988 in Thailand (Collins *et al.* 1991, Round 1989, 1995). However, owing to the lack of information about

the current situation in southern Myanmar, the remainder of this section exclusively concerns Thailand.

Deforestation: general The species's dependence on low-lying forest has long been judged the most likely explanation for its current rarity, since level lowland forest, owing to its accessibility, is always the first to be logged (Round and Treesucon 1986a, Round 1988a) and cleared for cultivation of food and plantation crops, in particular oil-palm and rubber (R. F. A. Grimmett *in litt.* 2000). By the 1980s, forests of the level lowlands had almost entirely disappeared, being replaced by croplands, fruit orchards, rubber and oil-palm plantations (Collar *et al.* 1986), the process accelerating as coffee was adopted as a further cash crop (Round and Treesucon 1986a). The speed of loss of the last tracts of forest in the lowlands of southern Thailand was indeed extremely rapid, apparently at least in part because of movements of large numbers of landless people to areas in the south of the country which they knew or believed to be stable and fertile for agriculture: Round and Treesucon (1986b) reported that a large tract (c. 100 km²) of forest in the Tha Sae district of Chumphon province—due for survey work for Gurney's Pitta—was almost entirely cleared (apart from the hill slopes) between the autumn of 1984 and June 1985 by an influx of at least 200 families that moved rapidly into the area from regions to the north. In 1987, the entire area of forest below 100 m remaining in peninsular Thailand was estimated to be as little as 20–50 km², and most of the remnants composing this paltry total were cleared in the following decade (P. D. Round *in litt.* 1998).

Deforestation: Khao Nor Chuchi Despite the commendable swiftness with which the Royal Forest Department (RFD) moved to protect part of Khao Nor Chuchi in 1987 as a Non-Hunting Area (NHA)—a stop-gap measure on the way to its establishment as a wildlife sanctuary—the longer-term actions of the RFD regrettably did not lead to the fuller protection of critical habitat. The failure of the NHA boundary to embrace a crucial 30 km² of Gurney's Pitta core habitat (the Khlong Thom basin) was pointed out to the RFD in 1990, three years before the area's formal establishment as a Wildlife Sanctuary (Round ms). Under Thai law a wildlife sanctuary should not encompass any human settlements, many of which existed inside the 30 km² key area (Round 1992), yet no action was taken to overcome this problem (Round ms)—indeed, although a suite of management activities would have been needed whatever the circumstance, the Khao Nor Chuchi Lowland Conservation Project (KNCP; see Measures Taken) came into existence largely *because* of this problem (Round 1996a). Thus when it was declared in 1993 the Khao Pra-Bang Khram Wildlife Sanctuary harboured a mere five of the area's then 21 Gurney's Pitta territories, leaving 16 pairs essentially unprotected in the Bang Khram National Reserve Forest (“national reserve forest” or NRF having nominal protection under the law, but with limited institutional capacity or commitment to such protection and no stated policy that such forest should survive in the long term: see Remarks 15) and therefore in need of further intensive intervention (Gretton *et al.* 1993, Round 1996a). While the wildlife sanctuary receives funds for its management from central government, NRF management falls to provincial authorities, so that sanctuary staff have no formal remit or responsibility to address issues in reserve forest, although technically the RFD does, through its provincial and regional offices (Round and Pedersen 1999, P. D. Round *in litt.* 2000). Moreover, because of the wildlife sanctuary's long perimeter-to-area ratio (it is only 1–2 km wide in places), even those five “secure” territories may not prove to be viable in the long term (Round 1996a).

At the start of the 1990s there were still no measures in place to halt the continued clearance of forest for rubber, oil palm and other crops at Khao Nor Chuchi, so that suitable habitat for the species was still being lost at a high rate: at least 1 km² of forest and mature secondary growth were cleared in and around the NHA in the 1990–1991 dry season, causing the loss of three Gurney's Pitta territories (Round 1991). This destruction, whether inside or outside the area, was illegal, and much of it was caused not by local people but by outsiders who had illegally purchased land in the area (Round 1991). The KNCP warned both the Khlong

Thom district forest protection unit as well as NHA staff of the impending destruction, but no action was taken until project staff actually encountered a bulldozer clearing forest inside a Gurney's Pitta territory (Round 1991).

