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How non-human primates and other terrestrial West African mammals were described in the Portuguese literary sources of the 15th and 16th centuries

La descrizione dei primati non umani e di altri mammiferi dell'Africa occidentale nelle fonti letterarie Portoghesi dei secoli XV e XVI

Summary - In the 15th and 16th centuries European exploration around the coast of Africa brought new first-hand information about the newly discovered lands to the attention of the western world. Encounters with new and wild animals were frequently reported by travellers and explorers, and although Europeans' perceptions were strongly influenced by cultural and religious prejudices, it is possible to find very interesting and accurate descriptions of non-human primates' and other mammals' morphology and behaviour. The current work presents the results of a review of many Portuguese travel chronicles of the Age of Discovery, which contain reports of sightings of these mammals. Specifically, the reports about West African chimpanzees (*Pan troglodytes verus*) from this period can be considered the product of precise and meticulous observations regarding this primate. In these descriptions, chimpanzees are often compared with human beings (from both cognitive, morphological and behavioural points of view) and/or described as performing human tasks. Reports on the population levels, distribution and behavioural habits of other terrestrial mammals can also be found, including that of elephants (*Loxodonta africana*) and hippopotamii (*Hippopotamus amphibius*). These descriptions are very realistic and greatly differ from the imagery found in medieval bestiaries and made an important impact on the zoological works of the Renaissance naturalists.

Riassunto - L'esplorazione delle coste africane nei secoli XV e XVI portò all'attenzione del mondo occidentale molte informazioni di prima mano sulle recenti terre scoperte. Anche gli incontri con gli animali selvatici furono accuratamente annotati da navigatori ed esploratori. Malgrado la percezione del mondo naturale fosse ovviamente influenzata da pregiudizi culturali e religiosi, è possibile incontrare accurate descrizioni relative alla morfologia e al comportamento sia di primati non umani sia di altri mammiferi africani. Questo lavoro presenta i risultati di un'analisi condotta sulle cronache di viaggio portoghesi nell'Età delle Scoperte contenenti riferimenti a questi animali. In particolare si osserva come le descrizioni dello scimpanzé occidentale (Pan troglodytes verus) siano molto precise e meticolose. Frequentemente essi sono paragonati agli esseri umani (dal punto di vista cognitivo, morfologico e dal punto di vista comportamentale) o descritti mentre svolgono attività umane. Da queste testimonianze si evincono inoltre informazioni sulla densità di popolazione, distribuzione e comportamento di altri mammiferi terrestri quali l'elefante africano (Loxodonta africana) o l'ippopotamo (Hippopotamus amphibius). Queste descrizioni più realistiche e molto diverse dai bestiari medievali, ebbero un forte impatto sulla zoologia rinascimentale.

Keywords: History of zoology; African mammals; Age of Discovery

Parole chiave: Storia della zoologia; Mammiferi africani; Età delle scoperte

Introduction

Although much has been written on the cultural, economic and political consequences of the European expansion in the 15th and 16th centuries, the role that animals played in this process has often been underestimated or even misunderstood. Animals were in reality a constant presence in all phases of the exploration and conquest of the new worlds, as demonstrated by the frequent descriptions of animals found in almost all the first chronicles of the navigators (cf. Ferronha *et*

al. 1993 for review).

Some African mammals had already been known to Europe since Greek and Roman times (Bodson 1998), and many of them had been described, often through mixtures of reality and mythology, by ancient natural philosophers and historians (among them Agatharchides, Herodotus, Aristotle, Strabo, and Pliny the Elder) (Kappler 1986). In the Middle Ages, many wild animals were known to live in North Africa and along the Nile. The natures and habits of these beasts were eagerly discussed, and drawing and paintings

were made of them. Wild animals of Africa were all considered part of the wonderful, diverse world God had created and given humans to rule over. The creatures God had made were also deemed to fulfil a higher purpose: from the natures and habits of different beasts, it was believed that humans could learn many moral and spiritual lessons (Lloyd 1971).

