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Carlo Piaggia, the definition of "gallery forests", and forest avifauna in Central Africa

ABSTRACT

In this paper, we provide a brief overview of how the concept of 'Gallery Forest' originated during the first European expedition into the Democratic Republic of Congo via the Nile route, led by Carlo Piaggia. Piaggia spent nearly two years with the Azande people, gathering ethnographic materials and documenting their customs. His work garnered significant recognition from the botanist George Schweinfurth, who followed Piaggia's path through the 'Niam Niam Country' with greater resources and personnel. Schweinfurth corroborated most of Piaggia's observations and suggested 'Gallery Forests' as the term for these riverine forests surrounded by savannah habitats.However, for various reasons, which we will briefly discuss, Piaggia was not widely acknowledged as the first collector of West African avifauna in Central Africa, particularly the grey parrot *Psittacus erythacus*. Incorrectly, the French zoologist Bouvier published Piaggia's bird collection in 1877, attributing it to the M'Tesa Kingdom in Uganda, when its true origin is likely Lake Tana in Ethiopia. Nevertheless, we owe Bouvier the credit for naming one bird species, *Zoothera piaggiae*, in honor of the great Italian explorer.

Keywords: Antinori, Azande, *Psittachus erythacus*, gallery forest, Schweinfurth.

It is not uncommon to notice how a discovery in the fields of geography or science can quickly fade into obscurity, only to be later claimed by someone else who often finds themselves in a more prominent position, surrounded by unquestioned prestige, which may differ from that of the original discoverer. This is why we are particularly pleased to recall two individuals whose relationship was consistently marked by cordiality and mutual esteem, to the extent that the most famous and prestigious scientist consistently acknowledged the specific merit of his explorer friend. The renowned scientist is the botanist George August Schweinfurth (born in Riga in 1836, passed away in Berlin in 1925), recognized as one of the leading scholars of Africa, with a particular focus on ethnography.

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Fig.1. Ritratto di C. Piaggia C. (1978). Da: Bassani E. (ed.). Carlo Piaggia. Nella terra dei Niam-Niam (1863-1865). Maria Pacini Fazzi Editore, Lucca.

The talented and self-taught explorer is Carlo Piaggia (born in Badia di Cantignano in 1827, passed away in Karkoj, Sudan, in 1882) (see Fig. 1). Between 1863 and 1865, Carlo Piaggia achieved the remarkable distinction of being the first

European to live among the then-entirely unknown Azande populations (then referred to as the Niam Niam) in what is now the Democratic Republic of the Congo (see Fig. 2).

Carlo Piaggia was born into a very poor family in 1827 in the province of Lucca. His family was decimated by cholera, which led him to embark on a journey to Africa in search of fortune. After spending several years in Tunisia and Egypt, where he undertook various jobs, he reached Khartoum (then under Egyptian rule) in 1856, initiating a series of four major explorations. These expeditions took him southward along the two branches of the Nile, venturing into unexplored territories in present-day South Sudan, the Central African Republic, Congo, and Uganda. He distinguished himself from other explorers through his compassionate interactions with local populations and his commitment to justice. He passed away in 1882 in Karkoj (Sudan) along the Blue Nile (Lupi, 2017). His time spent among the Azande earned him worldwide renown.

Fig. 2. Map of the travel route of Piaggia to reach the Azande ("Niam Niam") Country.

Schweinfurth would soon follow in Piaggia's footsteps with a three-year expedition between 1866 and 1869 (Schweinfurth, 1874). As also quoted in Schweinfurth's obituary in *Nature*, "*... he revealed the eastward extension of the great equatorial forest and vividly described the remarkable "gallery" formations it contains; avenues of gigantic trees " like the colonnade of an Egyptian temple," and*

“ aisles and corridors “ in the innermost recesses of apparently impenetrable woods. (This formation, as Schweinfurth carefully acknowledged, had been previously reported by Carlo Piaggia)” (Anonymous, 1925: 687).