At the start of KNCP Phase 2 the scale of the difficulties at the site (within the "Bang Khram National Reserve Forest") was daunting, e.g.: (a) an undetermined number of people were either selling land to make money, taking money from outside businessmen to clear land, or actively involved in small-scale illegal logging; (b) many small farmers inside the area were recent arrivals (some from as far away as north-east Thailand), not long-term members of the local community, and they therefore resisted engagement in community-based project activities; (c) the failure to enforce existing forest protection legislation (purchase or sale of land inside the reserve forest, whether previously occupied or not, is prohibited) had created a type of "tragedy of the commons" (whereby law-breaking confers advantages which law-abiders are impelled to match by similar behaviour), and thus land was still being freely but illegally sold and cleared; (d) those acting illegally within NRF lands saw KNCP, not the RFD, as the obstruction, and spread negative views about it among the local community and even intimidated some farmers from participating in project activities; (e) land tenure rights were poorly understood (land title was available to those present in the reserve forest before 1967, land-use certificates were available to those who entered between 1967 and 1975, and temporary residence with no land rights was available to those who entered after 1975) (Round 1996a).

Seven new households entered the area in 1995 and 14 in 1996 (KNCP unpublished documents). In spite of six years' work by KNCP, at least 2 km² of forest, secondary forest and regenerating scrub were encroached by rubber and oil-palm growers during 1996–1997 alone, involving 61 separate instances of encroachment and amounting to more than the total area encroached in the previous six years; this included five Gurney's Pitta territories that were damaged or destroyed (Round 1997, ms, KNCP unpublished documents; see Remarks 16). The sanctuary officials performed their duties sufficiently poorly in those two years that it was judged that "during that period, so many problems were allowed to build up that only a prolonged and sustained commitment by both Royal Forestry Department and province authorities will even begin to halt the latest round of encroachment" (KNCP 1999). By 1998 the wildlife sanctuary was being run by its fifth superintendent in six years, three of them since the start of KNCP Phase 2 in September 1995, including an 18-month period when the superintendent was only functioning for a third of his time owing to provincial political constraints (KNCP unpublished documents); such discontinuity in key command positions must have rendered the coordination and implementation of an already complex long-term ICDP even more problematic. In 1998 the number of clearings in Bang Khram National Reserve Forest rose from 127 in May to 140 in October, with new clearings appearing constantly (KNCP 1999), and at that stage a very high proportion of the human population was below the age of 15, implying that pressure for agricultural land would only increase in the near future (KNCP unpublished documents). The total area of land cleared between April 1996 and April 1999 was 406 ha, 20% of which was inside the supposedly inviolate wildlife sanctuary, the rest in the reserve forest (Pedersen *et al.* 1999). The current difficulty with outsiders purchasing and developing land in the protected area is outlined as follows by KNCP (1999):

Outsiders usually claim to be poor and landless, but this is not usually true. Most already have a small, but sufficient, area of land with proper legal land documents, elsewhere in adjacent provinces such as Nakhon Si Thammarat. This can be sold at a high price, enabling them to buy a roughly ten-times greater [area] of land lacking documents inside the national reserve forest. Sure in the knowledge that they will go unpunished, thanks to the lack of any coherent government policy on forest and land-issues, they invest much money in planting oil-palm (now the crop of choice over rubber, even for smallholders).

The impact of Phase 2 of KNCP was clearly beneficial, unquestionably continuing to restrain the rate of forest loss at the site and thus establishing a further time window for renewed initiatives (R. F. A. Grimmett *in litt.* 2000). However, some results may have been indirectly conducive to further forest loss: sustainable agricultural diversification was sometimes adopted as a complement to, rather than a replacement for, harmful monocultural plantations; many “local” people (accepting that some were recent immigrants) failed to recognise any benefits from the project unless they were immediate and monetary; and when local people were employed on the project they were resented by those who were not, while when outsiders were employed on the project they were resented by everyone (Round and Pedersen 1999). Meanwhile, without a further phase to KNCP (DANCED elected not to fund Phase 3) it is feared that Khao Nor Chuchi will continue to suffer from RFD’s neglect because it is perceived to be a small, unprestigious site with a relatively insignificant budget (B. R. Sykes verbally 2001).

The problems at Khao Nor Chuchi can be illuminated in two further ways. First, it is to be noted that a strong sense has emerged over the course of KNCP Phases 1 and 2 that the poor performance of the wildlife sanctuary staff (40 men unable to protect 30 km²) is related to the existence of a parallel agenda among some of them, possibly involving settlement and “ownership” by their relatives, friends and associates of plots of land and even the renting out of certain areas under their control (R. F. A. Grimmett *in litt.* 2000). Second, the ICDP model involved several assumptions which KNCP found to be incorrect, most notably (a) that local communities represent a single entity to work with, whereas in reality the immigrant human population at the site proved to be very different and very difficult to involve; and (b) that a programme of sustainable agriculture would meet local people’s aspirations, whereas in reality improvements in practice and productivity on one plot had no damping effect on the ambition to occupy and clear another (R. F. A. Grimmett *in litt.* 2000). Both these considerations reflect on fundamental aspects of the human condition (see, for a very similar set of circumstances and problems, Threats under Bali Starling *Leucopsar rothschildi*) and require very serious thought if species at the very brink of extinction are ever to be secured *in situ*.

