



Cataloguing the Lubango Bird Skin Collection: towards an atlas of Angolan bird distributions

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Cataloguer la collection de peaux d'oiseaux de Lubango : vers un atlas des répartitions des oiseaux

angolais. La collection de peaux d'oiseaux logée à Lubango, Angola, comprend plus de 40.000 spécimens, représentant plus de 850 taxons. En juin 2008, nous avons travaillé sur la collection pendant deux semaines, afin de collecter des données concernant la distribution des espèces. Ces travaux font partie d'un projet atlas pour les oiseaux de l'Angola. La collection est toujours en bon état et le «Instituto Superior da Ciências e Educação» (ISCED), qui abrite la collection, doit en être félicité. Les données mentionnées sur les étiquettes de 15.000 peaux, dont celles de tous les spécimens des espèces moins connues, ont été saisies dans une base de données informatisée. Les 25.000 enregistrements restants sont faits sur la base de photos des «fiches de catalogue». Les spécimens les plus intéressants sont ceux de quatre Aigrettes vineuses *Egretta vinaceigula*—les premières données pour l'Angola de cette espèce cataloguée mondialement «Vulnérable». D'autres exemples de peaux intéressantes sont illustrés par des photos et attirent l'attention sur l'importance de la collection pour des études systématiques. La collection de mammifères est aussi mentionnée brièvement. Enfin, des recommandations sont faites pour la gestion future de la collection.

Summary. The bird collection housed in Lubango, Angola, contains more than 40,000 skins, representing more than 850 taxa. As part of an atlas project for Angolan birds, we visited the skin collection for two weeks in June 2008, to extract distributional information from the specimens. The skin collection is still in good condition, and the Instituto Superior da Ciências e Educação (ISCED), which houses the collection, is to be commended for this. Data from labels of 15,000 skins were entered into an electronic database, including all specimens of lesser known species. The remaining 25,000 entries are being made from photographs of 'catalogue' cards. The most interesting specimens are four Slaty Egrets *Egretta vinaceigula*, the first records of this globally Vulnerable species in Angola. Other examples of interesting skins are illustrated in various photographs, drawing attention to the importance of the collection for systematic studies. A brief mention is also made of the mammal collection. Finally, a list of recommendations is given for the future management of the collection.

With the sixth-longest bird list of any African country, Angola harbours an exceptionally rich biodiversity. Add to this one of Africa's highest bird conservation priorities—the Western Angola Endemic Bird Area (Stattersfield *et al.* 1998) and its biologically important scarp forests—and the biological importance of the country becomes unquestionable. During the 1960s and 1970s the country's biodiversity was investigated, plant and animal collections established, and several reserves were appropriately managed (Huntley 1974), but 30 years of civil unrest have left conservation and research in Angola well behind that of other southern African countries. Basic information on species distributions is poor, and the network of reserves is dysfunctional.

Recent peace and stability have provided new opportunities for improving the situation. As a first step, old reserves need to be re-established, knowledge of species distributions updated and



Figure 1. The team working on the skin collection, entering details from bird labels into a database (Michael Mills)

L'équipe travaillant sur la collection de peaux, saisissant par ordinateur les données mentionnées sur les étiquettes (Michael Mills)





refined, key gaps in the conservation network identified and remedied, and links built with Angolan counterparts. Whilst available data on Angolan bird distributions were recently summarised (Dean 2000), the contents of the largest collection of Angolan bird skins, referred to here as the Lubango Bird Skin Collection (LBSC), were largely unknown. Summaries based on some information contained in the LBSC were published by Pinto (1970, 1972, 1973, 1983), but the collection of more than 40,000 specimens must be considered the largest untapped source of information on Angola bird distributions, and a primary source for systematic research. A sizeable collection of mammal skins and skulls is also housed here.

The aim of our visit to Lubango was four-fold: (1) to report on the condition of the LBSC and make recommendations for its future management, (2) to garner valuable distributional information from the LBSC on birds (and to a lesser degree bats), (3) to draw attention to the value of the collection for study purposes, and (4) to build links for future research and capacity building in Angola, centred on the collection. Here we report on the condition of the LBSC and make recommendations for its future management and use, draw attention to the importance of the collection by highlighting its contents, and provide a progress report on the cataloguing of the skin collection. Links with Angolan counterparts are being developed on several fronts, most notably through the work of Brian Huntley and colleagues of the South African National Biodiversity Institute (SANBI), but are not reported on here.