In a report submitted to the Bolletino della Società Geografica Italiana, Schweinfurth (1873) recalls:

> “*Il primo volume di questo Bollettino troverà sempre la più onorevole menzione negli annali della geografia perchè in esso vennero pubblicate le prime notizie esatte ricevute dalla bocca del primo Europeo che poteva parlare come testimonio oculare sul popolo dei Niamniam il cui nome era da lungo tempo conosciuto, del quale molto si parlava e che molto si temeva in tutto il Sudan. Carlo Piaggia, il mio predecessore, era stato fra i Niamniam più lungo tempo di me, ed ho potuto verificare che le sue relazioni erano esatte, e dimostravano in lui molto talento di osservazione. Disgraziatamente le sue notizie, colla redazione delle quali il marchese Antinori si è innalzato un durevole monumento, sono solo troppo brevi, e spero con quel che segue di completarle in parte ed in parte di confermarle sotto un nuovo aspetto*.”
>
> [“The first volume of this Bulletin will forever be held in high esteem in the annals of geography because it contained the initial precise information conveyed firsthand by the first European who could provide eyewitness accounts of the Niam Niam people. This tribe had long been known, widely discussed, and greatly feared throughout Sudan. Carlo Piaggia, my predecessor, spent more time among the Niam Niam than I did, and I was able to confirm the accuracy of his reports, which displayed his remarkable observational skills. Regrettably, his reports, edited with great care by Marquis Antinori, are all too brief. I hope that the following content will partially complement them and, in part, shed new light on their findings”]
>
> G. Schweinfurth (1873: 83-84).

And with regard to ‘Gallery Forests’:

> *“Il mio intrepido predecessore, Piaggia, ha chiamato gallerie queste striscie di foreste lungo i fiumi, perchè il viaggiatore si scava dei passaggi coperti attraverso alla densa massa dì fogliame. Vorrei vedere conservato e generalmente adottato un termine cosi espressivo. L’altezza media della vòlta superiore di fogliame è di 80 a 100 piedi, e non pare mai abbassarsi sotto ai 70 piedi. Queste gallerie però non presentano, vedute di fuori, l’aspetto imponente che hanno, vedute dal letto del ruscello, il quale profondamente scavato lascia appena sorgere la metà della foresta al disopra del piano che attraversa. Molte gallerie sono totalmente nascoste in questo modo. Il carattere del paesaggio, e le particolarità specifiche della flora di queste striscie di terreno rimangono sempre le stesse, e corrispondono completamente a quelli che ci hanno accompagnati fin dal primo giorno che abbiamo posto il piede sul suolo rosso:*

una macchia estesa formata da piante basse con alberi isolati e molto grandi, dei quali la particolarità principale é la non comune estensione della chioma"

["My intrepid predecessor, Piaggia, referred to these riverside forest strips as 'galleries' because travelers create covered pathways through the dense mass of foliage. I would like to see such a term preserved and widely adopted for its expressiveness. The average height of the upper canopy ranges from 80 to 100 feet, and it never appears to drop below 70 feet. However, when observed from outside, these galleries do not present the imposing aspect they have when seen from the riverbed, which deeply cuts through them, allowing barely half of the forest to rise above the level it crosses. Many galleries are completely concealed in this way. The landscape's character and the specific features of the flora within these strips of land always remain consistent, fully corresponding to those that have accompanied us since the first day we set foot on the red soil: an extensive maquis formed by low plants with isolated and very large trees, of which the primary peculiarity is the uncommon extension of the crown"]

G. Schweinfurth (1873: 94).

This is how Marquis Orazio Antinori, in the previously mentioned article of the Bollettino della Società Geografica Italiana, recounts Piaggia's observations during his time among the Azande

"Lungo queste acque crescono famiglie innumerevoli di piante che per le spesse ombre che gettano in basso il Piaggia chiama gallerie. Egli descrive queste gallerie con particolari minutissimi, i quali ti fan risovvenire gli ombrosi e incantàti viali o meglio laberinti che i poeti descrissero nei giardini delle fate. Se non che in luogo delle ninfe o dei satiri, trovi colà dentro i pesanti e solitari rinoceronti, i selvaggi bufali, i tardi e corpulenti elefanti, i cinghiali dalle ritorte difese, variate famiglie di scimmie, ed una gran quantità di piccoli quadrupedi roditori, oltre ad un infinito numero di cheirotteri che all'ombra dénsa delle piante si coprono dai raggi solari. Il seguire nello interno queste gallerie è cosa assolutamente impossibile, convien lambirle al di fuori, e traversarle in quei punti ove, o gli uomini o gli animali si sono aperti dei varchi. Laddove più esse si approfondano entro le gole dei colli, le dice popolate da altissimi alberi, alcuni dei quali crescono fino a 80 piedi"

