

The secretarybird dilemma: identifying a bird species from the Temple of Hatshepsut at Deir el-Bahari



Abstract: Known from a few representations in Predynastic Egyptian art, the secretarybird has otherwise been elusive, in the art of Pharaonic Egypt as well as the scientific discourse on iconographic imagery of birds in ancient Egypt. The author's studies of the animal decoration at the Temple for her doctoral dissertation identified three images of birds belonging most likely to the same species, depicted in the context of the expedition of Hatshepsut shown in the Portico of Punt. The zoological identification of the species as the secretarybird (another possibility is the African harrier-hawk) derives from an in-depth analysis of the bird's systematics, appearance, distribution and habitat, as well as behavior, which are essential for proper species recognition and instrumental for understanding the rationale behind bringing this particular bird from the "God's Land". Iconographic features contesting this identification and suggesting a different species, that is, the African harrier-hawk, are discussed based on a combination of theoretical background, material analysis, on-site interviews with experts and the author's personal experience with the species.

Keywords: African animals, birds in Ancient Egypt, secretarybird, African harrier-hawk, temple of Hatshepsut, Deir el-Bahari, Hatshepsut Punt expedition, temple decoration

A bird depicted in possibly three separate scenes from the Southern Middle Portico of the Temple of Hatshepsut in Deir el-Bahari, documented in 2012 by the author as part of her extended study of animals in the decoration of this Eighteenth Dynasty sanctuary [Fig. 1], has prompted an in-depth zoological study in an effort to support the primary identification of the species as being in this case the secretarybird.¹ A number of discrepancies observed in the representations suggested

1 The author's doctoral dissertation, initiated in 2012, considers the fauna pictured in the decoration of the Temple of Hatshepsut in Deir el-Bahari. Relevant animal images,

Kamila Braulińska

University of Warsaw

ACKNOWLEDGMENTS

I would like to acknowledge Dr. Zbigniew E. Szafrński, Director of the PCMA UW Polish–Egyptian Archaeological and Conservation Mission at the Temple of Hatshepsut at Deir el-Bahari, for the permission to work on the complete faunal iconographic material from the temple. I would like to express my deep gratitude to John Wyatt for his constant support in my research and for insisting that I keep checking other species as well. I am particularly grateful for the professional zoological assistance of Maria Krakowiak, who invaluabley facilitated my study of modern comparative material. I would like to thank Prof. Lionel Posthumus, for his preliminary linguistic consultation. I feel deeply grateful to Aneta Pošva, bird keeper, Vaclav Straub, bird breeding inspector, Michal Podhrázský, curator of birds, reptiles, amphibian and fish, and Jakub Pošva, for their hospitality and precious on-site consultations, as well as readiness to reply to my questions also as a post-on-site-experience.

Thanks are also due the Consulting Council for Students' Research and the University of Warsaw Foundation for their constant financial support of my projects, including one of the largest in my agenda, the research on the Secretarybird (Grant Project 6/III/2017 and Continuation grant Project No. 14, April 2018, respectively). Last but not least, I would like to thank the Polish Centre of Mediterranean Archaeology of the University of Warsaw for granting scholarships to Egypt, during which I could conduct my research on the fauna of the Temple of Hatshepsut and ancient Egypt.

the need for an in-depth analysis of the bird's systematics, appearance, distribution and habitat, as well as behavior, seeking the rationale behind the bringing of exemplars of this particular species from the "God's Land". The present paper records the results of a comparison of archaeological material from ancient Egypt with modern zoological expertise on the secretarybird, gleaned from both written and illustrative sources, and from personal observation of the bird. The latter includes a review of unpublished and commonly unavailable data from a world database on extant captive zoo populations and interviews with specialists. The research was done, among others, at three zoological units which have successfully bred the species: Zlín-Lešná Zoological Garden, Dvůr Králové Zoo & Safari Park and Prague Zoological Garden. Vaclav Straub, Michal Podhrázský and Aneta Pošva, ornithological section curators/in-

spectors and keepers of the studied birds from the respective units, were consulted. Eric Bairrão Ruivo (Science, Collection and Conservation Director) from the Zoopark de Beauval was consulted for the *Lophaelix occipitalis*. The Natural History Museum of the University of Wrocław provided the opportunity to study a taxidermic specimen and a skeleton of a presumed secretarybird, (the identification has since been put into doubt). The illustrations in this paper derive from the author's extensive on-site observation of the bird and its behavior.

The present paper is a part of a wider study on the topic. Due to the limited space, complexity of the topic, and the introductory character of the article, only some issues have been addressed. The possibility that the bird in question was actually an African harrier-hawk and not the secretarybird will be explored in a separate article (Braulińska, in preparation a).

BIRD IMAGES FROM THE PUNT PORTICO

The fragmentarily preserved bird images are found in a scene on the south wall and two other scenes on the west wall of the temple's southern Middle Portico, the so-called Portico of Punt. The one on the south wall, tentatively assumed to be of the same species as the other two, depicts

the bird in a natural setting [Fig. 1 inset on right]. One observes the rear part of the body with the distal, lower part of the underside of the right wing with flight feathers and both feet [Fig. 2 right]. The position of the wings suggests that the bird was shown in the act of landing in

including the birds, from the so-called Punt Portico were documented by the author in the 2011/2012 season. The bird was identified to species provisionally in 2012 and in 2014 the author presented her identification of the secretarybird in public, during a seminar at the University of Warsaw. She continued her study of the secretarybird in 2015, initiating zoological and etymological research within the frame of her PhD program, which has been financed from consecutive University of Warsaw student grants. Plans are in place for a monograph presenting the results of her doctoral research. On 24 May 2018, Filip Taterka (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences), who has been studying the Portico of Punt for publication since 2015, announced his identification of the bird species just as the author's research was about to be concluded. The author's documentation of the animals in the Portico was available to Taterka since 2016 (Braulińska 2017: 226).

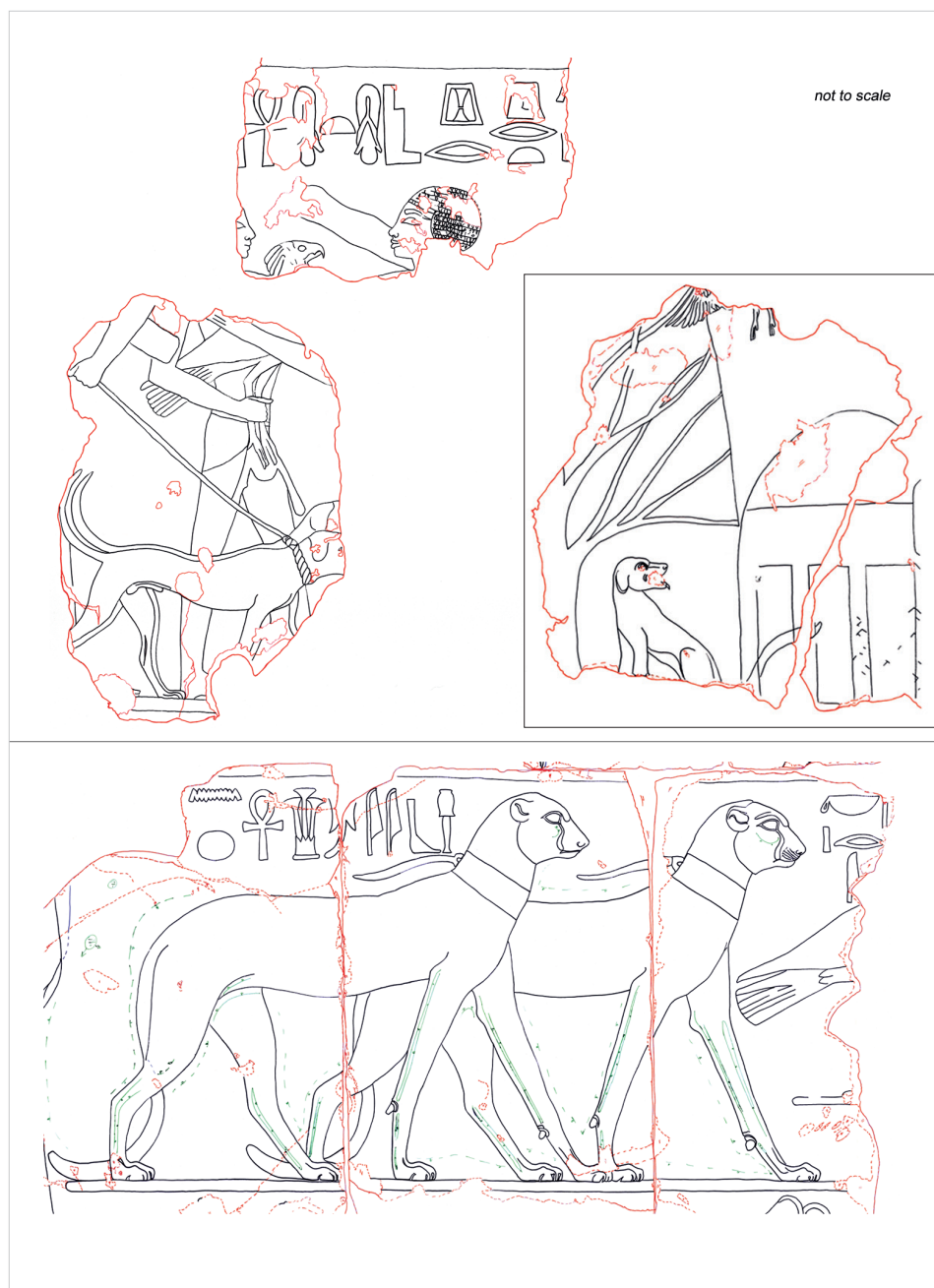


Fig. 1. Three scenes with images of a bird from the Portico of Punt in the Temple of Hatshepsut in Deir el-Bahari: inset on right, bird with a dog, “natural setting scene” (south wall of the Portico); top left, bird carried by a goods-bearer, presumably a Puntite, next to a pair of dogs, “bearers scene” (west wall of the Portico); bottom, rear part of a bird with inscription, “presentation scene” (west wall of the Portico) (PCMA UW Temple of Hatshepsut Project/Drawing K. Braulińska 2011/2012)

the branches of a tree that stood next to a hut with dome-shaped roof and a pattern resembling a mat on the walls. A dog is shown sitting in the shade of the tree.

A scene of bearers of goods in the southern part of the west wall depicts a bird being carried by one of the bearers, probably a Puntite [see Fig. 1 top left]. The bearer in front is looking back at the bearer of the bird, while the bearer behind him is leading two dogs, resembling the dog depicted under the tree in the first scene. The composition of the scene places the dogs directly below the bird. A substantial part of the middle body of the latter is missing, but the head is mostly preserved, as is the body from mid-part to the tip of the tail along with both legs and feet [see Fig. 2 left]. Distinctive features include primarily the beak, crest, tail and legs. The beak is typical of diurnal birds of prey with a hook at

the end and a strange “toothy” structure in the middle of the maxillar line. The crest, with obviously short and blunt tipped feathers, seems to be set around the back of the head, with the roots of feather stems in the sagittal plane. The tail is long, rectangular in shape, of the same length as the wings. The legs are long as well, with long straight toes.