Short history of the skin collection and collecting in Angola

The LBSC is one of the largest collections of bird specimens in south-central Africa and contains many well-prepared specimens, comparable in quality to any collection in Africa. The collection is a tribute to the late Dr António da Rosa Pinto, who, in 1958, began the nucleus of the collection by leading a collecting trip to Moxico Province, in the east of the country. At the time, Dr Pinto was a teacher at Salazar High School in Lourenço Marques (now Maputo) in Mozambique, and was in Angola on an official 'temporary' mission with the objective of establishing an Ornithology

Department at the Instituto de Investigação Científica de Angola (IICA). In 1963 Dr Pinto was appointed leader of the Centre for Studies at the IICA in Lubango. He subsequently managed to gather a very competent group of collectors and taxidermists, most of them Angolans, familiar with the birds and the countryside. This group, usually a team of six men but involving over 60 different personnel over the years, served the IICA well by establishing a collection of over 40,000 specimens, representing almost all of the avian taxa known to occur in Angola. The collection is currently housed at the Instituto Superior da Ciências e Educação (ISCED), whose staff is to be commended for maintaining the collection in excellent condition.

Although the collection at Lubango contains very little 'old' material, there is a long history of collecting natural history specimens in Angola. Bird collections had commenced by the 1850s, with visits by Dr Francisco Welwitsch, a botanist who collected some birds between 1853 and 1860, and Joaquim Monteiro, a mining engineer who collected birds in 1858–67. Collecting activity at about this time was stimulated by requests for bird specimens from Prof. J. V. du Bocage in Portugal, who requested that military and administrative officers in Angola collect birds for him. Also, in 1864, José Alberto D'Oliviera Anchieta went to Angola to collect birds for Prof. Bocage. His first collection, said to be 'rich', was lost in a shipwreck (Pinto 1983). Anchieta returned to Angola in 1866, and remained in the country until his death in 1897. He worked mostly in central and western Angola, collecting almost 4,400 specimens of 460 species of birds, of which 46 were new species to science.

A number of collectors of many different nationalities followed Anchieta in the late 1800s; O. Sala (Dutch), C. J. Andersson (Dean *et al.* 2006; Swedish), A. W. Eriksson (Swedish), C. Hamilton (British), J. Falkenstein (German), L. Petit and A. Lucan (French), O. Schütt and F. W. von Mechow (Steinheimer & Dean 2007; German), P. J. van der Kellen (Dutch) and the Valdivia Expedition. Many of these are remembered in the names of Angolan birds. With interest growing in the natural history of Angola, expeditions sponsored by museums began to visit the country in the early 1900s: the French mission of Rohan-Cabot (Ménégaux &





Berlioz 1923), the Swiss scientific expedition to Angola in 1928–29 (Monard 1934), the Phipps-Bradley expedition (with Rudyerd Boulton as collector), the Vernay-Angola expedition and collecting trips by Hubert Lynes and Jack Vincent (Lynes & Sclater 1933, 1934), and the Pulitzer-Angola expedition, again with Rudyerd Boulton as collector. Boulton subsequently collected and described a new endemic species, Pulitzer's Longbill *Macrosphenus pulitzeri* (Boulton 1931). In 1929–30, the Gray African Expedition of the Academy of Natural Sciences, Philadelphia, collected birds and mammals in central-western Angola (Bowen 1931, 1932), and an Italian expedition in 1930 collected the holotype of an endemic subspecies of Lühder's Bushshrike *Laniarius luehderi amboinensis* (Moltoni 1932). Individuals, some sponsored by museums and owners of private collections, were also active in Angola during the early 1900s. Dr William Ansorge made several trips to Angola between 1903 and 1909, collecting c.8,000 bird specimens (and many previously undescribed freshwater fish). The Portuguese naturalist Francisco Newton visited Angola at about the same time (de Seabra 1905), C. H. Pemberton collected in 1901–02 and Willoughby Lowe collected some material in the Luanda area in 1910–11 (Bannerman 1912). Important collections in the 1930s were made by Jean Bodaly who collected birds at Chitau, Bié, and by H. K. Prior at Dondi, Huambo. During a similar period, Rudolf Braun, who was resident in Angola, collected some material, most of which is now in the Zoological Museum in Berlin. The last collections of birds in Angola before the Ornithology Department of the IICA was established were made by H. A. Beatty, who collected for the Field Museum in Chicago. In two separate major collecting trips in 1954–55 and 1957, Gerd Heinrich collected birds for the Zoologisches Institut, Hamburg, the Field Museum and the Peabody Museum at Yale University. The Transvaal Museum and the British Museum sponsored expeditions in the 1950s, and both expeditions obtained very useful study material. With the exception of some birds donated to the IICA by Heinrich and the British Museum, most of the specimens collected between 1850 and 1960 in Angola are scattered in museums in Europe, the UK and North America. However, many of the specimens collected in

Angola and sent to Portugal in the late 1800s and early 1900s were destroyed in a fire at the University of Lisbon in 1978 (Mearns & Mearns 1998), and many other specimens have not been traced. Fortunately the bird collection at Lubango remains intact and is an extremely important source of reference material for ongoing research on the birds of Angola.