["Along these waters, numerous families of plants thrive, and due to the dense shadows they cast below, Piaggia refers to them as galleries. He provides meticulous descriptions of these galleries, evoking images of shady and enchanting pathways, akin to the labyrinths poets depicted in fairy gardens. However, instead of nymphs or satyrs, one encounters within these spaces, the hefty and solitary rhinoceroses, wild buffaloes, slow-moving and robust elephants, wild boars with twisted defenses, various clans of monkeys, and a multitude of small quadrupedal rodents. Additionally, there is an abundance of chiroptera seeking refuge from the sun's rays beneath the thick canopy of plants.

Navigating these galleries from within is an utterly impossible task. It is advisable to follow their periphery and traverse them at points where either humans or animals have created openings. As these galleries extend deeper into the valleys of the hills, Piaggia notes that they are populated by towering trees, with some reaching heights of up to 80 feet."]

O. Antinori (1868:114-115; Fig. 3).

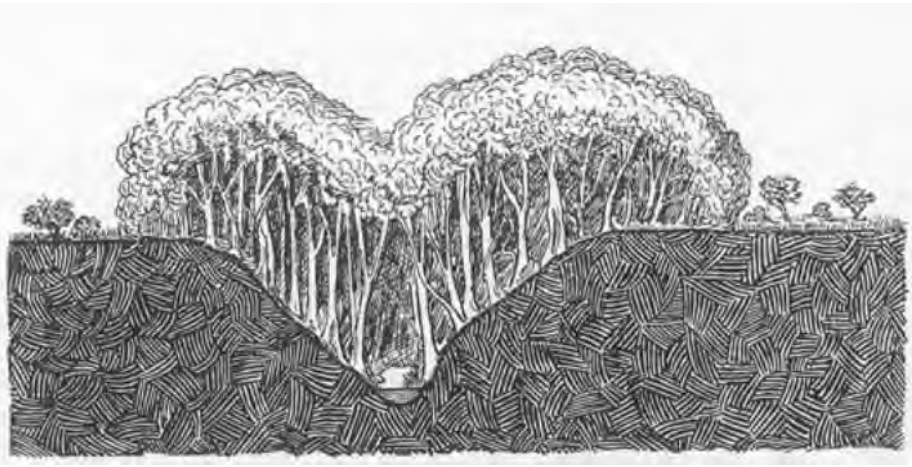

Fig. 3. Section of "gallery forest" scheme after Junker (from Chapin J.P. (1932) - The Birds of the Belgian Congo. Vol 1: 140).

Piaggia's keen insight is also documented by Lupi (2017):

«Fra i tipi di vegetazione che dovettero colpire particolarmente il Piaggia, si possono annoverare le foreste a "galleria"; quelle foreste presenti lungo il corso dei fiumi i cui alberi, sulle opposte sponde, spesso riescono a toccare le loro chiome si da formare appunto una galleria di verzura; tali comunità vegetali hanno oggi questo nome proprio in seguito al termine ideato dall'esploratore lucchese. Ciò era stato auspicato dallo studioso tedesco Schweinfurth; egli, infatti, aveva esplorato quei luoghi pochi anni dopo l'amico Piaggia ed aveva potuto constatare l'esattezza del termine"

[Among the various types of vegetation that must have left a significant impression on Piaggia were the "gallery" forests. These are the forests that line the riverbanks, where the trees on opposite shores often reach out to touch their canopies, forming a green corridor. These plant communities now bear this name, thanks to the term coined by the explorer from Lucca. This nomenclature had been envisioned by the German scholar Schweinfurth. Indeed, he had explored these regions a few years after his friend Piaggia and could verify the accuracy of this term»]

L. Lupi (2017: 982).

Fig. 4. Nineteenth-century representation of the gray parrot (*Psittacus erithacus* Linnaeus, 1758). From F. Levaillant, 1801. Histoire Naturelle des Perrqoquets. Second volume.