Deforestation: other recent sites Although several individual birds were located at Khlong Phraya Wildlife Sanctuary between 1988 and 1992, some of the forest patches which previously held them were destroyed during 1990–1992 (Gretton *et al.* 1993), and continued large-scale forest loss is thought to have eliminated the population entirely (P. D. Round *in litt.* 1998); in 1992 the boundaries of the reserve were unofficially “revised” in order to “accommodate the interests of influential encroachers”, and people were clearing forest inside the sanctuary without fear of arrest by forestry officials (*Bangkok Bird Club Bull.* 9[8]: 11–12). In addition, the level of forest clearance and disturbance in the Tha Chana district was considered so high as to preclude the survival of the species at that site; even by 1988, isolated patches of forest were all that remained, and these were rarely larger than 30 ha (Gretton *et al.* 1993). The tiny site in the Khlong Yan valley apparently was only being retained in 1988 as a result of plans to construct a dam in the vicinity; the encroachment that occurred in that year, and the almost total absence of lowland forest in the surrounding area, suggested that there was no future for Gurney’s Pitta in the region (Gretton *et al.* 1993).

Hunting and disturbance KNCP (1999) reported that “local people in the village of Ban Bang Tiew remain relentless hunters of wildlife”. In December 1991 a line of 30 noose-traps, probably for snaring junglefowl, was discovered running through the middle of a Gurney’s Pitta territory (Round 1992). It is of great concern that even in April 2000 hunting and trapping (even of terrestrial birds) was still being regularly recorded in Khao Pra-Bang Khram Wildlife Sanctuary and adjacent NRF; this problem is exacerbated by the fact that sanctuary staff “seldom if ever undertake routine patrols” so that intruders face little risk of being intercepted (*Bird Conserv. Soc. Thailand Bull.* 17[8]: 15). Nesting birds are probably also disturbed by villagers collecting forest products, especially the fruits of *Salacca* palms, which

Gurney's Pitta frequently nests in; such people may cause desertion by flushing sitting birds or even take nestling pittas in the hope of a good sale (Round ms). Visiting birdwatchers may also cause some unnecessary disturbance by using tape-recordings as lures, but this is not likely to be a serious problem (even so it is being addressed in 2001 by the Oriental Bird Club: see Measures Proposed).

Trade Between 1967 and 1969, seven individuals were found in trade at the Bangkok Sunday Market (McClure and Chaiyaphun 1971), and birds were relatively easy to obtain in Bangkok from the late 1950s to the early 1970s as well as entering trade in the UK and USA in the 1960s and 1970s (see Population). In 1986, one major animal trading company in Bangkok maintained that it still received 5–6 Gurney's Pittas per year and an unidentified contact claimed that as many as 50 birds per year were still entering trade in Thailand (Round and Treesucon 1986a). Two male Gurney's Pittas were seen in captivity in the Khao Khieo Open Zoo, Chonburi, in March 1996 (there was a reliable report that this establishment had originally received four pairs: F. R. Lambert *in litt.* 1997), and a 1996 calendar produced by the Zoological Parks Organization of Thailand showed three caged Gurney's Pittas (two males and a female) together (Round ms). There are said to be a number of others in captivity in Thailand (P. D. Round *in litt.* 1998). The origin of such birds is unknown, but three Gurney's Pittas were confiscated from local villagers at Khao Nor Chuchi and returned to the forest in the period 1990–1997 (Round ms).

Conservation actions during the past decade may have unwittingly increased the threat from trapping of birds for the cagebird trade, owing to the attention it has caused to be focused on Gurney's Pitta (P. D. Round *in litt.* 1998). Two birds were said to have been acquired by a Krabi-based lawyer, soon after the bird's rediscovery, and released on his privately owned offshore island (P. D. Round *in litt.* 1998). The domestic demand for wildlife in Thailand "may be growing" with the growing affluence of the business classes, while inertia and inefficiency in the RFD remains unchanged: "if the RFD with the huge amount of resources, manpower and vehicles at its disposal can't do anything in Bangkok, what hope is there for it even beginning to make an impact in the provinces?" (*Bird Conserv. Soc. Thailand Bull.* 12[9]: 14).