Methods

For two weeks in June 2008 the authors worked at the LBSC. Bird specimens were removed from drawers and information displayed on their labels transcribed into an electronic database on laptop computers (Fig. 1). The following information was captured for each specimen: specimen number, species name, subspecies, sex, age, weight, collection date and locality, and collector's name. In addition, photographs were taken of many skins, including representatives of all of the rarer specimens. Lesser known species were generally processed first. During the available time, data from 15,000 specimens were captured into the database, covering all of the rarer species. Handwriting on the labels was often hard to read, requiring substantial cleaning of the database, to correct names of collection localities and collectors. This work is ongoing.

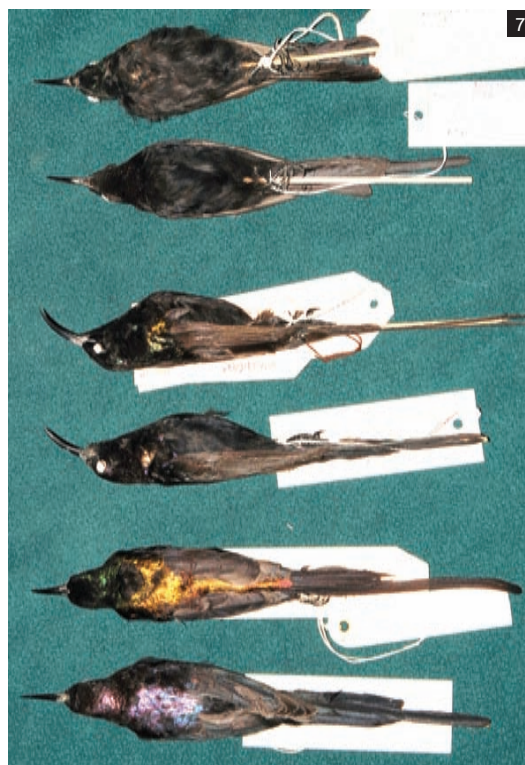
In addition to entering data from labels, specimen 'catalogue' cards (cf. Fig. 2) were photographed for the entire collection. Each card represents a single species and subspecies, and contains the following information on specimens belonging to the taxon:

Número	Data	Localidade	Sexo	Arranjo	Observações
2860	28.10.60	Guimaraes (Chingwen)	♀	G-7	1928-05-1927
2861	"	"	♀	"	"
3201	5.1.61	Guimaraes	♀	"	"
1821	18.7.66	Guimaraes (Chingwen)	♀	"	"
1822	18.7.66	Guimaraes (Chingwen)	♀	"	"
1823	18.7.66	Guimaraes (Chingwen)	♀	"	"
1824	18.7.66	Guimaraes (Chingwen)	♀	"	"
1825	18.7.66	Guimaraes (Chingwen)	♀	"	"
1826	18.7.66	Guimaraes (Chingwen)	♀	"	"
1827	18.7.66	Guimaraes (Chingwen)	♀	"	"
1828	18.7.66	Guimaraes (Chingwen)	♀	"	"
1829	18.7.66	Guimaraes (Chingwen)	♀	"	"
1830	18.7.66	Guimaraes (Chingwen)	♀	"	"
1831	18.7.66	Guimaraes (Chingwen)	♀	"	"
1832	18.7.66	Guimaraes (Chingwen)	♀	"	"
1833	18.7.66	Guimaraes (Chingwen)	♀	"	"
1834	18.7.66	Guimaraes (Chingwen)	♀	"	"
1835	18.7.66	Guimaraes (Chingwen)	♀	"	"
1836	18.7.66	Guimaraes (Chingwen)	♀	"	"
1837	18.7.66	Guimaraes (Chingwen)	♀	"	"
1838	18.7.66	Guimaraes (Chingwen)	♀	"	"
1839	18.7.66	Guimaraes (Chingwen)	♀	"	"
1840	18.7.66	Guimaraes (Chingwen)	♀	"	"