Incidentally, the previously mentioned obituary of Schweinfurth also highlights one of his most noteworthy discoveries: «*Schweinfurth also found the gray parrot and other West African types in the Nile regions*».

This reference undoubtedly pertains to the revelation of fauna indigenous to the Western forest region deep within Central Africa. Europeans were familiar with such species from the ports of Western Africa, yet the expansion of their habitat into the interior remained entirely unknown. The gallery forests, as uncovered by Piaggia, evidently served as a conduit for numerous Western and forest species to establish a presence in the Nile Valley.

Moreover, upon a careful examination of Antinori's 1868 report, we can discern that, while recounting the zoological findings from Piaggia's tenure in Central Africa, he states:

> "*Il Piaggia racconta di essere rimasto stordito nelle ore notturne dagli ululati delle bestie feroci, e lungo il giorno dalle grida dei pappagalli fra cui uccise più volte il* Psittacus erythacus*, da me verificato per tale sopra una cattiva spoglia presentatami*"
>
> ["Piaggia narrates how he was stunned during the nocturnal hours by the howling of ferocious beasts, and throughout the day by the squawking of parrots, among which he repeatedly hunted the *Psittacus erythacus*. I confirmed its identity from a poorly-preserved specimen presented to me"]
>
> O. Antinori (1868: 111; Fig. 4).

As further confirmation, Antinori noted:

> *Delle tre specie di pappagalli da esso descrittimi ne ho potuti riconoscere due, il* Psittacus erythacus *ed il* Pionus Meyeri*"*
>
> ["Of the three parrot species described to me, I could identify two: the *Psittacus erythacus* and the *Pionus Meyeri*"]
>
> O. Antinori (1868: 118).

A few years later, Richard Bowdler Sharpe (1847-1909), an ornithologist at the British Museum at the time, included this description in his account of Mr. Friedrich Bohndorff's ornithological collection: "*Bohndorff informed me that the landscape characteristics vary; in Semmius and Ndoruma, forests adorn the riverbanks, resembling the Western African regions. However, in the Bahr el Ghazal area, the riverbanks are covered with grassy terrain, interspersed with occasional forested patches*" (Sharpe, 1884:421). The British ornithologist further remarked, *'It is evident that when Mr. Bohndorff crossed the watershed and entered the Nyam-nyam Country, he crossed the boundary between two distinct faunal regions. The animals of the Nyam-nyam Country are more akin to those of Gabon and the Congo than to those of the Lado district or Kordofan*» (Sharpe, 1884: 421). We can indeed confirm that Piaggia was the first European to encounter the gray parrot *Psittacus erythacus* in Central Africa. Sadly, the extensive collections he amassed, the first of

their kind in what is now the North-East region of the Democratic Republic of the Congo, were tragically lost to a massive flood while he was hunting a considerable distance from the camp. Only a handful of skins could be salvaged. Nevertheless, some 'Piaggian' relics have managed to find their way into the Italian museum system, which, despite its troubled history, continues to preserve a significant biological record, particularly from the Horn of Africa (Gippoliti, 2005; 2020).

Salvadori (1915) makes reference to the arrival of a limited collection of birds collected by Piaggia among the Niam Niam in Turin in 1867. He briefly mentions just two rare *Tauraco leucolophus* specimens (Fig. 5), one of which was later exchanged with Count Ercole Turati (1829-1881), who owned a significant ornithological collection that would later become part of the Natural History Museum of Milan. Perhaps due to the limited number of samples, no one conducted a comprehensive study or published a list of the species included. During that period, Salvadori was occupied with the extensive bird collections from the circumnavigation voyage of the Magenta, a steam corvette of the Royal Italian Navy that embarked on the first Italian global circumnavigation between 1865 and 1867. The zoological specimens from this voyage were housed at the Turin Museum (Salvadori, 1915).