MEASURES TAKEN The species is listed on Appendix I of CITES, making international trade in live birds or specimens illegal. No measure is known in Myanmar, except that it is listed as "totally protected" under national legislation (Wildlife Act 1994); political and security constraints have prevented any recent assessment of the species's status in the country. The rest of this section concerns Thailand only, where it is protected under WARPA.

Field research After the rediscovery of the species in 1986, censuses were undertaken during the breeding season in three subsequent years under an initiative coordinated by the then Center for Wildlife Research (now Center for Conservation Biology), Mahidol University, Bangkok, and the then International Council for Bird Preservation (now BirdLife International); these surveys aimed to identify remaining populations of the species in peninsular Thailand, and the number of individuals in these areas (Gretton *et al.* 1993).

Protected areas A Non-Hunting Area (not particularly relevant to the conservation of the pitta, since it is a designation that does not adequately address forest clearance) was set up at Khao Nor Chuchi in 1987, and this was upgraded to a wildlife sanctuary in 1993, a much more robust protected-area category, although despite warnings (see Threats) most level lowland forest (the species's favoured habitat) was excluded from the sanctuary (Round 1996a).

Khao Nor Chuchi Lowland Forest Project (KNCP) This socio-economic ICDP (integrated conservation and development project) was set up in 1990, and what retrospectively was termed Phase 1 (1990–1993, with an extension into 1994) was implemented by Mahidol University through BirdLife International with support from the UK Overseas Development

Administration; Phase 2, running from 1995 to 1998 with an extension to May 1999, was again implemented by Mahidol through the Danish BirdLife partner DOF with support from the Danish Ministry of the Environment (DANCED), involving an expenditure of US\$1.5 million (Round 1996, ms, Pedersen *et al.* 1999, Round and Pedersen 1999). In both phases the aim was to ensure the conservation of lowland flora and fauna at Khao Nor Chuchi by promoting community participation in conservation and management of forest outside the sanctuary boundary, and to remove or reduce pressure on remaining forest by promoting sustainable agriculture (Round 1991, 1996a, ms, P. D. Round *in litt.* 1998). Phase 2 of the project possessed the objective of expanding the wildlife sanctuary and comprised the following elements: broad community participation in decisions and planning; formalised cooperation among local communities, project staff and sanctuary officials; mapping of project area; demarcation of project area boundaries; preparation of a project area management plan; adoption of sustainable agriculture; strengthening of forest and wildlife protection; habitat monitoring; increased local environmental awareness; enhanced local environment protection club; revolving loan for sustainable economic activities; and development of a tourism plan (KNCP unpublished documents). Stated aims of the project were (a) strengthening the capacity of the RFD in law enforcement in both the wildlife sanctuary and NRF, (b) adoption of sustainable agriculture by farmers in the project area, (c) community participation in habitat management and conservation, and (d) increased advocacy for conservation at Khao Nor Chuchi (Pedersen *et al.* 1999).

In Phase 1 attempts were made to discourage the increasing dependency on cash-crop monocultures in the reserve environs, with a view to creating patchworks of more wildlife-friendly habitats in cultivated areas (Round 1991, ms). The key emphasis was forest management, and a series of recommendations was made in order to zone areas for sustainable use; a considerable investment was also made in silviculture, and over 5,700 trees were distributed to villagers at the site, with a further 6,500 being provided for the reforestation of around 13 ha of forest at Khlong Thom (P. D. Round *in litt.* 1994). KNCP also set up a local education programme, and a Thai-language newsletter was distributed to local schools and a series of slide presentations were developed for use with local communities and school children (one such presentation was shown to over 3,000 children in the area in June 1991) (Round 1991, 1992). BirdLife International (as ICBP) provided funds for guard stations and vehicles (R. F. A. Grimmett *in litt.* 2000). Community-based ecotourism was investigated through the setting up of a village guest house, but the benefits generated were too small, or too unevenly distributed through the community, to have a meaningful impact (P. D. Round *in litt.* 1994).