Figure 2. An example of the bird 'catalogue' cards, for Grey-striped Francolin *Francolinus griseostriatus*, giving the specimen number, date and location of collection, and sex (Michael Mills)

Un exemple d'une «fiche de catalogue», pour le Francolin à bandes grises *Francolinus griseostriatus*, avec le numéro du spécimen, date et localité de collection, et sexe (Michael Mills)







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Figure 3. Two of the four specimens of Slaty Egret *Egretta vinaceigula* in the collection: (a) adult, (b) immature. These are the first published records of the species in Angola (Michael Mills)

Deux des quatre spécimens de l'Aigrette vineuse *Egretta vinaceigula* de la collection : (a) adulte, (b) immature. Il s'agit des premières données publiées de l'espèce pour l'Angola (Michael Mills)

Figure 4. A comparison of Black-chinned Quailfinch *Ortygospiza gabonensis* (top) and African Quailfinch *O. fuscocrissa* (bottom), from Angola. The latter species has a white chin and spectacles, but overall the species are very similar and may belong to a single species (Payne & Sorenson 2007). Skins from the Lubango museum come from a contact zone of the two taxa and could be used as part of a detailed phylogenetic study using multiple representatives from each quailfinch form, required to properly test whether the three detected genetic lineages exhibit consistent plumage differences (Fry & Keith 2004, Payne & Sorenson 2007) (Michael Mills)

Une comparaison entre l'Astrild-caille à face noire *Ortygospiza gabonensis* (en haut) et l'Astrild-caille à lunettes *O. fuscocrissa* (en bas) de l'Angola. La dernière espèce a le menton blanc et des lunettes blanches, mais pour le reste les deux espèces sont très semblables et pourraient comprendre une seule espèce (Payne & Sorenson 2007). Les spécimens du musée de Lubango proviennent d'une zone de contact des deux taxons et pourraient servir pour une étude phylogénétique détaillée. Une telle étude devrait utiliser plusieurs représentants de chaque forme d'astrild-caille pour pouvoir examiner si les trois lignées détectées ont des différences de plumage constantes (Fry & Keith 2004, Payne & Sorenson 2007) (Michael Mills)

Figure 5. Male (top) and female (bottom) specimens of Black-chinned Weaver *Ploceus nigrimentus*, collected in Huambo town (previously Nova Lisboa) in March 1966 probably the most recent of this rare species in Angola. Only two other specimens are listed in Dean (2000), with the only other localities being Galanga (the type locality) and Mombolo (Michael Mills)

Spécimens mâle (en haut) et femelle (en bas) du Tisserin à menton noir *Ploceus nigrimentus*, collectés à Huambo (auparavant Nova Lisboa) en mars 1966 probablement les mentions les plus récentes de cette espèce rare en Angola. Seulement deux autres spécimens, de Galanga (la localité type) et Mombolo, sont mentionnés par Dean (2000) (Michael Mills)

Figure 6. An example of the striking endemic male Golden-backed Bishop *Euplectes aureus* in breeding plumage (top), alongside Yellow Bishop *E. capensis* (bottom). A population of Golden-backed Bishop on São Tome is believed to have been introduced (Fry & Keith 2004) (Michael Mills)

Un exemple du remarquable mâle en plumage nuptial de l'endémique Euplecte doré *Euplectes aureus* (en haut), à côté de l'Euplecte à croupion jaune *E. capensis* (en bas). La population de l'Euplecte doré à São Tome est supposée avoir été introduite (Fry & Keith 2004) (Michael Mills)

Figure 7. The near-endemic Bocage's Sunbird *Nectarinia bocagii* (second, fourth and sixth) alongside the distinctive, endemic *gadowi* subspecies of Bronzy Sunbird *N. kilimensis*. Bocage's Sunbird is dark purple and black, whereas Bronzy Sunbird is greenish bronze and has a longer, more curved bill (Michael Mills)

Le quasi endémique Souimanga de Bocage *Nectarinia bocagii* (deuxième, quatrième et sixième spécimens) à côté de la sous-espèce endémique distincte *gadowi* du Souimanga bronzé *N. kilimensis*. Le Souimanga de Bocage est violet foncé et noir, tandis que le Souimanga bronzé est bronze verdâtre et a un bec plus long et plus arqué (Michael Mills)

Figure 8. The very similar Bates's Sunbird *Cinnyris batesi* (top) and Little Green Sunbird *Anthreptes seimundi* (bottom). The latter is overall brighter green, with a shorter, straighter bill; Bates's Sunbird is greyer below, and has a black tail, which is hard to see in the field (Michael Mills)

Les très semblables Souimanga de Bates *Cinnyris batesi* (en haut) et Souimanga de Seimund *Anthreptes seimundi* (en bas). Ce dernier a le plumage vert plus vif, avec un bec plus court et plus droit ; le Souimanga de Bates est plus gris dessous et a une queue noire, ce qui est difficile à voir sur le terrain (Michael Mills)

specimen number, collection date and locality, and sex for each example in the collection. Photographs of these cards (4,661 in total, representing 859 species) have now been labelled and ordered by family. Data entry is continuing using these photographs, but is expected to take at least another 18 months to complete.