The third scene, likewise on the west wall of the Portico, in its central part, depicts a presentation of the goods [see Fig. 1 bottom]. The tail with the undertail coverts plus the hind part of the belly and possibly the tip of the hind toe have been preserved, along with part of an inscription above the bird image [see Fig. 2 center]. Pacing right behind the bird is a pair of collared cheetahs, also identified with an inscription above their figures. The cheetahs have their own base line, as does the bird, on a slightly higher plane.

ZOOLOGICAL IDENTIFICATION OF THE BIRD SPECIES

Any zoological identification of species must assume a fair depiction of distinctive details. Faced with obvious discrepancies between the image and the real animal, the specialist must decide to what extent

the artist’s picturing of the animal was from actual observation and not biased by cultural or artistic conditioning (see Evans 2015). The next question, assuming real-life observation was the case and the

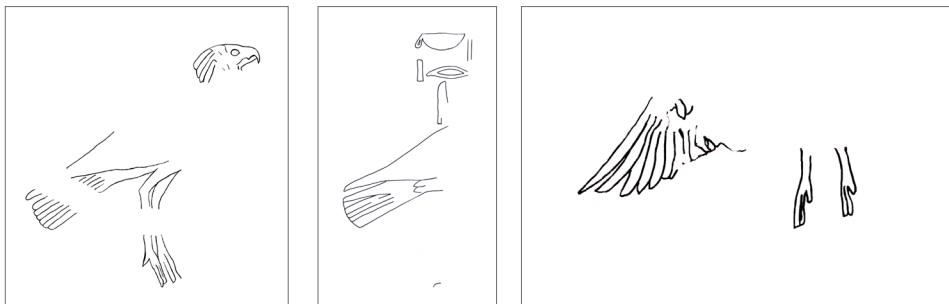


Fig. 2. Comparison of the preserved parts of bird images extracted from the three scenes in the Portico of Punt pictured in Fig. 1: from left, the “bearers scene”, the “presentation scene” and the “natural setting scene” (Drawing K. Braulińska)

artist was not relying on third-party descriptions or illustrations, is whether he was rendering the images from memory and simplifying features of lesser consequence for the overall image or composition? or was he portraying, more or less proficiently, a living bird? If the latter, then are the notable discrepancies due to carelessness or disregard for detail, or perhaps because the species was already extinct or has escaped recognition.

One last possibility, but one that is easily dismissed in view of the rendering of the other animals in scenes from the Portico, is that it is a hybrid representation or simply does not represent any existing species. The author's considered opinion is that the artist in this case was picturing a species that he had knowledge of, perhaps even first-hand at that.

There must have been a level of detail memorization that could be responsible for any departures from reality. Judging from surviving depictions, the prototype of the depicted bird must have had a crest, long unfeathered legs and a characteristic beak. It must have also been relatively big, although the Egyptian aspective would have made the images somewhat less reliable with regard to the overall size as depicted.

Keeping these reservations in mind and assuming that the three images represent the same species, the author's identification was narrowed down to birds of prey owing to the characteristic beak shape (which dismissed outright birds like bus-

tards and waders, including cranes, egrets and herons). The crest was another distinctive element. Several alternative species were examined, extending the studied pool to include not only birds typical of Africa, but also species originating from outside the African continent, this on account of bird migrations as well as changing zoogeography over the millennia, and not the least because of the still debated location of Punt. The study encompassed species systematics, appearance, characteristic features, modern distribution and habitat, and last but not least, behavior.

The analyzed features included general posture, size, body setting, crest, head profile, facial features, beak, trunk, leg characteristics, tail, ratios of particular body parts, such as position of folded wings to the tail, etc. These were compared with the temple images in order to establish degrees of similarity to particular species.

Several species were considered, most of them belonging to relatively allied taxa or at least taxa not that distant from one another.² Of these, the secretarybird (*Sagittarius serpentarius*) and, conceivably, the African harrier-hawk (*Polyboroides typus*) appeared to be relatively good alternatives, best fitting the specific characteristics of the depictions with an indication for the former. Progressing research has led to the elimination of several other species for a variety of reasons (see below, *Appendix* and *Table 1*).

2 For instance, the clade of Secretarybird and Long-crested Eagle. According to Sibley, Ahlquist (1995: 471), the Falconides infraorder comprises of the hawks, eagles, kites, harriers, Old World vultures, Osprey, Secretarybird, falcons and caracaras. The infraorder Falconides of these authors is equivalent to the traditional order Falconiformes, without the New World vultures.

THE SECRETARYBIRD IN LIGHT OF ZOOLOGICAL IDENTIFICATION

The secretarybird is an extant species that exhibits quite a fair share of similarities with the depiction from the Temple of Hatshepsut, even if the identification is not entirely satisfactory, considering that the African harrier-hawk is an acceptable alternative. In this situation, learning about the species in detail is crucial to understanding the ancient circumstances related to the discussed scenes and the phenomenon of species perception in general. In ancient times, people imported animals for concrete reasons and the key to their motives lay mainly on the animal side, which has long been underestimated in research on ancient Egyptian fauna.

A review of historical and ethnographical literature on the secretarybird has demonstrated that it has always excited interest, being “curious”, “peculiar”, “unmistakable”, “interesting”, etc. One may assume that the ancient Egyptians of the New Kingdom perceived it as such as well, particularly as they probably had no longer any direct contact with the bird. The secretarybird obviously was a curiosity and an attraction for the men of Hatshepsut, just as it has been until modern times. By 1871, when zoos around the world were vying with each other to bring animals from “as many faraway places as possible” (Mikhail 2014: 163), a secretarybird was an exhibit at the Cairo zoo, still located at that time in the

grounds of Khedive Ismail’s Palace Garden on Gezira island (Mikhail 2014: Pl. 6.1).

Zoological systematics. The secretarybird is monotypic, as is its genus and family. It is the only representative of the Sagittariidae family, genus *Sagittarius* and does not have subspecies or any taxa of lower rank.³ The most cited categorization (del Hoyo, Elliott, and Sargatal 1994: 206) classifies the animal as follows: class *Aves*, order *Falconiformes*, suborder *Sagittarii*, family *Sagittariidae*. All species of the order are diurnal birds of prey, either raptors or carrion eaters, and have tended to be classified based on bills and feet (Sibley and Ahlquist 1995: 471). Current research on the iconographical representation from the Temple has also focused on this element. Raptors have hooked beaks and talons in their feet, which may be modified in specialized forms, as in the case of the secretarybird. Similarities in skeleton and skull musculature relate the species to diurnal birds of prey, but its karyotype differs (del Hoyo, Elliott, and Sargatal 1994: 206). The history of systematic repositioning of the secretarybird shows the difficulty inherent in this bird classification (see Sibley and Ahlquist 1995: 473–484), and when it comes to juxtaposition with other raptors, it must be treated cautiously in terms of phylogenesis (see Krüger, Liversidge, and Lindström 2002: 607, 608). The Sagittariidae is the only family of African birds of prey that is

3 The existence of subspecies was suspected, by Horsbrugh (1912: 105), among others, despite the lack of parallels in the modern bird world. A tentative relationship to the South American *Cariamiidae* (D.W. Snow, cited after Sibley and Ahlquist 1985: 130; Brown 1972: 37) or the *Otididae* (bustards) has proved groundless.



Fig. 3. The secretarybird in a zoo environment: bottom, a subadult bird at Zlin Zoo; top left, an adult specimen at the Prague Zoo: note the bird coloration and wings-tail relation, the distinctive crest, deep-orange facial mask and extraordinarily long beak; top center, an adult secretarybird in Dvůr Králové Zoo & Safari Park: note feather coloration, folded crest tightly adhering to the nape, as well as feet in frontal view; top right, same bird, close-up of warning-off stance: note delicate head, large eyes and long "eye-lashes", yellow gape and the smooth ridge between the mandibles (Photos K. Brauliňská, courtesy of the Zoos)

exclusively African (Brown 1972: 37, 133); however, whether it is a true bird of prey has also been doubted (Brown 1972: 37).

Interestingly, a fossil species, *Eremopezus eocaenus*, found in upper Eocene deposits in Fayum Oasis, is compared to “a giant flightless secretarybird”, at least as far as the limbs are concerned, but the environment of the fossil layer, which was swampy, swampy forest with rivers, probably in monsoonal zone, was very different from the extant species environment area (see Rasmussen, Simons, Hertel,

and Judd 2001: 327). Three fossil species claimed to resemble a secretarybird have been recorded in France, one in Namibia (see Mourer-Chauviré 2003: 104–105), and a smaller specimen in North America (see Fedduccia and Voorhies 1989). The prehistoric records, from Europe and beyond, prove that the species not only could have had forms resembling it, but that they were not restricted merely to Africa.

Appearance. The silhouette of the secretarybird is sometimes compared to that of a bustard, a crane seen from a long



Fig. 4. The secretarybirds in Zlin Zoo: bottom, a juvenile bird, note the overall coloration, pale facial mask and dark beak; top left, a bird presenting the feather shape and setting of the crest, the long quills on the head and tail length (bird in the background); top right, detail of the legs and tail, note the striped tibia, scaled metatarsus and white undertail-coverts (Photos K. Braulińska, courtesy of the Zoo)

distance (Mackworth-Praed and Grant 1957: 128) or, more accurately, to a cross between a stork and a raptor (Perrins and Middleton 1985: 103). Comparisons with a “terrestrial eagle” (Brown: 1972: 37), even better a “walking eagle” (Miller 1915) or “long-legged marching/pedestrian eagle” (del Hoyo, Elliott, and Sargatal 1994: 206) best describe its looks. The general posture of the depicted birds fits the secretarybird species. Kurt Sethe (1906: 336) referred to the bird in the presentation scene as “a wader”, which was not that far off the mark considering the similarity of the lower part of the secretarybird’s body to that of waders.

The *Sagittarius serpentarius* may reach 120–150 cm in length (combined body, 71–80 cm, and tail, 54–70 cm, Anděrová and Janochová 2017: 60), wing of 60 cm to 66.5 cm (Mackworth-Praed and Grant 1957: 128), wingspan up to even 212 cm (Anděrová and Janochová 2017: 60). The long legs give a height of 130 cm (Shorrocks and Bates 2015: 71). The bird weighs about 2.3–4.3 kg (Anděrová and Janochová 2017: 60). Size (even if questionable in view of the Egyptian aspective) can be said to be fairly accurate, the only issue being the too-short legs. The body of the bird is large, set sloping while standing, more horizontal while striding. Optically, it seems large in comparison to the head. The extended, narrowing tail gives the impression of a counterweight. The setting of the body from chest to tail, as presented on the Temple wall, apparently horizontal, is characteristic of eagles as much as of the secretarybird. There is, however, an interesting detail, namely the angle of the body in the presentation scene. The bird here should have

been depicted walking, like the other animals, but the inclination of its body—more inclined than horizontal—suggests curiously a standing position. In this it would resemble the wader birds of ancient Egyptian depictions. The bird’s weight naturally can only be imagined from secondary features of the image; the ease with which it is carried in the bearers’ scene derives rather from the rules of Egyptian art.