In 1434 after the passing over of the Cape of Bojador by the Portuguese explorer Gil Eanes (Vitoriano et al. 1998), Europeans entered into direct contact with sub-Saharan animals. Some of them were already known to Europeans but had never been observed in their natural environment, while others, such as anthropomorphic primates, were completely new to them. The first sight of animals aroused a mixture of awe, curiosity, denigration and even a sense of entertainment, but always provoked great interest because they represented a new possible source of profit as goods for trading. If their perception of the sub-Saharan African nature and animals was strongly influenced by commercial interests and obvious cultural and religious prejudices, nevertheless it is possible to find in these encounters with animals very interesting and accurate descriptions of nonhuman primates and other terrestrial mammals' morphology and behaviour. These reports are even sometimes the product of precise and meticulous observations and differ greatly from the tradition of the medieval bestiaries which precede them. Today these reports can provide us with precious information about historical population levels and distribution of these animals as well as offer unique first-hand accounts of folkloric and ethnographic data from pre-colonial Africa.

This paper will first survey the Portuguese literary sources that contain reports of non-human primates and other terrestrial mammals of sub-Saharan Africa, focusing on West Africa, which was the first area explored by the Portuguese. We will discuss how these animals were perceived by early explorers in an attempt to provide some insights into the early modern European perception of "exotic" animals. We will also add some notes on what these accounts can reveal to us about the distribution and population levels of these animals as well as their use in trade by Europeans and Africans at the time.

AIMS AND METHODS

We analysed descriptions of mammals found in Portuguese literary sources (especially travel chronicles) beginning in 1434, the year of the first contact of the Portuguese with the west coast of sub-Saharan Africa, and continuing with accounts up to the early 17th century. We utilized transcriptions of the manuscripts in their original language. The taxon identification (although often impossible) and description of African mammals reported in these documents were analyzed following morphological keys for taxonomic rank according to zoological descriptions available in scientific literature. As a general reference, African mammal taxonomy follows Wilson, Reeder (2005).

RESULTS AND DISCUSSION

Non-human primates

Although many animals have played a prominent role in human civilisations throughout the world, non-human primates have always been assigned a special status and a distinct place in the human imagination for their similarities with human beings. They have often had a role, if also a



Figure 1. Watercolour of a Diana monkey (*Cercopithecus diana*). Aldrovandi Ulisse. Tavole, Bologna, 2nd half of 16th century. http://www.filosofia.unibo.it/aldrovandi.

regrettable one at times, in the central debates around human nature and human origins (see for review Corbey 2005; Barsanti 2009). African Primates such as the Barbary macaque (Macaca sylvanus Linnaeus, 1758), baboons (Papio spp.), or green or grivet monkeys (Chlorocebus spp.), were well known in the Greek and Roman worlds, and seem to have been widely used as pets by their wealthy citizens (Montangu 1940; Groves 2008; Masseti, Bruner 2009). Although ancient authors such as Aristotle and Galen had studied these animals and noted their similarity with humans, during the Middle Ages monkeys were assigned a lower symbolic status, attributed with being devious or evil creatures, symbols of sin and lust. This lore expanded rather than blurred the boundary drawn to separate the human from the beast (Janson 1952; Tompkins 1994). Additional interpretative models for primates which were very common in Medieval times were linked to ideas of monstrous races located, by writers such as Pliny the Elder and others, on the border of the known world or represented by hungry Indian satyrs of Dionysian levels of madness, or the medieval Homo sylvestris (see Husband 1980). All these disturbing creatures resembled something between human and ape and were believed to live in very distant countries.

The earliest Portuguese accounts of the chimpanzee in Western Africa continued this tradition of relating tales of strange, wild men living in forests. The Portuguese sea captain, soldier, explorer and cartographer Duarte Pacheco Pereira in 1506 (Pereira 1956) described them as such:

"In this land there are wild men who live in the mountains of this region, blacks called them "oosaa", and are very strong. They are covered with bristles as the pigs; they are very similar to humans, except that instead of speaking they shriek and their cry is heard from afar. I have a skin of these wilds."