A small amount of time was dedicated to comparing specimens of similar species, and taking side-by-side photographs, as well as inspecting the mammal collection.

Findings

Broadly, the collection remains in excellent condition, free of insect damage. Specimens are housed in wooden drawers lined using paper, in 28 large wooden cupboards. All specimens are labelled and the complete collection of field journals remains with the skins. However, the room in which the collection is kept is incredibly dusty, the field journals are unordered and poorly



Table 1. Details of the four specimens of Slaty Egret *Egretta vinaceigula* in the Lubango Bird Skin Collection.

Tableau 1. Données sur quatre spécimens de l'Aigrette vineuse *Egretta vinaceigula* logés dans la collection de peaux d'oiseaux de Lubango.

Specimen details				Collection details		
No.	Sex	Age	Mass (g)	Locality	Date	Collector
23532	F	Imm.	300	Rio Cunene (Quiteve)	27 June 68	A. R. Pereira
23257	F	Ad.	245	Luamúcuá (Quiteve)	19 June 68	D. Mumputu
23259	F	Ad.	175	Luamúcuá (Quiteve)	19 June 68	A. R. Pereira
23432	F	Imm.	300	Rio Cunene (Quiteve)	24 June 68	D. Mumputu

kept, and a large number of mounted specimens are clumsily arranged, making for poor working conditions. Although the collection has been kept in good condition by Prof. José Luis Alexandre and his staff at ISCED, there is no official curator or ornithologist at the collection. The current 'caretaker' of the collection has no training in biology or taxidermy, and the collection remains largely unused. There is not yet an official protocol for access, although permission to work on the collection can be granted by the Dean of ISCED, Prof. Matondo Tomalela. Francisco Miata is employed and trained to maintain and care for the herbarium collection housed here, and a counterpart in the bird collection is urgently needed.

The LBSC is significant for both the number of specimens it contains (>40,000) and the great variety of taxa presented (>850), including numerous rarer species. More than 1,600 photographs of skins were taken, representing >400 species, and have been databased. The most interesting discovery was the presence of four specimens of Slaty Egret *Egretta vinaceigula*, erroneously labelled as Black Herons *E. ardesiaca* (Fig. 3). These specimens (Table 1; Fig. 1) were all collected during a trip to Quiteve, Huila Province, on the banks of the Cunene River (16°02'S 15°11'E), on 19–27 June 1968, and constitute the first records of this Vulnerable species for Angola (Dean 2000).

Some other specimens of interest are summarised in Table 2 and species and species comparisons are illustrated in Figs. 4–12.

DO worked exclusively on the Ploceidae. Most Angolan Ploceidae are represented in the collection, notable exceptions being Orange Weaver *Ploceus aurantius* and Slender-billed *P. pelzelni*. Pinto (1972) listed a specimen of *P. pelzelni* collected in Cabinda that should have been present in the museum and is listed on the 'catalogue'

cards, but it was not found. While the collection generally contains few types, it does house the type series of the subspecies of Scaly-fronted Weaver *Sporopipes squamifrons pallidus* described by Pinto (1967). Several rare or uncommon weavers are represented: Black-chinned Weaver *P. nigrimentus* (2), Loango Weaver *P. subpersonatus* (2), Brown-capped Weaver *P. insignis* (5), Black Bishop *Euplectes gierowii* (1 from Tanzania) and Golden-backed Bishop *E. aureus* (47). Three specimens of Southern Masked Weaver *Ploceus velatus* were collected by Pinto from the isolated Lake Dilolo during August 1958 (Pinto 1965, Dean 1996), with further specimens from this expedition housed at the Lisbon Museum (Louette 1984). It has been suggested that these birds belong to the *reichardi-ruweti* species complex (Dean 2000). The LBSC specimens are dull-plumaged, but one is a male starting to moult: there are a few orange feathers on the upper throat. Other than this orange plumage anomaly (the throat should be turning black), the weavers appear to match nominate Southern Masked Weaver found further south in Angola. The nearest locality for Southern Masked Weaver is in north-west Zambia (Dowsett *et al.* 2008).