Several new bird taxa were described many years later by foreign zoologists who had access to new collections and abundant comparative material from West Africa. For instance, the rock partridge *Ptilopachus petrosus emini* O. Neumann, 1920, was first brought to central Africa by Piaggia, although his Congo specimens were never subject to detailed study. However, Piaggia's pioneering contributions did not escape the notice of James P. Chapin (1889-1964), the curator of the American Museum of Natural History. In his classic work, 'Birds of the Belgian Congo,' Chapin wrote, "*It was during the sixties of the last century that the penetration of the northeastern corner of the Congo basin was begun. First Piaggia, who lived more than a year among the Azande in the southern Bahr-el-Ghazal Province, made his way across the watershed as far as the village of Chifa (or Keefa), which we know to be near the present station of Bafuka. He collected but few birds within the area covered by the present work, and these were reported upon by Antinori"* (Chapin, 1932:10*).* Some of these specimens (17) are still part of the collections at what is currently known as the Museo Regionale di Scienze Naturali, Torino. They were first documented and illustrated in Lupi (Ghiraldi et al., 2017). Notably, among the species of significant zoogeographic interest, we find the previously mentioned *Tauraco leucolophus* (von Heuglin, 1855), a parrot species, *Agapornis pullarius* (Linnaeus, 1758), as well as *Laniarius* major (Hartlaub, 1848) and *Prionops plumatus* (Shaw, 1809). In Tab. I, we have provided a list of specimens classified by Antinori along with their potential updated nomenclature. Tab. II displays the comprehensive list of birds cited by Antinori but not collected (Antinori, 1868).

Fig. 5. Piaggia's stuffed specimen of *Tauracus leucolophus* (von Heuglin, 1855) housed in the Museo Regionale Scienze Naturali in Turin (photo by L. Ghiraldi).

It should be noted that in 1877, i.e. more than 10 years after Piaggia's departure from the Azande, the French ornithologist and trader Aimé Bouvier

published, without offering either precise locations or collection dates, a list of 34 species of birds collected by Piaggia in Uganda, describing among other things a new species: *Turdus piaggiae*, today *Zoothera* (or *Geokichla*) *piaggiae* (Bouvier, 1877).

ORIGINAL DETERMINATION BY ANTINORI, 1868	CURRENT NOMENCLATURE	MRSN
Micronisus monogrammicus	*Kaupifalco monogrammicus* (Temminck, 1824)	
Accipiter sphoenurus	*Accipiter badius sphenurus* (Rüppell, 1836)	
Accipiter gabar	*Micronisus gabar* (Daudin, 1800)	+
Circus cyaneus	*Circus* sp.	
Scops senegalensis	*Otus senegalensis* (Swainson, 1837)	+
Athene perlata	*Glaucidium perlatum* (Vieillot, 1817)	+
Agapornis pullaria	*Agapornis pullaria* (Linnaeus, 1758)	+
Apaloderma narina	*Apaloderma narina brachyurum* Chapin, 1923	+
Pogonorhynchus rolleti	*Lybius rolleti* (De Filippi, 1853)	+
Cuculus canorus	*Cuculus gularis* (Stephens, 1815)	+
Cuculus?	*Cuculus solitarius* (Stephens, 1815)	+
Coccytes afer	*Clamator* sp.	+
Lamproccyx klaasii	*Chrysococcyx klaas* (Stephens, 1815)	+
Lamproccyx auratus	*Chrysococcyx caprius* (Boddaert, 1783)	
Corythayx leucolophus	*Tauracus leucolophus* (von Heuglin, 1855)	+
Schizoris zonura	*Crinifer zonurus* (Rüppell, 1835)	
Coracias pilosa	*Coracias naevia* Daudin 1800	
Ispidina picta	*Ispidina picta* (Boddaert, 1783)	
Tchitrea ferreti	*Terpsiphone viridis ferreti* (Guérin-Méneville, 1843)	
Platystira torquata	*Saxicola torquatus* (Linnaeus, 1758)	
Ceblepyris pectoralis	*Ceblepyris pectoralis* (Jardine et Selby, 1828)	
Lanicterus phoeniceus	*Campephaga phoenicea* (Latham, 1790)	
Lanarius icterus	*Melaconotus blanchoti* Stephens, 1826	+
Dryoscophus cubla?	*Laniarius major* (Hartlaub, 1848)	+
Prionops poliocephalus	*Prionops plumatus concinnatus* Sundevall, 1850	+
Melanisparus leucopterus	*Melaniparus niger* (Vieillot, 1818)	+
Oriolus auratus	*Oriolus auratus* Vieillot, 1817	
Ptilopachus ventralis	*Ptilopachus petrosus emini* Neumann, 1920	+
Sarcidiornis africana	*Sarkidiornis melanotos* (Pennant, 1769)	

Tab. I. List of species returned from the Azande Country by C. Piaggia according to Antinori (1868), a tentative revised taxonomy and vouchers in the Museo Regionale di Scienze Naturali in Turin.