The coloration is in general bluish-gray, pale gray, with black at the distant parts of crest, wings, tail, belly and thigh (the latter is a common name, not to be confused with the proper femur) [Fig. 5] and it may differ slightly between the sexes and clearly between young and adult birds, but since no colors have been observed in the depictions of the bird



Fig. 5. Secretarybird feathers: left, coloration difference of a long tail feather among individuals; right, a long double feather from the secretarybird’s tail and a remex feather at far right (Photos K. Braulińska, private collection, courtesy of Pragued and Dvůr Králové Zoos, Czech Republic)

from the Temple, this element can have no bearing on the identification.

One of the two most distinctive features is a set of long crest feathers of the head and nape, leaning towards the back of the body, changing position, shape and arrangement to reflect the bird's emotional state and — blowing wind. Feathers are slightly narrower at the base, widening more or less symmetrically towards the tip, resembling an otter-tail-like/pointy oar with long, gently defined blade [see Fig. 5]. The head crest feather of the bird in the bearers-scene seems to be too short and too wide compared to that of the secretarybird. The shape of the feathers in the Deir el-Bahari image is also different, and they are all short, of equal length and shape, while those of the secretarybird should be long, reaching even to the back of the animal. Unless the artist had been inaccurate in his depiction, then this detail indicates either an accurate rendering of a phase in the secretarybird's life when these feathers are shed to be replaced by others, or a very young animal (the most convincing idea, to be presented in detail in Braulińska in preparation a), or an altogether different species.

The head of the secretarybird, on top of a not especially long neck, is rather delicate, with a characteristic facial mask of usually orange color, with yellow cere of varying hue. It is duller in females and immature specimens (Redman, Stevenson, and Fanshawe 2016: 80). The lores (area between the eye and the beak) and the whole facial mask are bare. The nostrils are oval and vertical. The head in the studied iconographical image itself is much more eagle-like than the secretarybird's, however small in comparison

to the body, which is a pro for the identification of the bird with the latter. The relatively small ratio between the horizontal (head-beak) and vertical axes makes the head robust, unlike the secretarybird's, at least the adult's, but not excluding the young bird. No obvious traces of the facial mask have been preserved. The eye, round and fairly large, in relation to the head and the beak, is a typical feature of the bird and seems to distinguish it from other species. The rendering of the eye in the Temple image could thus support the identification. The long lashes around the eye—a feature that would have attracted attention—are in fact a modified feather. However, there is no trace of anything of the kind in the images.

The shape of the beak is typical of birds of prey, like eagles. Maxillar and mandibular tomia are smooth and straight from the gape until the frontal curve; the length and curvature of the beak, as well as its tip vary (K. Braulińska, personal observation, see Fig. 3). However, the beak of the bird imaged in the Temple seems to be too broad for a *Sagittarius* (and the African harrier-hawk, too, as a matter of fact), even if the tip would fit the secretarybird, taking into consideration that it could vary. A feature absolutely excluding a secretarybird is the characteristic “tooth” in the middle, which even if it was supposed to have symbolized the border between the cere and the beak—apparently the colors of the different parts of the beak—still has not been observed in any of the living birds. The structure does resemble however a tomial (or toral) “tooth” that may occur in falcons (well visible in some peregrine falcons, also kestrels) and accipitrids (including some eagles and kites) and is used for breaking the spine of prey

(addressed in Braulińska in preparation a) [see below, Fig. 13].

The legs of the *Sagittarius serpentarius* are very long and slim, heavily feathered down to the tarsal joint, naked and nude in the tarsometatarsus part, covered with smooth scales especially visible in front, presumably for protection against preying attacks [see Fig. 3 top right]. The leg length is a factor in speed and adroitness in hunting. The limbs of the birds in the bearers- and presentation scenes from the temple are not long or slim enough. The feathered upper part seems to be too short, the lower part of the leg definitely too thick and short, the toes too long. The bird has a four-toed foot, with the inner, middle and outer toes short, but very strong (Dyrz 1991: 178). The legs of the secretarybird are obviously built for walking, and not for grasping prey, like other birds of prey do, therefore they have no prehensile function, and the claws are significantly reduced in comparison to other birds of prey [Fig. 6]. These are neither raptorial nor wading, nor cursorial feet. Moreover these stick-like legs are a weak point, being easily fractured and difficult to heal (Latham 1792: 19; modern

zoo reports). In this context, the bird in the natural-setting scene may actually be one of the smaller species attested in the Portico of Punt, although the specific position of feet and wings in flight and landing, as well as the proximity of the dog (strangely also present in the bearers scene) could still point to the secretarybird.

The bird's tail in the image is also misleading. It is clearly square-ended, not like the graduated tail of the secretarybird, and equal length with wings, which is unreal. It does not have the long double feather in the middle of the tail (tail feathers are up to 70 cm, the tail in the author's collection is even 71.5 cm long), grey, with black spots at the end, varying from individual to individual [see Fig. 5]. It is one of the two main discrepancies between the real birds and the iconographic images on the wall. Birds lacking the long plume may be seen in nature, but it is not their regular look. It is highly unlikely that the damage to the relief in two of the scenes could have removed all trace of a tail, and the representation of the bird in front of the pair of cheetahs undeniably had no tail: there



Fig. 6. Comparison of the legs and feet of the Secretarybird (on the left) and the Martial Eagle. Note the short toes of the former. Exhibits of the Natural History Museum, University of Wrocław (Photos K. Braulińska, courtesy of the Museum)

is no space for it and no suspicious traces of damage that could have obscured it. However, the apparently missing long feathers theoretically were a way of rendering a bird's moulting phase, which is a regular feather exchange process, but which could have possibly been affected by stress, caused by captivity, as well as potential malnutrition in a new environment (although one may imagine that the rat-eating secretarybird should have managed, at least on the ship). Exchange of feathers is a long and complex issue for birds depending on several variables, determined to some extent also by their survival strategies. It is also possible, based on the author's own observations, that the specific form of the feathers in the Temple representations—short and of strange shape—is due to the juvenile age of the depicted bird. Another option is the artist's inaccuracy. The juvenile age of the specimen could also explain the strange lines on the head that do not follow the pattern of the facial mask, but could follow the plumage of this part in a juvenile bird. It is surprising, however, why it was rendered in relief, while the rest of the plumage was merely painted.

The bird breeds in different regions at different times, hence if moulting was indeed responsible for the missing tail feather, then combining the results regarding the bird with other observations related to Hatshepsut's expedition may be a large step forward in this research. It must be kept in mind, however, that there are several variables affecting the moulting process (suspending it, a chaotic pattern in some species, rarely a reverse sequence, even differences between populations) and the image on the Deir el-Bahari wall. There

may have been other reasons: mechanical (for example, a cheetah attack) or ceremonial (quill deprivation for ritual reasons, as presumed by Vaclav Straub, although this is difficult to believe in the context of the bird as traded royal goods). Nevertheless, even more convincing than the moulting process, is the previously mentioned very young age of the depicted bird, which in fact makes all the discrepancies less glaring.

One of the characteristic features of the secretarybird is the white soft feathering of the area of the belly and undertail coverts, which seems to have been rendered by the Egyptian artist in the representation beside the cheetahs. In nature, the black coloration of the tail and the primaries of the wings seem to end together, sometimes leaving a characteristic slight gap between them, which seems again to be rendered in the images from Deir el-Bahari (bearers and representation scene).

Distribution and habitat. In general, the secretarybird is distributed south of the Sahara, rather widely [Fig. 7], excluding tropical forests and the edges of the Horn of Africa. It is not yet known to what extent the modern range of the *Sagittarius serpentarius* is comparable to the ancient one; although it was noted in 19th century Egypt and is recorded from medieval Egypt (see Kinzelbach 2008: 247, who suggests a more frequent occurrence of the secretarybird in the Nile Valley), it must have been imported there. Although the climate in the New Kingdom could have resembled that in modern times, one needs to consider a whole range of variables. The habitat of the secretarybird is mainly grasslands

(acacia grasslands), open bushed and wooded grassland, steppes and dwarf shrubland, poorly bushed savannah. It avoids very high grass that would impede walking (Dyrzcz 1991: 178), dense woodland forests or heavily bushed sites, as well as mountainous regions. It is recorded in the areas from sea level up to 3150 m a.s.l. (Redman, Stevenson, and Fanshawe 2016: 80) and in both dry and moist savannah and grassland habitats. Modern research has also shown the animal's changing behavior imposed by a changing environment (general avoidance of transformed habitats, however with recent adjusting to new conditions, Dyrzcz 1991: 178, Hofmeyr, Symes, Underhill 2014); the same could have happened in antiquity, not in terms of the behavior of a single animal, but as a potential distribution and habitat change for the species as a whole. The latter are important not only as a tentative explanation for the appearance of the secretarybird specifically in Ancient Egyptian art, but also as

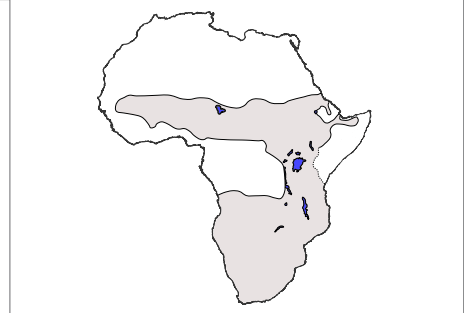
an indication that the area of origin of the animal should not be strictly limited.

The territory of a secretarybird may cover from 20 km² to 200 km², depending on the region (Perrins and Middleton 1985: 105). Del Hoyo, Elliott, and Sargatal (1994: 208) suggest 20 km² in mixed savanna (tree and grass), 45 km² in dry grassland, 70 km² in the montane grassland of South Africa. It could explain the tendency in Egyptian art to present it as a single specimen. Also in the Temple the bird is represented as a solitary individual (unless the pair has not been preserved), while other animals are brought in pairs.

Behavior. Secretarybirds are sedentary and strongly territorial (Dyrzcz 1991: 178), although it is claimed that the bird exhibits varying degrees of nomadism (Dean and Simmons 2005, after Hofmeyr, Symes, and Underhill 2014: 1), not to be confused with migration. Dispersal movements, which are a fairly new theme in bird studies, over a variety of distances (even more than 1500 km) need to be



Fig. 7. The secretarybird range map, dashed line showing hypothetical range based on environmental clues; above, group of three secretarybirds in the open grassland of Tanzania (Drawing K. Braulińska, based on multiple sources, primarily: IUCN and Redman, Stevenson, and Fanshawe 2016: 80, and for the lacunae, on the plant cover of the area, primarily: <http://2016africalandcover20m.esrin.esa.int/viewer.php>; photo M. Krakowiak)



noted as well. They haunt the same area and even use the same nest each season, if not disturbed (Horsbrugh 1912: 105). They were reported to lay eggs in the same nest even when their eggs had been taken (Horsbrugh 1912: 105). Breeding-site tenacity coupled with nomadism may be typical features of species that are rodent predators, especially in areas with scarce and irregular rains (Andersson 1980: 175). However, it should be borne in mind that *Sagittarius serpentarius* is not exclusively a rodent predator; its diet diversification makes it less dependent on food source fluctuations than the less diet-flexible species. The bird's preferences could have facilitated its capture by the Puntites(?) or other peoples, for whom they could have been an export product.