In Phase 2 the Project Steering Committee (representing all stakeholders and chaired by the Deputy Director, RFD) established a Conservation and Management Board (CMB, chaired by the Deputy Governor of Krabi province) in the project area (Pedersen *et al.* 1999). Several major achievements beyond the full functioning of the CMB included: (a) the development of a land-use management support package, involving the demarcation and GIS mapping of the project area (relevant parts of the Bang Khram National Reserve Forest and adjacent wildlife sanctuary); (b) basic monitoring of biodiversity (birds, butterflies and other taxa) and land use (documenting encroachment on a six-monthly basis); monthly environmental awareness activities and associated printed materials; (c) support for forest protection staff in the form of equipment, training, study tours and workshops with a *per diem* for temporary patrol workers; (d) support for sustainable agriculture through demonstration plots, farmers' groups, training courses and a tree nursery (which distributed 160,000 seedlings); (e) provision of alternative income-generating opportunities, including eco-tourism and handicrafts; (f) establishment of a revolving loan fund (which disbursed 59 loans); and (g) production of a management plan dividing the area into conservation, rehabilitation and buffer zones (Pedersen *et al.* 1999, Round and Pedersen 1999).

Following completion of Phase 2 of KNCP in mid-1999, a further phase of work was planned (see Measures Proposed), but sufficient commitment from the Thai authorities was not forthcoming, and in January 2000 DANCED declined to provide further funds (Sykes *et al.* 2000). This left the situation squarely in the hands of the RFD, although independent interventions to the Thai royal household were made in late 1999 by BirdLife International and the Oriental Bird Club (OBC), in response to disquieting evidence of local hostility, trapping activity and anticipated forest clearance in the dry season from around October onwards (e.g. *Bird Conserv. Soc. Thailand Bull.* 17[8]: 15, *Oriental Bird Club Bull.* 30: 24, Sykes *et al.* 2000). In late 1999, continued reports of deforestation led to an RFD task-force being mobilised to tackle the problem (*Bird Conserv. Soc. Thailand Bull.* 17[8]: 15), and a privy councillor to the crown was despatched to Khao Nor Chuchi in early 2000 (Sykes *et al.* 2000). OBC itself despatched representatives on five occasions to Thailand during 2000, undertaking discussions, site visits and press conferences, and paid for the mid-year survey by Y. Meekaeo (Sykes *et al.* 2000), at which time temporary intervention from an RFD task force resulted in the virtual cessation of illegal dry-season clearance (Sykes 2000).

MEASURES PROPOSED Myanmar Surveys to establish the current distribution and status in Myanmar of Gurney's Pitta are highly desirable in order to identify a suitably large area for the conservation of the Thai-Myanmar rainforest biome. Such surveys should coincide with the predicted March–June peak in calling activity (Gretton *et al.* 1993, Round 1995).

Thailand The most critical area of lowland forest habitat for Gurney's Pitta consists (or, owing to its continuing piecemeal year-by-year loss, consisted) of the 30 km² area of the Khlong Thom basin lying outside the wildlife sanctuary and inside the Bang Khram National Reserve Forest: it is reasonable to predict that, unless this area is adequately (i.e. completely) protected, Gurney's Pitta will become extinct in Thailand and probably globally. Nothing is more urgent than that a solution should be found to this problem, after almost 15 years of intensive lobbying, practical site management and heavy financial investment during which the species has declined from 39 pairs in the area to a mere 12 pairs. At this rate extinction is only about five years away.

In the long term, the best solution is to expand the Khao Pra-Bang Khram Wildlife Sanctuary to embrace the Bang Khram National Reserve Forest. However, in 1996 the latter contained 80 households growing rubber on smallholdings (Round 1996a) and by 2000 as many as 200 households existed there (P. D. Round *in litt.* 2000), and, as pointed out earlier, wildlife sanctuaries must not, under law, contain human settlements (Round 1992). One possible solution is therefore to relocate these people elsewhere or simply pay them compensation under a compulsory scheme, although both these clearly have significant cost implications; nevertheless, in the long term it may prove to be the most cost-effective (the new Director General of RFD hinted in a welcome statement in October 2000 that this might be considered: B. R. Sykes verbally 2001). Another would be to allow smallholders to continue to enter the expanded sanctuary in order to tap rubber throughout the useful lifetimes (c.25 years) of their plantations, but then to allow the area to revert to forest (P. D. Round *in litt.* 1998). An immediate option results from a study by J. W. K. Parr and S. Tanhan in August–September 2000, using the KNCP-generated land-use GIS: this found that a critical area of 13 km² adjacent to the present wildlife sanctuary held 5–6 pairs of the Gurney's Pittas found in 2000, yet contained only 38 households, so that the best first step would be to expand the sanctuary to include this area, and in September 2000 RFD indicated that it would be taking this measure (S. Sophasan *in litt.* 2000).