Mammals

The mammal collection at Lubango consists of skins and skulls of a variety of species. The aim of this expedition was to catalogue the bird collection, thus there was only limited time for AM to examine the mammals, which numbered more than 3,000 specimens of at least 123 species. The bats were examined in greatest detail and included 211 specimens of 23 species. This represents about one third of the 63 species known to occur in Angola. With respect to collecting sites, there is a geographical bias towards the south-east of the country, which is unsurprising since that is where





Table 2. Summary of some of the more interesting specimens contained in the Lubango Bird Skin Collection, with the number of specimens for each species (No.).

Tableau 2. Aperçu d'un nombre de spécimens intéressants dans la collection de peaux d'oiseaux de Lubango, avec l'indication du nombre de spécimens pour chaque espèce (No.).

Common Name	Scientific Name	No.	Notes
Rufous-chested Sparrowhawk	<i>Accipiter rufiventris</i>	3	Rare in Angola
Swierstra's Francolin	<i>Francolinus swierstrai</i>	6	Vulnerable endemic
Grey-striped Francolin	<i>Francolinus griseostriatus</i>	12	Near-Threatened endemic
White-throated Francolin	<i>Francolinus albogularis</i>	6	Rare in Angola
Horus Swift	<i>Apus horus</i>	12	Form <i>toulsoni</i> , often treated specifically as Loanda Swift
Bradfield's Hornbill	<i>Tockus bradfieldi</i>	16	Scarce species
White-headed Barbet	<i>Lybius leucocephalus</i>	37	Endemic and distinctive ssp. <i>leucogaster</i>
Benguela Long-billed Lark	<i>Certhilauda benguelensis</i>	55	Near-endemic
Grimwood's Longclaw	<i>Macronyx grimwoodi</i>	38	Data Deficient
Angola Cave Chat	<i>Xenocopsychus ansorgei</i>	31	Endemic
Black-necked Eremomela	<i>Eremomela atricollis</i>	65	Localised species
Congo Moor Chat	<i>Myrmecocichla tholloni</i>	29	Near-endemic
Gabela Akalat	<i>Sheppardia gabela</i>	7	Endangered endemic
Pulitzer's Longbill	<i>Macrosphenus pulitzeri</i>	4	Endangered endemic
Laura's Woodland Warbler	<i>Phylloscopus laurae</i>	1	Endemic ssp. <i>laurae</i> ; rare in Angola
Rock-loving Cisticola	<i>Cisticola aberrans</i>	6	Endemic ssp. <i>bailunduensis</i>
Angola Slaty Flycatcher	<i>Melaenornis brunneus</i>	32	Endemic
Margaret's Batis	<i>Batis margaritae</i>	1	Rare in Angola; endemic ssp. <i>margaritae</i>
White-fronted Wattle-eye	<i>Platysteira albitrons</i>	4	Near-Threatened near-endemic
Bare-cheeked Babbler	<i>Turdoides gymnogynys</i>	15	Near-endemic
Black-faced Babbler	<i>Turdoides melanops</i>	21	Near-endemic
Rockrunner	<i>Chaetops pycnopygius</i>	22	Near-endemic
Bannerman's Sunbird	<i>Cyanomitra bannermani</i>	13	Near-endemic
Bocage's Sunbird	<i>Nectarinia bocagii</i>	11	Near-endemic
Ludwig's Double-collared Sunbird	<i>Cinnyris ludovicensis</i>	76	Endemic
Oustalet's Sunbird	<i>Cinnyris oustaleti</i>	31	Localised species
Gabela Helmetshrike	<i>Prionops gabela</i>	3	Endangered endemic
Chestnut-backed Sparrow Weaver	<i>Plocepasser rufoscapulatus</i>	82	Near-endemic
Bar-winged Weaver	<i>Ploceus angolensis</i>	11	Near-endemic
Black-chinned Weaver	<i>Ploceus nigrimentus</i>	2	Near-endemic
Golden-backed Bishop	<i>Euplectes aureus</i>	47	Endemic
Dusky Twinspot	<i>Euschistospiza cinereovinacea</i>	29	Endemic ssp. <i>cinereovinacea</i>

Lubango is situated. The collection includes a number of interesting bat specimens such as two D'Anchieta's Fruit Bat *Plerotes anchietae*, a species known from just 11 specimens (Bergmans 1989, Kock *et al.* 1998); 21 specimens of Angolan Epauletted Fruit Bat *Epomophorus angolensis*, an Angolan near-endemic; and African Sheath-tailed Bat *Coleura afra*, a widespread species but in southern Africa known from just three specimens (Monadjem *et al.* in press). Non-chiropteran mammals well represented in the collection include genets (*Genetta*), hares (*Lepus*), hyraxes

(dassies) (*Heterohyrax* and *Procavia*) and at least 33 genera of rodents. Primates are particularly poorly represented with skins of just six species.