Sagittarius serpentarius is mostly terrestrial when not nesting, however it flies well. Its flight is an impressive aerial display; it may also be considered rather labored (Redman, Stevenson, and Fanshawe 2016: 80). In flight it resembles a stork, and to some (Horsbrugh 1912: 106) "any eagle or vulture". Nevertheless, the bird would rather run, instead of flying away, when disturbed (Redman, Stevenson, and Fanshawe 2016: 80; Latham 1792: 19). The wings are also used raised and opened while hunting, as well as running around on the ground. Striking with wings during hunting may aim at disorienting and shooing the prey out of a hiding place, after which the foot attack supervenes (see Martin 1890: 219). The tendency to stay on the ground and rather run than fly could have raised the peculiarity of the animal for an ancient observer, whether Egyptian or local. Hunting behavior is unique: the bird

kicks and stamps the head of its prey with a great force (partly due to the length of legs) and precision (requiring a good visual and neuromuscular systems coordination) in order to kill or incapacitate the prey (Portugal et al. 2016).

Secretarybirds are monogamous, therefore often observed in pairs. However, they may be observed in solitude, preying in isolation or perhaps patrolling territory (del Hoyo, Elliott, and Sargatal 1994: 208). Egyptian representations of singular specimens seem to match the natural behavior of the species.

The birds build large platform-like nests on flat-topped trees, which in most cases will be acacia (note the significance of acacia for ancient Egyptians); seldom do they nest on the ground, protected by vegetation. Such conditions are known also from captivity. Horsbrugh (1912: 105) noted that when on a tree, the *Sagittarius serpentarius*'s nest is a landmark seen from a far distance counted in miles. Moreover, the egg incubation time (43–44 days), the fledgling and nesting period (73–85 or 65–106 days according to different authors, Brown and Amadon 1968; Shorrocks and Bates 2015: 71; del Hoyo, Elliott, and Sargatal 1994: 213) make the female and the young birds especially vulnerable to capture. Owing to the occasional siblicidal nature of secretarybirds (e.g., Bortolotti 1986: 184), young birds could have been found solitary also in the nest. The birds would be seized probably directly in the nests (see above, suggested loss of tail feathers during moulting). Modern comparative material demonstrated brooding as the best moment to do it (V. Straub, M. Podhrázský, A. Pošva, personal communication), and it may be assumed that this was the case

when the bird was captured for the Hatshepsut expedition. Interestingly, in the environment-scene, the bird is presented

in the direct vicinity of the crown of a tree, which makes sense in terms of the secretarybird's behavior and habitat, and the pe-



Fig. 8. Secretarybird behavior: top left, typical position of inspecting the ground for prey, note the halo-set crest and foot shape (a vulture can be seen in the background); bottom left, another mode of searching for prey or for nest-building elements, note the folded flat crest; top right, characteristic position for picking up objects, note the recrices coloration and flight feather reach; bottom right, stages of sitting down in a position resembling a sphinx, note continuous observation of the ground and halo-setting of the crest (Photo K. Braulińska, courtesy of the Zoos)

riod in which they could have been caught. Again, one bird nesting while the other one hunts would fit the model of capture and import of a single bird. It could also explain the juvenile age of the birds presented to Hatshepsut, assuming the interpretation of age is correct.

According to Sibley and Monroe (1990: 289), breeding of secretarybirds was documented only in the east and south of Africa, from Ethiopia to South Africa and as far as Namibia to the west. Moreau (1966: Pl. 14) lists West Africa, Gambia, Sudan, Kenya, Uganda, Somaliland, Zambia, Malawi, Rhodesia, etc. Such specifications, when correlated with other facts known about the expedition of Hatshepsut, and the secretarybird habits may indirectly point to the region where the animal could have been taken. The breeding seasons of both the *Sagittarius serpentarius* and the *Polyboroides typus* (a possible alternative) vary, depending on geography, as well as the author who is cited. It might be possible to correlate this with the facts about the Punt expedition of Hatshepsut.

The secretarybird's diet consists of rodents and small mammals, large insects and snakes (including venomous ones), as well as other reptiles (such as lizards, frogs, toads, chameleons). Eggs and the young of birds nesting on the ground also contribute to their diet (Perrins 1990: 108; cf. Horsburgh 1912: 106; Martin 1890: 29, 217, etc.), warblers, larks, doves, small hornbills, plovers, tortoises have been reported (del Hoyo, Elliott, and Sargatal 1994: 209). Walking or rather striding is a constant activity of the secretarybird, whether in the wild or in captivity (see Quintin 1912: 109). It has been called a "snake-eater" by the early importers (Edwards 1771: 56), yet

feeding on snakes does not seem to be the core of the bird's diet. Some authors point to the locust as a base of its diet, which however would mean tremendous quantities consumed, which is not the case, or grasshoppers and small rodents (Shorrocks, Bates 2015: 71), which is very likely. It would also allow survival in the more arid conditions mentioned above. The species was also reported consuming young chickens and small pets (kittens) (Martin 1890: 29), sparrows, eels, rabbits (Quintin 1912: 110), hares, meerkats, mongooses, shrews, hedgehogs, even beetles, termites and carrion; plus such objects as golf-balls confused with eggs (Colahan and Ferreira 1992) and wasps together with their nests (del Hoyo, Elliott, and Sargatal 1994: 209). The secretarybird is said to eat large quantities of prey and have an enormous appetite (Horsburgh 1912: 106, 107; Quintin 1912: 109; see Martin 1890: 29–30). The diet of the bird may point to the habitat, hence indirectly the area, from which the animal could be brought. It may also be evidence that in terms of diet, it could survive the trip to Egypt and the living conditions in its new home. Snakes, although probably not the base of the bird's diet in its natural environment, were an element which may have amazed the Egyptians the most. The unique manner of hunting prey must have been noticed by the ancients as well. It may be assumed that dietary and feeding habits could have influenced, directly and indirectly, the choice of the secretarybird for taking back to Egypt.

Secretarybirds are shy animals and vulnerable to stress; they do not like any changes in their environment, which would have made them a poor commodity for travelers coming from Eighteenth-Dynasty Egypt. One may speculate whether the depicted

bird could have survived the journey and later life in an alien land. It may not have arrived in Egypt alive, which would explain the discrepancies between the Temple depictions and live birds. One might argue that it would not have been depicted on the wall, if it had not survived the trip. However, it was such a rare specimen of alien fauna, that it was inconceivable for it not to be depicted on the queen's triumphal wall, if it had been captured/purchased and loaded on a ship. And it would be puzzling indeed to find it again in the presentation scene; nevertheless the previous argument could apply as well. However, the fact that the secretarybird's behavior tends to change might be a clue to support Hatshepsut's version that the depicted secretarybird arrived safely in Egypt. Despite their timidity, secretarybirds were occasionally tamed, considered pets and claimed to be very friendly and affectionate (see Martin 1890, Sonnerat 1776: 89). Whether it is a characteristics common to the species or just to individual birds is difficult to determine.

Focusing on the behavior of the bird in the Temple scene, it is noteworthy that

it is held in a specific way to immobilize the legs which are characteristically used for defense (M. Podhrázský, personal communication), while leaving the beak free as the bird seldom uses it for this purpose. This is unlike the cranes imaged elsewhere in the Temple as well as in significantly older (Old and Middle Kingdoms) private tombs in Giza, Saqqara, Medum, Beni Hassan, el-Bersha and Thebes, which in terms of the decoration could have been a prototype of sorts for the Queen's Temple (see Stupko 2010: 170–171). They may walk with their beaks tied to their necks, or are carried by bearers who grab the legs (mainly folded) with one hand and either the beak or the neck with the other, alternatively, both of these body parts are grasped with one hand. Such beak immobilization may have prevented stretching for flight (Stupko 2010: 177), but it could equally well be hypothesized that the beak was considered a threat. On the contrary, the beak of the bird represented in the bearers-scene, despite being apparently a bird of prey, was not secured in any way and hence was not used by the bird in defense.

POSSIBLE REASONS FOR IMPORTING THE BIRD

The jizz (the overall impression of the species, combining appearance and behavior, enabling identification, see Redman, Stevenson, and Fanshawe 2016: glossary) of the secretarybird must have been exotic to the inexperienced eye of the Egyptians who came to Punt. The bird may have been tamed or even bred by the natives, who could have recommended the “product” to the Egyptians. It is also possible that the Egyptians captured the bird themselves, something that would be confirmed, if

the bird from the environment scene is indeed a secretarybird, as it would prove direct observation of nesting behavior. Nevertheless, it must have been the bird's skill at slaying snakes that drew the attention of the Egyptians (assuming that it was this particular species that was indeed imported).

Perhaps bringing this specific animal could have had broader symbolism related to mythology. Based on some postulates proposed by Andrea Manzo (2011:

81), it could be assumed that the queen could have additionally legitimized her rule with the successful import of this serpent-slaying bird through the mythological connections with deities and the ability to control chaos. Both the secretarybird and the African harrier hawk slayed snakes, but the secretarybird appeared to do it in a more spectacular manner. Appreciating animals fighting snakes (such as the mongoose, possibly also waders), Egyptians must have liked the idea of finding in the Land of Wonders another animal of that kind. The secretarybird depicted on the queen's wall could have reinforced the message.

Finally, there is the issue of the region and habitat where the bird could have come from. A very late, Twenty-sixth Dynasty stela from Tell el-Dafana makes a reference to the mountain of Punt, which Franco Crevatin (2017) locates in an area close to the Red Sea, at a latitude corresponding to the Third/Fifth cataract, already in a zone already characterized by a rainy season. Since, according to Crevatin, the Egyptian expedition did not take place in the rainy season, one could try to correlate this information with the secretarybird's breeding period. However, this kind of correlation might be too unreliable. Taking into consideration the fact that the secretarybird does not inhabit

mountainous areas, the "mountain" interpretation of the destination mentioned in the stela could point to the alternative, the African harrier-hawk, as that species does not mind a hilly or mountainous habitat. However, should the region referred to in the text of the stela be just one specific area of the God's Land, then the secretarybird may have come from another part of it (if from Punt at all, see Sethe 1906: 336, who proposes Sudan).

Considering the known distribution of the species, Hatshepsut's expedition did not need to cross the modern-day borders of Djibouti (or former Somaliland). Moreover, there was actually no need to go any further than modern-day Sudan, perhaps Eritrea, to collect the bird. Furthermore, the modern Somali coast, suggested by some, is the only region in the area NOT inhabited by the secretarybird today. Was it different in Hatshepsut's times?

The bird may have inhabited naturally the Land of Punt, but it is also possible that it was "in transit", Punt being also a transfer-point for other goods, from inland Africa. The latter explanation, albeit doubtful, should not be completely excluded, as long as one does not find unambiguous ancient confirmation that these animals were native to the environment that they were depicted in.