The following measures are needed: (a) prevention, by government agencies and through law enforcement, of further forest clearance and immediate reclamation and replanting (with native forest species) of any new clearings; (b) reclamation and restoration of land cleared

inside the wildlife sanctuary since September 1995 (when farmers' and villagers' representatives agreed that there should be no further land clearance), and a compensation package to remove people who had cleared land before September 1995; (c) implementation of CMB's management plan (developed in Phase 2; see Measures Taken)—and including such elements as (i) the acquisition (by purchase or concessionary lease to a national NGO) and reforestation of currently cultivated land adjacent to the wildlife sanctuary, with an endowment to cover the management costs, and (ii) the independent monitoring of the pitta, the sanctuary and the staff of the sanctuary to determine the rate of the species's recovery and ensure best management practices; (d) development of a strategy to move people out of the wildlife sanctuary and from areas in the NRF proposed by the CMB for eventual inclusion in the wildlife sanctuary; (e) preferential development assistance, provided by the Thai government, for villages around Khao Nor Chuchi in recognition of the forest conservation objectives in the area (Pedersen *et al.* 1999, R. F. A. Grimmett *in litt.* 2000).

Following detailed mapping of land use within the reserve in 1998, it was hoped that zoning of land will be possible, allowing rehabilitation of forest in some key corridors (KNCP 1999). Short-term measures should be three-fold: (a) to prevent deforestation of existing forest patches constituting Gurney's Pitta habitat; (b) to encourage the RFD to become actively engaged in the conservation of Gurney's Pitta and the lowland forest, and to fulfil their national obligation in making efforts to conserve the species; (c) to broaden the involvement and hence responsibility among the national conservation NGO community towards conserving Gurney's Pitta and the lowland forest (J. W. K. Parr *in litt.* 2000). The Oriental Bird Club is committed in 2001 to supporting initiatives intended to fulfil these three measures (B. R. Sykes verbally 2001), including the monitoring of a commitment made on television by the Director General of RFD in September 2000 to take action against forest encroachers and to annex a significant remaining area (8,000 "rai", i.e. 13 km²) of the NRF as part of the wildlife sanctuary (Sykes 2000).

Establishment of other protected populations Given the current rate of deforestation, the possibility of providing suitable habitat (over a 10-year period) within the western portion of Khlong Phraya Wildlife Sanctuary, an area currently included within the sanctuary and apparently largely managed by an oil palm company, should not be overlooked, with a view to the translocation of several pairs from Khao Nor Chuchi (J. W. K. Parr *in litt.* 1999). This is certainly important, since even if the necessarily best outcome (a greatly expanded wildlife sanctuary) can be reached at Khao Nor Chuchi, the carrying capacity of the area is still likely to be well below the numbers commonly considered appropriate for the long-term genetic viability of any species, so that a strategy will be needed for the restoration of lowland forest in various safe reserves in peninsular Thailand, with a view to the translocation (or, through the intermediate step of captive breeding, introduction) of Gurney's Pitta.

Captive breeding Round (ms) pointed out that remnant populations of 1–2 pairs might exist in small patches of secondary forest elsewhere in southern Thailand, and mentioned rumours that one or more birds had been found in 1997 at Namtok Huai Yang National Park, Prachuap Khiri Khan, adding that such pairs "may be essentially irrelevant as far as the future conservation of the species is concerned since their genes may never become integrated into those of any other such pairs or small populations". The prospect of these birds and populations dying out is, however, a great pity, when instead they might be captured for a captive-breeding programme managed by a distinguished international operator such as the Durrell (formerly Jersey) Wildlife Preservation Trust. Therefore a new survey of low-lying remnant forest patches should urgently be conducted in peninsular Thailand, with a view to moving into captivity any individuals deemed by evidence (such as forest patch size, degree of isolation and cutting activity) to have no future, and that a major effort be made to establish a strong captive population which can serve as a reserve while the delicate situation at Khao Nor Chuchi is resolved and a long-term strategy of forest restoration (see

above) implemented. Such an initiative must not, however, be allowed to become a disincentive to habitat conservation at Khao Nor Chuchi, and therefore should run concurrently with the programme recommended above.

Research Round (1992, ms) pointed out that several aspects of the species's biology remain unclear, e.g. the area of forest needed by pairs of birds to survive and the influence of micro-habitat differences on the distribution and breeding success of birds. Despite being, ironically, amongst the best studied of the world's pittas (see Lambert 1996), it is certainly the case that a major research initiative, using ringed and radio-tagged birds, would provide much extremely valuable information on the species's year-round ecology and requirements (particularly concerning optimal stages of secondary forest regeneration; see Remarks 12), survival rates and dispersal patterns, all of which are ultimately essential for managing any population which is very strictly constrained by range.