We are inclined to believe that this collection was indeed made prior to Piaggia's trip to Uganda, probably in Ethiopia, particularly around Lake Tana during 1873-1874. This assumption is supported by the syntype label of *Zootheca piaggiae* in London (Schüz & Zwernemann, 1968), which mentions "Lake Sasse," likely a

mispronunciation of “T’sana.” This publication remains the only scientific paper dedicated to one of Piaggia’s numerous ornithological collections.

ORIGINAL IDENTIFICATION	UPDATED NOMENCLATURE
Microdipterix longipennis	*Macrodipterix longipennis* (Shaw, 1796)
Cosmetornis spekei	*Caprimulgus vexillarius* (Gould, 1838)
Elminia teresita	*Elminia longicauda teresita* Antinori, 1864
Nectarina acik	*Chalcomitra senegalensis acik* (Hartmann, 1866)
Helotarsus ecaudatus	*Terathopius ecaudatus* (Daudin, 1800)
Haliaetus vocifer	*Haliaeetus vocifer* (Daudin, 1800)
Pionus Meyeri	*Poicephalus meyeri (*Cretzschmar, 1827)
Psittacus erythacus	*Psittachus erythacus* Linnaeus, 1758

Tab. II. List of bird species observed by C. Piaggia in the Azande Country (Antinori, 1868).

It is highly likely that, due to a series of omissions and inaccuracies, Piaggia’s pioneering role in the discovery of Central African avifauna went unnoticed or was significantly underestimated. Ironically, it was a Frenchman who ensured that the Italian explorer’s legacy lives on through a species of bird named in his honor, despite Piaggia dedicating his life to collecting specimens in remote and perilous regions.

Additionally, thanks to Schweinfurth’s generosity, the term ‘Gallery Forests’ continues to be a valuable concept in ecological research across the tropical belt, especially in the Americas (Seaman & Schulze, 2010) and is still in use today (cf. Hema et al., 2017).The limited number of Piaggia’s specimens now housed in Turin represents a valuable historical and scientific heritage that may warrant inclusion in international biodiversity educational initiatives, particularly those related to the preservation of Central African forests (cf. Gippoliti, 2022).

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RIASSUNTO

Carlo Piaggia, la definizione di "Foresta a galleria" e l'avifauna di forests in Africa centrale.

In questo articolo, forniamo una breve panoramica di come il concetto di "Foresta della Galleria" sia nato durante la prima spedizione europea nella Repubblica Democratica del Congo attraverso la rotta del Nilo, guidata da Carlo Piaggia. Piaggia trascorse quasi due anni con il popolo Azande, raccogliendo materiale etnografico e documentando i loro costumi. Il suo lavoro ottenne un significativo riconoscimento da parte del botanico George Schweinfurth, che seguì il percorso di Piaggia attraverso il "Paese del Niam Niam" con maggiori risorse e personale. Schweinfurth confermò la maggior parte delle osservazioni di Piaggia e suggerì il termine "Gallery Forests" per indicare queste foreste fluviali circondate da habitat di savana. Tuttavia, per varie ragioni, di cui parleremo brevemente, Piaggia non fu ampiamente riconosciuto come il primo raccoglitore di avifauna dell'Africa occidentale in Africa centrale, in particolare del pappagallo grigio *Psittacus erythacus*. Erroneamente, lo zoologo francese Bouvier pubblicò la collezione di uccelli di Piaggia nel 1877, attribuendola al Regno di M'Tesa in Uganda, mentre la sua vera origine è probabilmente il Lago Tana in Etiopia. Tuttavia, dobbiamo a Bouvier il merito di aver dato il nome di una specie di uccello, Zoothera piaggiae, in onore del grande esploratore italiano.

Parole chiave: Antinori, Azande, foresta a galleria, *Psittachus erythacus*, Schweinfurth.

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