LINGUISTIC ISSUES

The Latin scientific name for the bird is *Sagittarius serpentarius* (Miller 1779), deriving from the "archer" look attributed to it by the Africans and early naturalists; *sagitta* is the Latin for "arrow", *sagittarius* is then "an archer" or "bowman",

and *serpens*, obviously "a serpent", whereas the suffix "-arius" is added to words that mean "pertaining to" (Gotch 1996: 226; more on that etymology, other names and their actual authors, in Braulińska in preparation b).

The modern name of the secretary-bird, which occurs in the sources from at least 1769 (Vosmaer 1769; see Braulińska in preparation b), is commonly believed to derive from the appearance of the bird's crest that resembled a quill pen that clerks/secretaries tended to stick behind the ear in past centuries. An equally contestable theory points to the Arabic *saqr el-teir* for "falcon bird" as a probable source of the common name in many modern languages (see also Urban 2008; Glenn 2018). This name, in corrupt form, could have been exported from Africa with the bird itself (Vosmaer 1769: footnote d). In this author's view, the scope of the etymological discussion should be broadened to include the phonetical resemblance of other words to the bird's name, reflecting its appearance and behavior (see Braulińska in preparation b).

In the context of the species identification discussed in the present text, one should point out the presence of four signs above the bird pictured in the presentation scene: \curvearrowright (Gardiner V31*), \curvearrowleft (D21) with \blacksquare (Z1), β (M17) and the remains of a single vertical line that could be an ele-

ment of the sign *s* (or *i*, which however would be more difficult to explain; more possibilities are still being considered) (the author was the first to observe and document the lattermost). The inscription above the cheetahs to the left names the animals with the expression 3by mh for "cheetah", hence the expectation that the signs above the bird, $[s]kr[...?]i$ (?) or $[s]k[.].i$ (?) (depending whether the phrase recorded syllabic writing, E. Kopp, personal communication), could have rendered its ancient calling. Syllabic writing was usually used to denote foreign names, which theoretically could have been the case here. The reconstruction of the inscription depends on several variables, foremost whether the bird image is reconstructed as standing or walking, the latter being not only the more natural one, but also affording slightly more space for the missing signs [Fig. 9]. A direct transcription of the Egyptian $[s]kr[...?]i$ (?) or $[s]k[.].i$ (?) into the modern name is rather not credible, but the present author would like to suggest that there might have been a common source for both ancient and modern in native African.

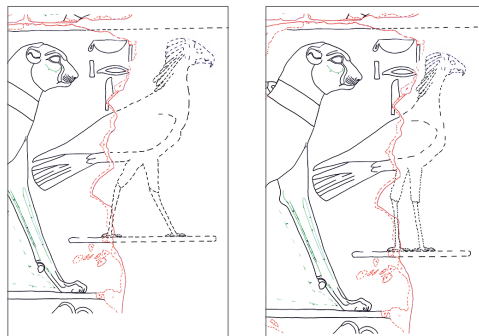


Fig. 9. Two reconstruction variants of the bird in the presentation scene: left, less probable for a longer inscription, right, more probable for a shorter one (note the insufficient space for the bird's legs, which may be another indication of a young age) (Drawing K. Braulińska)

THE SECRETARYBIRD IN ANCIENT EGYPTIAN ART

No direct parallel to the representations depicted in the Deir el-Bahari Temple has been found in any ancient Egyptian representations from pre- and pharaonic Egypt. No other inscription has ever been discovered. Extant parallels are to the species itself, and cover only the late Predynastic period, vanishing from later iconography.

The disappearance of the secretarybird from Egypt at this time may have been a consequence of climatic change, although substantial known changes in climate seem to be later (Old Kingdom, perhaps the so-called 4.2k event). Therefore, in considering the existing parallels, one is faced with the question whether the images are the result of direct observation of the bird in its habitat in Egypt or a memory of an image brought from inland Africa. The African climate in general fluctuates (see Nicholson 1979), therefore the changes in the secretarybird's distribution are not necessarily the effect of an event like that of 4200 BC, corresponding to the end of the Old Kingdom. It is also possible that the bird then represented was not a native Egyptian species.

Parallels are found on the so-called Brooklyn Knife Handle⁴ [Fig. 10] and the Pitt-Rivers Knife Handle⁵ [Fig. 11]. The objects present the same media and a



Fig. 10. The so-called Brooklyn Knife, ritual knife, about 3300–3100 BC, flint and elephant ivory, 5.3 cm by 23.4 cm; top, tracing, the secretarybird is in the second row from top on the imaged side. Brooklyn Museum, Charles Edwin Wilbour Fund, 09.889.118. Creative Commons-BY (Photo Brooklyn Museum, 09.889.118_view3_SL1.jpg; tracing Brooklyn Museum, 09.889.118_bw_print_SL4.jpg, image rotated)

4 Brooklyn Museum, 09.889.118, Nagada III, about 3200–3000 BC; from Abu Zeidan, Tomb B32.

5 British Museum, EA 68512, Nagada II, about 3200 BC; from Sheikh Hamada in Upper Egypt.

similar kind of scene: rows of animals arranged in an orderly manner, all proceeding towards the blade. There are two rows of birds, if the interpretation of the uppermost rows as vultures (Bénédite 1918: 226) or sacred ibises (*Threskiornis aethiopica*) (Churcher 1984: 161) is correct. Actually, theories abound as the objects were documented and interpreted by several different scholars. On both knife handles, on the face without the boss, there is a single row of stork/crane-like wader birds, the most correct interpretation of these being Saddlebilled Stork (*Ephippiorhynchus senegalensis*).⁶

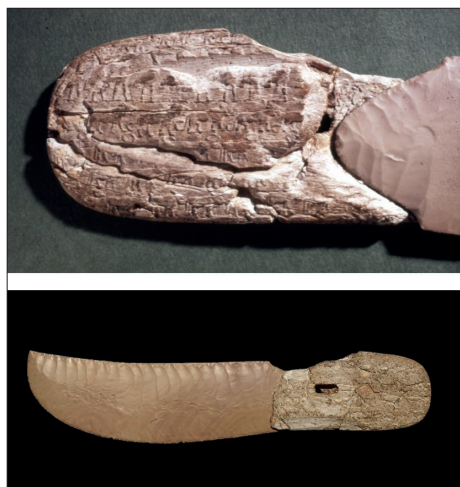


Fig. 11. So-called Pitt-Rivers Knife, British Museum EA68512; flint blade and ivory grip decorated with rows of animals in relief; above, detail of the grip decoration (Creative Commons-BY-NC-SA 4.0 © The Trustees of the British Museum)

The last two birds in the representation are obviously different, a fact noted by some authors, even if only by describing “long-legged birds” (Houlihan 1988: 23; Bénédite 1918: 229 in the table, but not in the text). Churcher (1984: 155) allows the highly improbable possibility of some of the birds in the row on the Brooklyn Handle being marabou storks (*Leptoptilos crumenifer*). According to Churcher, the image differentiation is accidental and a consequence of technological limitations rather than the artist’s intention to depict another species. It is these last two birds that are of special interest for the present paper.

Similar rows of animals are traced on three other Predynastic objects, namely the so-called Carnarvon Knife Handle,⁷ the Abydos K 1262b knife handle,⁸ and the so-called Davis Comb.⁹ In two cases there are images of birds that are different in appearance from the rest: the last two in the row on the Carnarvon Handle and the very last one on the Davis Comb. In the latter case, it may be due to a general reduction of the length of the rows resulting from limited space, the object being a comb rather than a knife handle. The Abydos handle is damaged and is consequently missing the last creature and part of the one before last; it is difficult, therefore, to determine the character of the last

- 6 Erroneously, referred to as Jabiru in some Egyptological literature (see Houlihan 1988: endnote 119). The first eight birds on the Pitt-Rivers Handle were interpreted as marabou storks (Edwards 1955: 1061).
- 7 Metropolitan Museum of Art., 26.7.1281, Late Naqada III, about 3200 BC, possibly from Upper Egypt, Qau.
- 8 Excavation Inv. No. Ab K 1262b, Nagada II(?), U-Cemetery, Abydos.
- 9 Metropolitan Museum of Art, 30.8.224, Late Naqada III, about 3200–3100 BC, exact provenience unknown, bequeathed to the Museum from the collection of T.M. Davis.

two birds.¹⁰ Since the bird imaged on these Predynastic objects bear no features specific to the species of interest here, they are considered as a parallel for the wader-bird rows, symptomatically similar on the three knife and one comb handles.

The birds pictured on the Pitt-Rivers Handle have been identified as cranes (e.g., Strudwick 2006: 32), those on the Abydos handle as storks (Dreyer 2010: 16–17), and those on the Brooklyn Handle as ostriches and storks (Lortet and Gaillard 1909: 256). Other identifications include the jabiru or, confusingly, Adjutant-bird (Bénédite 1918: 226)¹¹ in the case of the Brooklyn, Pitt-Rivers and Carnarvon Handles, and the jabiru or marabou storks for the Davis Comb (Hayes 1953: 27). These identifications are largely fictional, most of all because of the lack of differentiation among the pictured birds.

The rows of wader-birds, where represented, are interrupted by two other

classes of animals: a mammal, that is, a giraffe (*Giraffa camelopardalis*) in the second position in the row, and a reptile, a serpent¹² more precisely, in the first, held by the first bird or just rising up in front of it. The Pitt-Rivers Handle is broken at this point, making it impossible to determine the presence of a snake, suggested by the parallel, there. In his comparative analysis of the species represented on the Brooklyn, Pitt-Rivers and Carnarvon knife handles, Bénédite (1918: 225, 229) suggested that the rows of “large-beaked waders” are concluded by a grey heron. He also mentioned “the crested bird”, which he identified as an ibis (*Ibis comata*). However, the only crested ibis known from Ancient Egypt was the rare hermit ibis (*Geronticus eremita*) [Fig. 12].¹³ Other authors have cited Bénédite’s identifications (for instance, Vandier 1952: 543).

10 Dreyer (2010: 16) mentions eight storks in the row after the giraffe, which might suggest that he differentiates the last preserved bird (and originally one before last in the row) from the group in front of it, but he fails to mention the bird any further. Perhaps it is a miscount on his part and he intended to mention nine storks, that is, if only such short beaks could be interpreted as belonging to storks.

11 Confusing, as this name refers to either the Greater Adjutant (*Leptoptilos dubius*) or Lesser Adjutant (*Leptoptilos javanicus*), none of which seems to have ever appeared in the area of Egypt. The bird that could be theoretically considered would be the marabou stork (*Leptoptilos crumenifer*), that currently inhabits Africa south of Sahara, and judging from the tabular juxtaposition in his article (Bénédite 1918: 229), was the one considered by this author. See also Bénédite (1918: 226, footnote 1) for further identification of the bird referred to as the Adjutant-bird.

12 For some reasons, Bénédite (1918: 226) interprets the serpent as *Eryx thebaicus* (which is a subspecies of the Theban sand boa *Eryx colubrinus*, but also an obsolete name for the species *Eryx colubrinus*) or *Eryx jaculus* (which is a species itself, that is, the Javelin sand boa). The former inhabits currently the Nile Valley, the latter the North Coast and Delta. For differences between them and further details, see Baha El Din (2006: 226–230). Churcher (1984: 155) confirmed the identification as *Eryx jaculus* but under the name of Egyptian sand boa (claiming it is a synonym for *Eryx thebaicus*, which is, however unacceptable as these are in fact two different species).