REMARKS (1) Collar *et al.* (1986) speculated that this might be "Talobusa" at 10°23'N 98°32'E, but the Malay meaning of "large bay" seems very clear.

(2) A captive bird reported by an employee of WWF Thailand to have been taken in Namtok Huai Yang National Park, Prachuap Khiri Khan (*per* F. R. Lambert), is thought more likely to have been brought in from Myanmar, as hunters routinely cross the border at this point (P. D. Round *in litt.* 1998). The site is thought to be very close to the 1952 collecting locality, but a visit in December 1996 revealed no suitable lowland habitat remaining anywhere in the vicinity (P. D. Round *in litt.* 1998).

(3) A specimen in MNHN, received in 1893 but otherwise undated, was collected by G. M. Bel at or in "Siam Prov. Banataphan" which appears most likely to be Ban Saphan district in Prachuap Khiri Khan province (Collar *et al.* 1986).

(4) Hume and Davison (1878) mentioned a record from "Kenong, within the estuary of the Pakchan, but on the Siamese or southern side". However, the only settlement on the south side of the Pakchan estuary whose name bears any resemblance is Ranong, which used commonly to be spelt "Renong", so it seems that "Kenong" was the result of a typographer's misreading of a manuscript R as K (Collar *et al.* 1986).

(5) The elevation of 600–1,060 attributed to this important record in Meyer de Schauensee (1946) is contested by Round (1995) and Round and Treesucon (1986) on the grounds that Gurney's *Pitta* has not otherwise been recorded above 140 m (or, more recently, 250 m: see Ecology: Migration). Moreover, several other species mentioned by Meyer de Schauensee (1946) from the same site, such as Malayan Peacock-pheasant *Polyplectron malacense* (see relevant account) and Gould's Frogmouth *Batrachostomus stellatus*, are considered to be lowland forest specialists and unlikely to occur at the altitudes proposed. The view is now that Meyer de Schauensee's collectors took their material in the lowlands and entered false elevations on the labels "in order to avoid the exertion and discomfort of a wet-season ascent" of Khao Phanom Bencha (Round 1995). The extent to which the published elevations influenced the dreadful mapping error (showing Gurney's *Pitta* as ranging through the relatively extensive upland forest in the peninsula) in Bain and Humphrey (1982)—repeated in Humphrey and Bain (1990) despite Collar *et al.* (1986) and Round and Treesucon (1986)—cannot be judged, but it is instructive to note how a trivial incident such as an act of deception in 1936 could have created a misconception that could, in turn (had anyone depended solely on Bain and Humphrey 1982), have resulted in the complete obliteration of a species.

(6) Hume (1879–1880) announced, without comment, that the species had been found on "Tonka", i.e. Phuket Island (Ko Phuket). This evidently referred to a male in BMNH from "Tapraw" taken by J. Darling (one of Hume's collectors: see Robinson 1927), since a male from "Tapraw, Island of Tonkah" is mentioned by Sclater (1888), although the issue is confused by this being attributed to Davison and ascribed to the type material (Collar *et al.* 1986).

(7) Ban Lamphu La, 10 km north of Trang town, was previously known as Ban Lam Ra and is thus presumably the Lam-ra mentioned by Robinson and Kloss (1910–1911) (Collar *et al.* 1986).

(8) The “Ko-Khau” of Robinson and Kloss (1910–1911) is probably a typographer’s misreading of “Ko-Khan” (it appears as the latter on specimen labels), in which case it is likely to be Ban Khok Khan, now Ban Khuan Khan (Collar *et al.* 1986).

(9) Hornett (1994) wrote: “...until the early 1970s at least, the Gurney’s Pitta was fairly frequently available on the commercial bird market in Bangkok. I myself kept an extensive collection of native Thai bird species between the late 1950s and early 1970s and the Gurney’s Pitta was always a most valued and highly appreciated species in my collection for all of those years. I acquired several pairs from the old weekend market at the Pramane Ground in the early years and privately through established dealers later on.”

(10) J. R. van Oosten (*in litt.* 1990) acquired three pairs from a dealer in September 1967, paying US\$50 per bird, which at that stage were very thin. His notes on them are reproduced in full for their intrinsic interest and because they help demonstrate that unsuspected information is sometimes available from avicultural sources.

“The birds were fed berries, blueberries, soaked currents, and finely chopped grapes, apple (later grated), and papaya. In addition they always had an insectivorous mixture in front of them. They received mealworms and wax moth larvae every day. Twice a week they received boiled beef heart cut into small strips. Other insects collected in jars nightly with the use of a night light were also fed. Everything that was fed (except the insects) was covered with a vitamin/mineral mixture that I made and used with all my birds. Also every day they received an egg food mixture which I made up fresh and which they really liked. They ate all of the above items but obviously insects were their favourites.