Travels to Africa by the Portuguese explorer Diogo Gomes were recorded in a text known as the Manuscript of Valentim Fernandes (see Monod et al. 1951). In this manuscript the presence of an animals very similar to humans is described:

"There is here an animal that seems two of them and it is very false. It has a white face and goes with four feet; it is similar a man and it is black in the body and in the fur and sharp!"

These reports are the first known descriptions of the West African chimpanzee (*Pan troglodytes verus* Schwarz, 1934), one of the four chimpanzee subspecies still found in Guines Bissau, Liberia and the Ivory Coast, (Wilson, Reeder 2005; Mittermeier et al. 2013). These first naturalistic descriptions of chimpanzee morphology were very sparse and it is only at the end of the 16th century that it is possible to find more in-depth accounts that also include comments about the behaviours of this primate. For example, André Alvares de Almada (Almada de 1594), a Luso-African man who traded in Sierra Leone during the 1560s and 1570s wrote:

"In Sierra Leone lives a kind of monkey not found in else where in Guinea; they are called daris, and have no tail, and if there were not hairy it would be possible declare that they were human like ourselves, for in other respects there is little differences. They walk on their feet, and some are so clever that if they happen to be captured when young and are brought up in a house, they go to the river to seek water and bring it back in a pot on their head. [...] They pound food stuff in the blacks' mortars like a human being. They are short and thick in body, with good legs and arms."

This description is still a mix of personal observation combined with accounts reported to him by native peoples, but chimpanzees are here considered monkeys and not a "strange" humanlike creature of the woods. Nevertheless, in his account, the old European myth of "Beauty and the Beast" is reaffirmed:

"They are fond of the conversation of young women, and if they meet any who have lost their way and are alone, they seize them and carry them off with them, and give them many caresses in their fashion."

As Corbey (2005) observed, the theme of the encounter between Beauty and the Beast (the quintessential symbol of the "other", in which the beast is seen as a dangerous or wild, uncivilized being in contraposition to the West), continues to reappear in portrayals of great apes up to contemporary times. This theme also appears later in writings by André Donelha (Donelha 1977), another Luso-African from the 16th century. He wrote in 1625: "Also they (native people) say that if it (chimpanzee) meets a woman alone, it makes

a match with her." Donelha, though quoting de Almada at many points, more thoroughly described the morphology and behaviour of the West African chimpanzee:

"(In Sierra Leone) there are monkeys of different shape and colours. *Daris* have the size and appearance of human beings. The females have breast like young women, the old ones have them hanging down like an old woman. They go on two feet at will. If captured when small they become tame; they are employed to go for water to the spring and for wood and to grind food in a mortar like a person. It is certain fact and happens in the Serra Leone. [..] This animal would not go to sleep unless it was given a mat or something on which to lie. They say that in the wild they break off branches and lay them across each other in forks of trees, and they make a bed with many leaves on which they lie."

The Jesuit priest Fr. Manuel Alvares (Alvares 1615), who was a part of a mission to Cape Verde and western Africa (Sierra Leone) recorded much valuable information concerning chimpanzee behaviour as well as elements gathered from the oral traditions of local people at the beginning of the 17th century:

"The smaller animals include dari, which is amusing to see thought one cannot admire its appearance. This creature is almost human. Even thought it does not normally wall upright, its face, eyes, nose, mouth and other parts are more like those of a human being than those of a beast. Its beard, which is full of white hairs even if dari is only two months old, is worth seeing, and this taken together with its very flat nose and its frankly hideous upper lip, is enough to amaze anyone! [..] When they walk they go on the backs of their hands, placing them on the ground. [...] What is especially amazing in this animal is that it climbs up a palm tree with its baby, and will go from branch to branch without hurting the baby and indeed looking after it with loving care. [...] They have naturally compassion. I ordered a boy from this Serra, who looked after one of our *dari*, to be punished. The animal persistently refused to allow the boy to be punished. It attacked, making ferocious faces, and so they had to release him, out of fear. Daris are good musicians. In the forest they make such an extraordinary thundering sound that it seems that we hear a drums being played. [...] A person who sees their footprints will not recognize them thinking they are human. [...]"