Habitats: erosion of biodiversity in the environs of Lubango

The habitats in which birds were collected between 1958 and 1974 ranged from coastal desert through palm and baobab savanna on lowland alluvium along the Cunene River, to grassland and sclerophyllous shrubland on the sandstones of the high-altitude tableland that surrounds



Lubango, to escarpment forest along the 'Scarp' and equatorial gallery forest along various rivers. Travelling from northern Namibia to Lubango we passed successively through palm savanna and mopaneveld, baobab savanna, *Baikiaea* (teak) woodland on yellow sand, mixed woodland with *Combretum*, *Terminalia*, *Commiphora* and *Albizia* set among spectacular granite hills, and then, at higher altitudes on red sands, miombo woodland. The sandstone plateau above the town of Lubango supports stunted miombo and a high

diversity of shrubs including *Protea welwitschi* and grass trees *Xeris* sp. Closed Afromontane forest patches occurred in deep, well-watered gorges on the escarpment. When the bird collection was constituted, in 1958–74, the human population of Angola was sparse and most of the woodland in the southern part of Angola was intact. Tall woodland that included large specimens of such hardwoods as *Pterocarpus angolensis* (kiaat), *Combretum* (bush willow) and *Baikiaea plurijuga* (teak) extended from the Namibian border to Lubango.

Human population growth over the past four decades has changed the face(s) of the landscape. Within a 50-km radius of Lubango miombo woodlands have been cleared and replaced with subsistence agriculture based on grain crops, goats and cattle, with charcoal made from large miombo trees as a cash supplement. Further from the city of Lubango bags of charcoal and honey for sale at roadside markets are witness to the continued erosion of the woodland, as trees make way for more subsistence crops, cut to raid bee hives, ringbarked for materials used in medicine or to construct bark hives, and converted to charcoal





Legend to figures on opposite page

Figure 9. The endemic Monteiro's Bushshrike *Malaconotus monteiri* (second and fourth) alongside its closest relative, Grey-headed Bushshrike *M. blanchoti*, which differs in lacking the pale ring around the eye, in having a yellowish, not greyish eye, and a less robust bill. Monteiro's Bushshrike is supposedly less orange below (Fry & Keith 2000, Sinclair & Ryan 2003), but these two specimens contradict this (Michael Mills)

L'endémique Gladiateur de Monteiro *Malaconotus monteiri* (deuxième et quatrième spécimens) à côté de son parent le plus proche, le Gladiateur de Blanchot *M. blanchoti*, qui diffère par l'absence du cercle oculaire pâle et par son œil jaunâtre, non pas grisâtre, et son bec moins fort. Le Gladiateur de Monteiro est supposé être moins orange dessous (Fry & Keith 2000, Sinclair & Ryan 2003), mais ceci est contredit par ces deux spécimens (Michael Mills)

Figure 10. Rosy-throated Longclaw *Macronyx ameliae* (second and fourth) alongside examples of the Data Deficient Grimwood's Longclaw, well represented in the collection by 38 specimens of two subspecies, *grimwoodi* and *cuandocubangensis*, the latter not mentioned in Keith *et al.* (1992) (Michael Mills)

La Sentinelle à gorge rose *Macronyx ameliae* (deuxième et quatrième spécimens) à côté d'exemplaires de la Sentinelle de Grimwood, espèce «Insuffisamment documenté» bien représentée dans la collection par 38 spécimens de deux sous-espèces, *grimwoodi* et *cuandocubangensis*. Cette dernière n'est pas mentionnée par Keith *et al.* (1992) (Michael Mills)

Figure 11. The Endangered, endemic Gabela Helmetshrike *Prionops gabela* (first and third) alongside its closest relative, the widespread Retz's Helmetshrike *P. retzii*, illustrating the latter species' larger size and darker plumage (Michael Mills)

Le Bagadais de Gabela *Prionops gabela* (premier et troisième spécimens), espèce endémique «Menacée d'extinction», et son parent le plus proche à large distribution, le Bagadais de Retz *P. retzii*, illustrant la taille plus grande et le plumage plus foncé de ce dernier (Michael Mills)