13 Which seems to be the discussed specimen, as the other crowned bird of the Pitt-Rivers Handle, mentioned by him as the black crowned crane (*Balearica pavonina*), must be the one next to it.

It has been suggested by Bénédite (1918: 4) that the last two birds in the row on the Carnarvon Handle could be a common crane (*Grus grus*),¹⁴ which seems to be possible due to the difference in sizes.¹⁵ The second last bird on the Pitt-Rivers Handle is also identified as a crane (Edwards 1955: 1061), whereas the bird on the Brooklyn Handle is a saddlebilled stork or grey heron (*Ardea cinerea*) (Churcher 1984: 155), or rather one of the heron species (*Ardea* sp.) (Churcher 1984: 156).

In view of the above, and considering that, as Bénédite puts it, the decoration of



Fig. 12. Hermit ibis, northern bald ibis or waldrapp (*Geronticus eremita*). Prague Zoo (Photo K. Braulińska, courtesy of the Zoo)

the Brooklyn knife in particular is “striving after excessive multiplicity” (Bénédite 1918: 2), the only possible secretarybird image is on the Pitt-Rivers Handle. It is the last figure of the sequence, the furthest one from the blade. Such an identification coincides with that of several earlier authors (Churcher 1984: 155, 156 for the Brooklyn Handle; Edwards 1955: 1061 and Osborn and Osbornová 1998: 5, both for the Pitt-Rivers Handle). Despite the different interpretation in H.M. Steward’s drawing of the Pitt-Rivers Handle, (Edwards 1955: Fig. 5) and the one published by Petrie and Quibell (1896: 51 and Pl. 77 without species identification or scene interpretation), there can be little doubt as to the identification. However, Champion’s drawing of the Brooklyn Handle, interpreted by Lortet and Gaillard and published by de Morgan (1909: Fig. 138), is disquieting. It lacks one of the most typical features of the birds (present in the other two drawings), namely a characteristic feather crest on the head. The bird displays a feature that could be the long middle feather of the tail of a *Sagittarius serpentarius*.¹⁶ In Churcher’s drawing of the Brooklyn Knife, the tail is not only long, but seems to be forked, which may represent the double feather,

14 *Grus cinerea* according to him, while the other birds of the row are a Goliath heron of the White Nile (*Ardea Goliath*, called today the Goliath heron) or rather a jabiru (*Mycteria senegalensis*), now called *Ephippiorhynchus senegalensis*, so saddlebilled stork. Taking into consideration the confusion mentioned by Houlihan (1988: endnote 119), one still needs to remember that the name “jabiru” has survived in some languages, for instance Polish, where the proper name is “żabiru afrykański”, and French (“Jabiru d’Afrique”).

15 Ornithological sources as a rule give the bird’s body length and not its height. Following this remark: common crane 115 cm and saddlebilled stork 142 cm (Redman, Stevenson, and Fanshawe 2016: 140, 62, respectively).

16 Included also in de Morgan’s publication, although as a single line. With regard to the Carnarvon Handle, Bénédite (1918: 3) noted the square shape of the tail of the last bird in the row, which would either dismiss the Carnarvon Handle from the present study or could be considered as evidence for a differentiation of the original decoration.

one of the most typical features of the species, missing from the Deir el-Bahari image. The beak of the Brooklyn specimen is short and oriented horizontally, contrary to most of the birds in front. The general body position seems to be more horizontally oriented. The neck seems to be shorter than of the other birds in the row, and set differently, bearing a rather small head. The legs, although they seem to be too short in relation to the body, are in fact no shorter than the legs of the other birds. They reveal a prominent last toe set towards the rear of the animal. Churcher (1984: 156) adds the long and drooping wings, which the present author would rather see as the forked tail. Churcher mentions a separation between the wing and the tail as evidence for the bird being rather a secretarybird than a bustard (for instance, the Nubian bustard *Neotis nuba*). This stands contrary to the Deir el-Bahari representations, where the tail and wing are of the same length, only slightly separated.

Going into such detail on Predynastic depictions is encumbered by the inaccuracy resulting from technological limitations at the time when these handles were carved (not to mention the inadvertent interpretation of a modern documentalist). Therefore, one needs to bear in mind the guiding features of a species that the artist had to render in order to distinguish between the animals.

Nigel Strudwick (2006: 32) pointed out the difference between the rows of animals on knife handles and animal decoration of the palettes. However, it should be noted that the Towns Palette (JE 27434, known also as

a Libyan (Booty) Palette, Tehenu Palette, Buto Palette, and Trees and Towns Palette) is an exception. No secretarybird-like bird has ever been identified on any of the known palettes.

To understand the role of a (potential) secretarybird on the discussed objects, one should understand the meaning as a whole of the rows of animals appearing on various Predynastic objects.¹⁷ The issue continues to be debated. Ivory as a medium for the decoration may have had a specific meaning (Raffaele 2010: 248, 252–254). It has been suggested that the discussed rows stressed plurality, following the rule “unity in plurality and conversely, plurality in unity” (Bénédictite 1918: 236). For instance, plurality of this kind was connected by Francesco Raffaele (2010: 259) with massive ritual sacrifices, which were related to control over the environment (see below). The rows of animals may have been species lists (Bénédictite 1918: 236), emblems of clans (Bénédictite 1918: 238–241) or their confederations, alternatively districts (Hayes 1953: 28 citing earlier authors). At least for some species, they could be related to geography and emblems of nomes (Bénédictite 1918: 237–238), although this is doubtful due to the alternation of carnivore and ruminants (Bénédictite 1918: 240). Political geography in relation to these rows should be dismissed due to the lack of any falcon images (Bénédictite 1918: 238).

A hunting context is determined by the presence of dogs at the ends of registers. The basic function of ensuring an (abundant) food supply comes to mind naturally, but one cannot reject a hunting/capturing and perhaps slaying

¹⁷ Evidenced also on other objects (see Vandier 1952: 548–560 and many others), which do not include the secretarybird and hence were not included in this study.

ing (instantly or in later rituals) significance, not only of the wild animals, but ideologically, perhaps also of the enemies that they may have symbolized. Therefore, the rows could be related also to processions of captives, offering bearers and tribute bringers (Raffaele 2010: 258, footnote 64). Game animals were related to chaos, therefore both their hunting, as well as depicting in such orderly fashion as displayed on the discussed objects, could symbolically constitute the process of an ordering of the world. The rows might have represented an ordered cosmos (for instance, Patch 2012: 152), perhaps also the subdued foreign lands of foreign peoples or species. In terms of animals, Ann Roth (2011: 197) proposed that perhaps it was “an attempt to control them by means of typological groupings”. Whitney Davis (1976: 415) emphasizes the “definite concern for order, both in composition and content”. Dreyer’s (2010: 17) interpretation refers specifically to the row of birds, namely, that the opening storks with snakes at/under their beaks symbolized subordinating the enemy. An enemy that was not destroyed—as the snakes which are not eaten, but controlled—was still alive (the same as snakes under the feet of elephants with their heads still raised). This, according to Dreyer, was supposed to mean that the chaos was controlled, but not completely eradicated from the world. The giraffe, related to foresight in Egyptian thinking, was meant as a caesura: chaos in front of it and behind it (meaning the following birds, including our secretarybird) a wishful state of peace, lack of chaos and an abundance of game (Dreyer 2010: 17).

Interestingly, Jacques Vandier (1952: 556) suggested that the Nagada people may have considered the animal world not necessarily as lower than their own, just different, and that these two worlds, having their own superiorities, were mutually crossing. The author emphasizes, however, that when it came to a conflict of interest between the two, the human would subdue nature unremorsefully, although demonstrating different attitudes towards particular groups of animals (fear, appreciation, admiration), also as part of religious symbolism.

The relation of the knives bearing such animal row decoration to their owners is unknown (see Needler 1984: 57–58, 124–125, 268–271). It may be considered, that the decoration was primarily of foreign origin, as it resembles the repeat patterns of Mesopotamian seals. A possible Asiatic origin is confirmed and insisted on by Vandier (1952: 558), especially in case of the interspersing and overlapping rows of animals (such as dogs and lions on an example from Hierakonpolis, see Quibell 1900: Pl. 19.6). Raffaele (2010: 248–249, 254) suggested, moreover, that such decoration was also a filter protecting the person, who killed the animal in a sacrificial act, from any negativities. It is beyond doubt that these animals must have played a significant role in the life of Predynastic Egyptians, and definitely the species depicted in these objects mostly had their continuation in the Pharaonic period, being permeated with significant symbolism (bulls, lions, particular species of birds, etc.). The secretarybird is an example of a species that did not.

It is not clear why the secretarybird was depicted on the knife handles and as the last bird in the row. The narrowing

register may have required smaller species (Bénédict 1918: 3). It may be the case of the Carnarvon Knife Handle, but not the Davis Comb, unless the latter was just a copy of the knife handle scenes, and copied all, including these technological circumstances. Whether it reflected reality depends on the species depicted nearby. One may wonder whether the secretarybird at the end of the row somehow closes it, after a stork with a snake in/beside its beak opened it. Predynastic Egyptians must have observed the birds killing snakes. Perhaps their presence at the end of the row is purposeful in a theoretical sense in relation to the snake slaying (in the beginning and at the end of the row). However, the unusually long tail of the secretarybird could have been only a neat ending of the row on the rounded edge of the knife handle.

The identification of the secretarybird goes in line with the saddlebilled stork, which also inhabits sub-Saharan Africa. The latter bird does not seem to have been reported from modern Egypt (Houlihan 1988: 23); moreover, hunting snakes, like the waders in the depictions, is not very typical of it.¹⁸ The saddlebilled stork, although suggested to have gone extinct by the early Dynastic period (Houlihan 1988: 24), must have been more popular in Egypt than the secretarybird, as it even became a hieroglyphic sign (G29, G30 in Gardiner 1957: 470).

The singular representation of a secretarybird on the knife handles may reflect the bird's natural inclination to appear solitary or in pairs. However, the saddle-billed stork is not a gregarious creature either, while on the knife handles it is depicted

in abundance. As for the suggested choice of smaller species of wader birds due to technological limitations, the secretarybird hardly fits the idea, being barely 15 cm smaller than the saddlebilled stork (128 cm and 142 cm respectively, for the sizes, see Redman, Stevenson, and Fanshawe 2016: 80 and 62) and may even be larger than the stork when a maximum body length of 150 cm is taken into account.

Therefore, either the theory of species selection to fit a shrinking register on an object is wrong or the identification as secretarybird is incorrect. Knowing the later regulations of Egyptian iconography, it may be assumed that the former is erroneous. Keep in mind, however, that such theoretical comparison of sizes is burdened by the need to consider the bird's position, either horizontal or vertical, which would influence the height. The secretarybird has a more horizontal posture in general than the saddle-billed stork, but the position of the latter varies depending on the activity: more horizontal when walking and more vertical when resting or standing. On the Predynastic items discussed here, all the birds in the rows seem to be walking despite being shown in a way (inclination) that suggests standing.