The Alvares's description goes on to say that these monkeys sleep in trees on twisted branches and leaves that serve them as mattresses; moreover, he gives the first description of tool use among chimpanzees (cf. Sept, Brooks 1994).

From a primatological point of view, it is important to distinguish elements of myth and legend from those of genuine observation, but it is evident that many of these reports are the product of precise observations regarding the West African chimpanzee. Interestingly, chimpanzees are often compared with human beings (from cognitive, morphological and behavioural points of view) and/or as performing human tasks. Many of the behaviours described in these accounts have been confirmed by contemporary scientific studies (e.g. McGrew 1992) and are valid ethological observations on chimpanzee types of locomotion, construction and use of tools, nest building, use of clubs in competitive contexts, drumming, etc. We also find the first reports of observations of compassion and empathy by a non-human primate (see Alvares 1615: "They have naturally compassion"), and it should be underlined that this set of behaviours is considered a fundamental discovery of recent ethological studies (e.g. De Waal 1996, 2008). Alvares (1615) also gives some insights on the native African people's beliefs and perceptions of chimpanzees:

"There are heathen that claim to be descendants of this animal (chimpanzee), and when they (native people) see it they have great compassion: they never harm it or strike it because they consider it the soul of their forefathers, and they think themselves of high parentage. They say they are of the animal's family, and all that believe they are descendent from it call themselves *Amienu*."

As Sept, Brooks (1994) observed, these early accounts of chimpanzee natural history may cause primatology to reflect on the long history of complex chimpanzee-human interaction in Africa, including the extent to which these interactions have influenced the divergence of chimpanzee socio-ecological patterns in different regions of the continent. These documents are an important reminder that for centuries, particularly



Figura 2. Drawing of an hippopotamus from *Histoire de la nature des estranges poissons marins*, Belon, (1551).

in western Africa, chimpanzee populations have lived in close proximity to humans and have adapted to the human landscape.

Reports about other non-human primates referred in general to their great variety and on their trade, already common from the first decades after the Portuguese discover of western Africa. Only in few cases is it possibly to identify the species of the primates mentioned. For example, in the manuscript of Fernandes (Monod et al. 1951) red monkeys are reported, Piliocolobus badius (Kerr, 1792) or/and, Erythrocebus patas (Schreber, 1775); black ones, possibly Colobus polykomos (Zimmermann, 1780), brown ones, possibly Chlorocebus sabaeus (Linnaeus, 1766) and baboons "of many kinds", Papio papio Desmarest, 1820 and possibly *Papio anubis* Lesson, 1827. Some sources referred to monkeys, which were frequently a gift offered to the Europeans by local rulers (e.g. Monod et al. 1951), and were also among the most common animals exported live to Europe (see for instance Fig. 1). The beautiful coloured African monkeys were new to European courts and quickly became appreciated as pets (Veracini 2008-2011). Their import from western Africa began in the 15th century as evident both in iconographical and literary sources. Although the trade of these animals seems to have not led to a rapid local extinction (as did happen with other mammals such as elephants and monk seals), nevertheless their populations is likely very reduced today in comparison with the abundance described in the pre-colonial period by almost all of these travellers. Many non-human primate species of Western Africa are today vulnerable or threatened with extinction (IUCN 2016).

Other terrestrial mammals

Many other terrestrial mammals are mentioned and described in the early Portuguese chronicles. From some of them it is possible to identify the species and to understand their historical distribution and use by humans. Here we shall mention those that had a cultural and economic impact on Europe.