Figure 12. Two subspecies of Meves's Starling *Lamprolornis mevesii* found in Angola; the more glossy *mevesii* (top and third) alongside the duller *benguelensis*, endemic to the southern escarpment zone, that may deserve specific status (Hall 1960). Specimens from the Lubango Bird Skin Collection could help unravel the systematics of this species (Michael Mills)

Deux sous-espèces du Choucador de Meves *Lamprolornis mevesii* représentées en Angola: *mevesii*, plus brillant (en haut et troisième), et *benguelensis*, endémique de la zone australe de l'escarpement, plus terne. Les deux formes pourraient être des espèces à part entière (Hall 1960); des spécimens de la collection de Lubango pourraient servir à élucider leur taxonomie (Michael Mills)

for heating and cooking in the ever-growing urban centres. Large trees are disappearing in even quite remote areas such as the slopes above the precipitous cliffs of the escarpment at Leba. Smoke rising from the woodland, cut stumps, charcoal pits, paths made by ox-drawn sleds, and feathers of wild birds used to sustain the woodcutters bear silent witness to the ongoing erosion of the natural capital of this beautiful land.

Towards an atlas

One of the objectives of compiling a catalogue and database of the bird specimens in the Lubango collection is to build a georeferenced database of bird specimen records for Angola. These data will be merged with another database, containing data on distributions taken from Traylor (1963), Pinto (1983), Dean (2000) and Mills & Dean (2007), data on bird specimens in other collections and sight records of birds contributed by visitors to Angola. These data will then be mapped, probably at a 15' × 15' scale. The maps will provide guidelines for the recommendation of protected areas and will also provide some basic distribution patterns, useful for modelling effects of climate change and potential environmental disasters (e.g. oil spills from offshore wells along the northern coast). Gap analyses using these data will establish priorities for future ornithological field work in Angola.

Bird atlas studies not only show bird distribution patterns, but more importantly also identify areas for which there are no data. Globally, bird atlases have made a key contribution to conservation, through highlighting the conservation priorities of species (providing fundamental data for Red Data listing) and habitats (e.g. Fishpool & Evans 2001). Angola, emerging from decades of political instability, is a country where knowledge of bird distributions is particularly poor, although the avifauna is diverse. Most surveys and collecting have been conducted in western and north-central Angola, and along the coastal areas and parts of the Mayombe in Cabinda. We do not know whether gaps in the distribution of certain species are 'real' or artefacts of surveys. An atlas will help close these gaps or show whether they are real. This has important implications for conservation in Angola in that attention will then be drawn to areas of high avian species richness, which might also prove to be areas of high species richness amongst other taxa. Identifying focal areas will





also lead to an evaluation of land use practices in these areas and an assessment of their impacts; for example, charcoal burning using native woodland (miombo species complex) trees.

Recommendations for the collection

Although the collection is being kept in reasonable condition, conditions can be greatly improved and the collection should be put to practical use. We recommend that the following steps be taken:

- Produce an electronic database of the bird skin collection, which work is in progress, and once the database is complete, copies will be provided to colleagues in Angola and worldwide, to promote work using the skins. Data will start to be made available online via the website of Natural World (www.nat-world.org) within the next 12 months.
- Training of (a) young Angolan ornithologist(s), to act as curator for the collection.
- Possible 'adoption' of the collection by a foreign museum to assist with training and to improve the conditions in which skins are kept.
- Cleaning of the entire room in which the skins are housed.
- Properly organising all documents pertaining to the collection.
- Cleaning and cataloguing the valuable collection of books associated with the collection.
- Encouraging collaboration between Angolan and foreign researchers, using the skin collection as a point of contact.
- Stimulate interest in Angolan birds by incorporating informative visits to the collection in standard biology courses at the institute and making use of the specimens for student projects.

Conclusions

Given the threats to biodiversity in Angola, it is important that some of the plant and animal collections from the 1970s remain in the country to guide and inspire a new generation of Angolan scientists. With the help of SANBI, other biodiversity experts in the South African Development Community and assistance from outside the region there may still be time to plan a protected area network for Angola that will retain all vegetation types and the associated fauna. Without planning, active protection and

initiatives to provide alternative sources of income for the local inhabitants, it is unlikely that the next generation of Angolans will be able to enjoy the beauty of the country and the biological diversity experienced by their grandparents, to taste wild honey, see Giant Sable *Hippotragus niger variani* in the wild, or even to simply find sufficient wood or charcoal for their daily needs.

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