In December pair #1 and #2 were placed in my greenhouse aviary which was divided into two sections. They were in excellent shape and were back to a weight which I felt was just about right. The sections were planted well and they took to their new home with ease. Pair #3 was on the improvement list and they after another 30 days were sent to Dr Beruat in Brazil.

Pair #3 did very well in their new home but never bred as they were housed in a mixed collection. The male died in 1972 and the female a year later.

Pair #2 went to a friend of mine in June 1968 who had a very nice small collection in Victoria, Canada. They made several attempts to breed but again because they were housed in a mixed collection they only built nests which always seemed to disappear. The female died in 1973 (July) and the male died in September that same year.

Pair #1 built their first nest in May of 1968. It was three feet off the ground in a cement block wall which had ledges sticking out from it. The first nest site was very well hidden by philodendrons and hanging ivy. I first spotted two eggs on June 17th and candled them on June 27th and they were both fertile. I left the birds alone and did not look into the nest again until July 12th when two little babies were noted so I have no idea how long incubation was but guessed around 20 days give or take. Extra insects were fed and all went well for three days when on the 15th of July I found a baby dead on the ground and then checking the nest I found the other baby dead.

Over the next two years they built nests composed of twigs, leaves, stems, and string and cotton strips. They used the same wall location but different ledges. The last nest built was on the ground and the only reason I found it was that the female was missing one day and when she came out for the mealworms I checked and found the nest. They nested twice each year but only had one other hatching. In several cases the eggs just disappeared. I had other birds in the aviary with them such as hummingbirds, manakins, tanagers and one South American antpitta. I assumed that maybe the antpitta was responsible for the dead babies and the missing eggs.

In February 1971 I gave the pair to a zoo who I thought would do well with them. They shall remain nameless but both birds were dead when I visited the zoo four months after they had received the birds.

Needless to say had I known the birds were as rare as they are I would have kept them and really worked on breeding them. They were among the top five favorites of the birds I have had over the years. They are something else. The only other pair I ever saw was at the San Diego Zoo. In fact I never heard of any others in this country..."

(11) There is a concern that some villagers do not distinguish between the calls of Gurney's Pitta and Banded Pitta *Pitta guajana*, which may lead them to report larger numbers of the former in and around Khao Nor Chuchi than is in fact the case, a circumstance that might explain occasional official claims that the population of Gurney's has not declined since the mid-1980s (B. R. Sykes verbally 2001).

(12) While the association with secondary habitat is clearly genuine, it is important not to rule out the possibility that breeding success might be lower in such habitat, even if densities are higher; there is a crying need for comprehensive scientific study to determine points such as this, although as the population grows ever smaller so a statistically significant sample becomes ever less achievable.

(13) Lambert (1996) speculated that this record of ground-nesting might have been an error, but the evidence from captive birds (see Remarks 10) indicates that nests on the ground are at least occasional. Nevertheless, the widespread unease in the literature about E. C. S. Baker's egg collection and his overall accuracy (see Remarks 2 under Grey-crowned Prinia *Prinia cinereocapilla* and Remarks 4 under Blue-banded Kingfisher *Alcedo euryzona*), the failure by Herbert (1923–1926) to see the nest in question, and the fact that certain points on, e.g., egg type (see Lambert 1996) and the precise chronology of events concerning the find (see Collar *et al.* 1986), cast real doubt on the authenticity of this record.

(14) However, as these birds are detected by their self-advertisement calling, it is not impossible that they, too, remain in such sites over larger parts of the year than researchers yet know.

(15) In theory this depends on whether such NRF is labelled "economic" or "conservation", but RFD has already written off virtually all NRF (other than upland watersheds throughout the country) as "economic forest", meaning that it will disappear as farmland or be turned into plantations of (e.g.) eucalyptus (P. D. Round *in litt.* 2000).

(16) For a brief period it appeared that something might be done about these encroachments, when in October 1997 notices announcing their illegality were posted in each clearing; using clause 25 of the National Reserve Forest Act (1964), efforts were due to be made 30 days after this posting to uproot planted crops, reforest selected areas and allow the remainder to regenerate (Round *ms*). In fact a single clearing planted to oil palms was re-planted with forest trees in July 1998, but there was no follow up by either the RFD or the Krabi provincial authorities, and within a month or two the planted trees had in turn been uprooted and the land re-planted with oil palms (P. D. Round *in litt.* 2000).