Secretarybird images have been suspected on other objects of Predynastic art, but a confusion was brought on by the crested ibis, hermit ibis *Geronticus eremita* with its characteristic head crest that gave it its name [see Fig. 12]. In many cases, however, the identification with the secretarybird may be dismissed owing to the length and shape of the beak of the ibis. A case in point is an ivory plaque from

¹⁸ It may also be considered that the first bird of the row is a different species, although it exhibits the features of the middle ones.

Hierakonpolis (Quibell 1900: Pl. 16.4), although another ivory plaque from Hierakonpolis (Quibell 1900: Pl. 12.1) shows that this feature was not always properly pronounced in Predynastic art. But how then should one interpret the two backmost birds on two other plaques (Quibell 1900: Pl. 16.1 and Pl. 14, lower)?

Another group of objects that could be taken into consideration as bearing depictions of the secretarybird are tags from Abydos, Umm el-Qaab, tomb U-j. A similar confusion regarding species can be suspected here. Some of them are undoubtedly hermit ibises, although claimed to be secretarybirds (see Braulińska in preparation b).

SUMMARY

Upon considering several potential candidates for the species identification, the study found that no other species (with the only conceivable rival being the African harrier-hawk—definitely less “interesting”, less “peculiar”, and less controversial as well), had more similarity to the image than the secretarybird. However, the contested features, of which there are a few, suggest either an artist’s suspect accuracy in rendering the bird’s appearance, an extinct species (or subspecies), or the juvenile age of the bird without fully developed features.

When appearance fails to give unambiguous results, the answer may lie in other factors, like animal behavior, giving insight into Ancient Egyptian mentality and the standing perception of a given animal. This aspect of Egyptian iconography has been mostly underestimated, although it may bring a number of interesting conclusions (see Evans 2010). Habitat and distribution are important as well, although not easy to assess in view of the uncertainties connected with ancient climate changes, the location of the land of Punt, which is where the bird pictured in the Portico of Punt from Deir el-Bahari is said to have come from (unless it had come from Sudan). Taking into considera-

tion that climate and vegetation in the New Kingdom resembled current conditions, Egyptians had no need to travel far in order to find the secretarybird (or its proposed alternative for that matter). Thus, the bird’s utility for pinpointing the location of Punt is limited in view of the birds’ relatively flexible breeding periods and their fairly wide distribution. Assuming Hatshepsut’s bird is indeed either a secretarybird (or an African harrier-hawk), then they can confirm the African location of the mysterious land in a fairly general manner, which is not a particularly revolutionary discovery. Not to mention other possible explanations that Punt was actually a “transfer point” for some goods, a kind of hub for trading exotic and coveted products from more distant areas, or that there was no one permanent location of this land.

The ancient Egyptian name for the species, partly preserved, also raises interesting issues with regard to the ancient naming of foreign animals, and indirectly, perhaps even the understanding of the etymology of the modern common name.

In-depth analysis of the secretarybird as a species, truly interesting and unique with its peculiar looks and even more peculiar behavior, might be useful in understanding

ancient motives for importing the bird (as well as contributing to the preservation of the species which is in rapid decline today).

The author's in-depth study of the observed discrepancies in the images has led to the suggestion of natural (or human-induced) processes as an explanation for some of these. Some discrepancies could be due to artistic inaccuracy or rendering of a currently unknown form of the animal. However, the most convincing theory is that of the particularly young age of a still nesting secretarybird (between 7 and 12-15 weeks) (Braulińska in preparation a).

The identified parallels from Predynastic art, in which images of waders were quite common, do not necessarily mean that the

secretarybird was a native species of Egypt. These representations could have been a record of distant periods or areas, but since Egypt of the age still resembled a savannah, the animal is likely to have lived there.

No study of the ancient animal would be complete without getting to know living representatives of the species. Despite the obvious need for caution when making such comparisons, the long timespan between past and present having changed a number of variables, the study of modern comparative material may still bring minor observations that can contribute to major answers. The only way forward is a multidisciplinary approach to the questions that still remain.

APPENDIX

Alternative species were taken into consideration, first the strictly African ones. Species originating from outside Africa were also covered, this on account of bird migrations, as well as changing zoogeography through the millennia, as well as the still debated location of the Land of Punt. These non-African species included birds from other continents.

The examined species all proved ultimately to have legs that were too short (even when stretched out as in the case of a bird that is being carried) and feathered too low, almost to the toes, in most cases, which is not the case of the bearers-scene. Besides, their angle in relation to the tail was improper. An overview of the studied species and the reasons for rejecting the identification are given in *Table 1*.



Fig. 13. Stuffed specimen of a martial eagle, note the relatively long legs and the tooth-like structure on the beak (Photo K. Braulińska, courtesy of the Natural History Museum, University of Wrocław)

Table 1. Species considered and rejected based on comparison of concrete features with the images from the Temple

No.	Scientific/common species name	Features suggesting the species be considered	Main dismissing features
Strictly African species			
1.	<i>Lophaetus occipitalis</i> Daudin 1800 Long-crested eagle	Bird-of-prey beak; crown/crest; crown size; behavioral elements potentially observed by Ancient Egyptians	Body size (despite relativity and unreliability in Egyptian art) and proportions; head shape and crest position centrally on top of the head; different crest shape; too short legs, long toes with claws; species not noted in either Ancient or modern Egypt (Wyatt, personal communication, 2018)
2.	<i>Stephanoaetus coronatus</i> Linnaeus 1766 Crowned (hawk-) eagle	Bird-of-prey beak; prominent crest, compared to a halo (Williams and Arlott 1993: 50)	Smaller size of crest; different crest setting; fully feathered legs until toes; prominent claws
3.	<i>Polemaetus bellicosus</i> Daudin 1800 Martial (hawk-) eagle	Bird-of-prey beak; crest; large bird; relatively long legs; rectangular tail; a kind of "tooth" on the mandibular tomium (line)	Much smaller crest than even the one of <i>Stephanoaetus coronatus</i> ; legs feathered to the toes with long claws (contrary to Williams and Arlott 1993: 51)
4.	<i>Macheiramphus alcinus</i> Bonaparte 1850 ssp. <i>anderssoni</i> for Africa Bat hawk	Bird-of-prey beak; crest, large round eyes	Rather small bird (compared to other species discussed and the one depicted); slightly crested; resembling the peregrine falcon (<i>Falco peregrinus</i>) in flight (note symbolic significance of this species in Ancient Egypt); tail shape
5.	<i>Hieraetus wahlbergi</i> Sundevall 1851 outdated <i>Aquila wahlbergi</i> Sundevall 1851 Wahlberg's eagle	Bird-of-prey beak; crest, rather rectangular tail	Rather small; short-legged; crest of both shape and style not matching
6.	<i>Terathopius ecaudatus</i> Lesson 1830 Bateleur eagle	Bird-of-prey beak; crest	Minimal resemblance to the studied images
Species covering also other continents or seasonally visiting Africa			
7.	<i>Gypaetus barbatus</i> Linnaeus 1758 African-Eurasian bearded vulture	Head feathers resembling crest when ruffled; feathers on the maxilla forming an equivalent of the "tooth" from the temple representation	Length of the head; legs feathered to the long toes; lower beard
8.	<i>Pandion haliaetus</i> Linnaeus 1758 ssp. <i>haliaetus</i> for Africa Osprey	Bird-of-prey beak; head feathers resembling crest; slight tooth-like formation on the maxillar tomium	Small size; lack of proper crest; short, prominently clawed legs
Currently Asian species			
9.	<i>Pithecophaga jeffreyi</i> Ogilvie-Grant 1896 Philippine eagle	Crest; size; general shape; head and beak robustness; half-feathered legs	Modern zoogeographical range (but Sonnerat, 1776: 86, 87, stating, presumably in error, that the secretarybird inhabited the Philippines).; habitat (rain forest, but see Cooney 2016: 202, stating that Hatshepsut's expedition brought plants and animals from the rain forest); different relation of wing to the tail; too prominent claws

10.	<i>Spilornis cheela</i> Latham 1790 Crested serpent-eagle	Crest; general resemblance; behavior – hunting tree serpents; eating dead snakes	Modern range (India, China, Southeast Asia, Indonesia, Philippines, Perrins 1990: 93) making contact with Pharaonic Egypt unlikely; short-legged; rather small species
11.	<i>Spizaetus cirrhatus</i> J.F. Gmelin 1788 Changeable hawk-eagle	Bird-of-prey beak; crest; beak	Modern range; crest shape and setting; rather shorter legs, feathered to the toes; tail longer than folded wings
Currently New World species			
12.	<i>Cariama cristata</i> Brisson 1760 Red-legged seriema	Long legs; similar setting of the body; morphological and ecological similarities causing previous grouping in systematics together with the secretarybird	Geographical distance; beak shape; crest located at the forehead; absolutely different tail; tail distanced from the wing tips
13.	<i>Opisthocomus hoazin</i> Illiger 1811 Hoatzin	Crest; round eye, large in relation to the head	Geographical distance; different setting and shape of crest; relatively different beak; smaller head in relation to body; folded wings tips distanced from the tail; too short legs
14.	<i>Harpia harpyja</i> Vieillot 1816 Harpy eagle	Bird-of-prey beak; crest; head robustness; slight tooth-like formation on the maxillary tomium	Geographical distance; habitat (tropical forest); shorter legs; long toes with claws; legs feathered low
15.	<i>Morphnus guianensis</i> Daudin 1800 (Guianan) Crested eagle	Bird-of-prey beak; crest	Geographical distance; body setting; too short legs; tail significantly longer than folded wings
16.	<i>Chauna torquata</i> (or <i>Chauna chavaria</i>) Oken 1816 (Linnaeus 1766) Southern screamer (or northern screamer)	Crest; fairly long legs; long toes; similar setting of the body; folded wings equal in length to the tail	Geographical distance; slimmer beak; thinner crest; higher forehead due to the feathers; smaller eye, less prominent due to the longer face feathers

Kamila Braulińska

ORCID 0000-0002-9940-8078

Faculty of History, University of Warsaw

00-927 Warsaw, Poland,

ul. Krakowskie Przedmieście 26/28

ks.braulinska@uw.edu.pl

How to cite this article:

Braulińska, K. (2018). The secretarybird dilemma: identifying a bird species from the Temple of Hatshepsut at Deir el-Bahari. In Z. E. Szafranski (Ed.), *Deir el-Bahari Studies 2. Polish Archaeology in the Mediterranean 27/2* (pp. 83–116). Warsaw: University of Warsaw Press. <https://doi.org/10.5604/01.3001.0013.3198>

References

- Anděrová, R. and Janochová, L. (2017). *Lexikon zvířat: od A do Z* [Lexicon of animals: from A to Z]. Prague: Zoologická zahrada hl. m. Prahy [in Czech]
- Andersson, M. (1980). Nomadism and site tenacity as alternative reproductive tactics in birds. *Journal of Animal Ecology*, 49(1), 175–184
- Baha El Din, S. (2006). *A guide to reptiles and amphibians of Egypt*. Cairo: The American University in Cairo Press
- Bénédite, G. (1918). The Carnarvon ivory. *JEA*, 5(1), 1–15, 225–241
- Bortolotti, G.R. (1986). Evolution of growth rates in eagles: sibling competition vs. energy considerations. *Ecology*, 67(1) 182–194
- Braulińska, K. (2017). Mammals in the iconography of the Temple of Hatshepsut:

- a project underway. *PAM*, 26/1, 221–228
- Braulińska, K. (in preparation a). African Harrier-Hawk, *Polyboroides typus*, as another actor in the secretarybird dilemma: an alternative for the bird identification at the Temple of Hatshepsut in Deir el-Bahari
- Braulińska, K. (in preparation b). On the names and early records of the secretarybird, *Sagittarius serpentarius* (Miller, 1779)
- Brown, L. (1972). *African birds of prey*. London: Collins
- Brown, L.H. and Amadon, D. (1968). *Eagles, hawks and falcons of the world*. Feltham: Country Life Books
- Churcher, C.S. (1984). Zoological study of the ivory knife handle from Abu Zaidan. In W. Needler, *Predynastic and archaic Egypt in the Brooklyn Museum* (pp. 152–168). New York: The Brooklyn Museum
- Colahan, B.D. and Ferreira, N.A. (1992). Golf-balls and secretary birds. *Gabar*, 7(1), 28
- Cooney, K. (2016). *Hatshepsut: kobieta, która została królem [The woman who would be king]*. (J. Mikos, trans.). Warsaw: W.A.B. – Grupa Wydawnicza Foksal [in Polish]
- Crevatin, F. (2017). Piove su Punt. In I. Incordino and P.P. Creasman (eds), *Flora trade between Egypt and Africa in Antiquity* (pp. 17–20). Oxford–Philadelphia: Oxbow Books
- Davis, W.M. (1976). The origins of register composition in Predynastic Egyptian art. *Journal of the American Oriental Society*, 96(3), 404–418
- Dean, W.R.J. and Simmons, R.E. (2005). Secretarybird. In P.A.R. Hockey, W.R.J. Dean, and P.G. Ryan (eds), *Roberts birds of southern Africa* (7th ed., pp. 542–543). Cape Town: Trustees of the John Voelcker Bird Book Fund
- del Hoyo, J., Elliott, A., and Sargatal, J. (eds). (1994). *Handbook of the birds of the world II. New world vultures to guineafowl*. Barcelona: Lynx Edicions
- Dreyer, G. (2010). Ein neues Fragment eines dekorierten Messergriffes aus Abydos. In O. El-Aguizy and M. Sherif Ali (eds), *Echoes of eternity: Studies presented to Gaballa Aly Gaballa* (pp. 15–22). Wiesbaden: Harrassowitz
- Dyrz, A. (1991). Sekretarz [Secretarybird]. In P. Busse (ed.), *Mały słownik zoologiczny: ptaki II* (p. 178). Warsaw: Wiedza Powszechna [in Polish]
- Edwards, G. (1771). Description of a bird from the East Indies; in a Letter to James West, Esq; President of the Royal Society; from Mr. George Edwards, F.R.S. *Philosophical Transactions*, 61, 55–56
- Edwards, I.E.S. (1955, December 17). An Egyptian bestiary of 5000 years ago – from a famous flint knife, now exhibited in the British Museum. *Illustrated London News*, p. 1061. Retrieved from <https://www.britishnewspaperarchive.co.uk/viewer/bl/0001578/19551217/074/0025> [accessed: 28.02.2018]
- Evans, L. (2010). *Animal behavior in Egyptian art*. Oxford: Oxbow Books
- Evans, L. (2015). Ancient Egypt's fluctuating fauna: Ecological events or cultural constructs? *Proceedings of the National Academy of Sciences of the United States of America*, 112(3), E239
- Gardiner, A.H. (1957). *Egyptian grammar: Being an introduction to the study of hieroglyphs* (3rd, rev. ed.). London: Oxford University Press

- Glenn, I. (2018). Shoot the messenger? How the secretarybird *Sagittarius serpentarius* got its names (mostly wrong). *Ostrich*, 89(3), 287–290
- Gotch, A.F. (1996). *Latin names explained. A guide to the scientific classification of reptiles, birds and mammals*. New York: Facts on File
- Hayes, W.C. (1953). *The scepter of Egypt: A background for the study of the Egyptian antiquities in the Metropolitan Museum of Art I. From the earliest times to the end of the Middle Kingdom*. New York: Metropolitan Museum of Art
- History of a confusion (1). (2012, June 28). Retrieved from <http://northernbaldibis.blogspot.com/2012/06/history-of-confusion-1.html> [accessed: 3.09.2017]
- Hofmeyr, S.D., Symes, C.T., and Underhill, L.G. (2014). Secretarybird *Sagittarius serpentarius* population trends and ecology: insights from South African citizen science data. *PLOS ONE*, 9(5), e96772. <https://doi.org/10.1371/journal.pone.0096772>
- Horsbrugh, B. (1912). Some notes on the secretarybird *Serpentarius secretarius*. Part 1. *Avicultural Magazine*, 3rd series, 3, 105–108
- Houlihan, P.F. (1988). *The birds of Ancient Egypt*. Cairo: Cairo University Press
- Kinzelbach, R.K. (2008). Pre-Linnaean pictures of the secretarybird, *Sagittarius serpentarius* (J.F. Miller, 1779). *Archives of Natural History*, 35(2), 243–251
- Krüger, O., Liversidge, R., and Lindström, J. (2002). Statistical modelling of the population dynamics of a raptor community in a semi-desert environment. *Journal of Animal Ecology*, 71(4), 603–613
- Latham, J. (1792). *Johan Lathams allgemeine Uebersicht der Vögel I*. Nürnberg: C. Weigels und Schneider
- Lortet, L. and Gaillard, C. (1909). *La faune momifiée de l'ancienne Égypte II*. Lyon: Georg Mackworth-Praed, C.W. and Grant, C.H. (1957). *Birds of eastern and north eastern Africa*. London: Longman
- Manzo, A. (2011). Punt in Egypt and beyond: comments on the impact of maritime activities of the 12th Dynasty in the Red Sea on Egyptian crafts with some historical and ideological thoughts. *Ägypten und Levante*, 21, 71–85
- Martin, A. (1890). *Home life on an ostrich farm*. London: G. Philip & Son
- Mikhail, A. (2014). *The animal in Ottoman Egypt*. Oxford: Oxford University Press
- Miller, L.H. (1915). A walking eagle from Rancho La Brea. *The Condor*, 17(5), 179–181
- Moreau, R.E. (1966). *The bird faunas of Africa and its islands*. London: Academic Press
- Morgan, H. de. (1909). Étude sur l'Égypte primitive. *Revue de l'École d'Anthropologie de Paris*, 19, 128–140
- Needler, W. (1984). *Predynastic and archaic Egypt in the Brooklyn Museum*. New York: The Brooklyn Museum
- Nicholson, S.E. (1979). The methodology of historical climate reconstruction and its application to Africa. *The Journal of African History*, 20(1), 31–49
- Osborn, D.J. and Osbornová, J. (1998). *The mammals of ancient Egypt [=Natural History of Egypt 4]*. Warminster: Aris & Phillips
- Patch, D.C. (2012). Early Dynastic art. In D.C. Patch, *Dawn of Egyptian art* (pp. 137–179). New York: The Metropolitan Museum of Art

- Perrins, C.M. (1990). *The illustrated encyclopaedia of birds: The definite guide to birds of the world*. London: Headline
- Perrins, C.M. and Middleton, A.L.A. (eds). (1985). *The encyclopedia of birds*. New York: Facts on File
- Petrie, W.M.F. and Quibell, J.E. (1896). *Naqada and Ballas, 1895*. London: B. Quaritch
- Portugal, S.J., Murn, C.P., Sparkes, E.L., Daley, M.A. (2016). The fast and forceful kicking strike of the secretary bird. *Current Biology* 26, R58–R59
- Quibell, J.E. (1900). *Hierakonpolis I. Plates of discoveries in 1898*. London: Quaritch
- Quintin, W.H.S. (1912). Some notes on the secretary bird *Serpentarius secretarius*. Part 2. *Avicultural Magazine*, 3rd series, 3, 109–111
- Raffaele, F. (2010). Animal rows and ceremonial processions in Late Predynastic Egypt. In F. Raffaele, M. Nuzzolo, and I. Incordino (eds), *Recent discoveries and latest researches in Egyptology: Proceedings of the First Neapolitan Congress of Egyptology, Naples, June 18th–20th 2008* (pp. 245–285). Wiesbaden: Harrassowitz
- Rasmussen, D.T., Simons, E.L., Hertel, F., Judd, A. (2001). Hindlimb of a giant terrestrial bird from the upper Eocene, Fayum, Egypt. *Palaeontology*, 44, Part 2, 325–337
- Redman, N., Stevenson, T., and Fanshawe, J. (2016). *Birds of the Horn of Africa: Ethiopia, Eritrea, Djibouti, Somalia, and Socotra*. Princeton, NJ: Princeton University Press
- Roth, A.M. (2011). Objects, animals, humans, and hybrids: The evolution of early Egyptian representations of the divine. In D.C. Patch, *Dawn of Egyptian art* (pp. 194–201). New York: The Metropolitan Museum of Art
- Sethe, K. (1906). *Urkunden der 18. Dynastie V. Historisch-biographische Urkunden aus der Zeit der Königin Hatshepsowet*. Leipzig: Hinrichs
- Shorrocks, B. and Bates, W. (2015). *The biology of African savannahs*. Oxford: Oxford University Press
- Sibley, C.G. and Ahlquist, J.E. (1995). *Phylogeny and classification of birds: a study in molecular evolution*. New Haven, CT: Yale University Press
- Sibley, C.G. and Monroe, B.L. (1990). *Distribution and taxonomy of birds of the world*. New Haven, CT: Yale University Press
- Sonnerat, M. (1776). *Voyage à la Nouvelle Guinée*. Paris: Rouault
- Strudwick, N. (2006). *Masterpieces of Ancient Egypt from the British Museum*. Cairo: The American University in Cairo Press
- Stupko, A. (2010). Cranes in the Chapel of Hatshepsut at Deir el-Bahari. Study on Representations, *Études et Travaux XXIII*, 157–178
- Urban, M. (2008). Secretary bird, or how an etymological dictionary should be written and by whom. *Studia Etymologica Cracoviensia*, 13, 191–199
- Vandier, J. (1952). *Manuel d'archéologie égyptienne I.1. Les époques de formation: la préhistoire*. Paris: A. et J. Picard
- Vosmaer, A. (1769). Beschryving van eenen Afrikaanschen nog geheel onbekenden roof-vogel, de Sagittarius genaamd, op de Kaap de Goede Hoop vallende, en overgebracht in de Diergaarde. Amsterdam: Pieter Meijer
- Williams, J.G. and Arlott, N. (1993). *Birds of East Africa*. London: HarperCollins