One of the most well-known African mammals since Antiquity was the African elephant (*Loxodonta* sp.) (Bodson 1998; Scullard 1974). Preliminary genetic evidence suggests that there may be at least two species of African elephants, namely the Savanna Elephant (*Loxodonta*

africana Blumenbach, 1797) and the Forest Elephant (Loxodonta cyclotis Matschie, 1900). A third species, the West African Elephant, has also been postulated. We can assume that in most of the cases the authors are speaking of L. africana (the species with a larger size) because this feature is always underlined, but in most of the cases we cannot know what is the taxon the authors are reffering to . Although almost forgotten during the Middle Ages (Ferronha et al. 1993), elephants immediately attracted attention again after their description by the Portuguese erudite Gomes Eanes de Zurara, who wrote the Crónica dos feitos de Guiné (1468-1473), a foundational work telling of early Portuguese voyages of discovery down the African coast. He wrote (Zurara 1937):

"Native people of Guiney used elephants to make shields. These animals here are very large and their meat can feed more than 2500 people. The natives do not use the bones (ivory) of elephants."

In the same years the Venetian captain Alvise da Mosto (known also as Ca' da mosto) at the service of Henry the Navigator, while exploring the Rio Gambia gave the first naturalist description of African elephants (Cadamosto 1948). His observations disproved the myths and legends then prevalent in Europe about elephants, (e.g. the myth that they did not have joints of knee according to the Bible, see Lloyd 1971):

"There are many elephants but they cannot tame them as they do elsewhere. These elephants go in herds as some of our animals, cows or pigs; the ivory teeth that come to us are brought one in each side (of the maxilla) as wild pigs. [...] Elephants can stay in the ground and they have knees, and bend their legs to go as any other animal; before it was thought to be asleep standing up and could not kneel. [...] Their teeth never fall except when dead; they do not attack men unless they are attacked. The attack is to do by the trumpet with a long shot from the bottom up throwing the man a few feet away. It runs much faster than men. They are very dangerous when they have cubs and they have no more than three or four cubs."

He also gave an accurate description of elephant hunting. Other successive chronicles contain detailed hunting scenes describing all the different techniques of local cultures (e.g. Monod et al. 1951; de Almada 1594). The impressions related after first contact with these pachyderms were always ones of awe and wonder in part because in the 15th century elephants were considered very intelligent in accordance with the descriptions of

Pliny the Elder (Ferronha et al. 1993). But more than anything else it was their vast numbers and the incredible size of their tusks, which opened to European merchants great potential for earnings. As noted by Zurara (1937) Europeans discovered only in the 15th century the ivory trade in Western Africa because before then, ivory reached Europe from the Levant ports where Arabians brought it from Egipts (Håkansson 2004). Almada de (1594) reported that "every year from one port of Guinea are exported 300 tons of ivory," whereas Donelha in 1625 referred to the "big size of ivory" and the buzinas de marfim (trumpets of ivory) used in war by the peoples of Sierra Leone. In the 16th century, many ivory sculptures were made in the European style by local African artisans (Pereira 1956; Monod et al. 1951). These ivory sculptures were the first objects from Black Africa to reach European collections. By 1520-21 the painter Albrecht Durer had purchased two of these objects, saltcellars, in the Netherlands, the first examples recorded in Europe outside of Portugal (Vogel 1989). African elephants populations were vast and widespread, and ivory became one of the main traded goods throughout most of the Atlantic Coast from Senegal to Serra Leone in the 16th century, as reported by almost all of the Portuguese sources (e.g. Monod et al. 1951; Almada de 1594). It seems that the decline of the ivory trade (a consequence of the reduction in elephant populations) in this part of Africa started around 1650. Ivory was still exported but had to be collected from regions far from the coast. Elephants had entirely disappeared from the West coast of Africa by the end of the 18th century (see Donelha 1977: Introduction). Today, relict populations can be found in West Africa, while this species is regionally extinct in Gambia (IUCN 2016).

Another animal that immediately attracted the attention of the Portuguese travellers for its amphibious nature and large size was the hippopotamus (*Hippopotamus amphibius* L. 1758). Although already known since Ancient times (see Belon 1551, Fig. 2, and the impressive fresco in Pompei depicting pygmy people of Nubia fighting with a hippo), it was in fact an animal almost completely unknown to the first European travellers to Africa. Pereira (1956) gave us a first-hand description of this animal. He used the term "sea horse" that had already been

used by Cadamosto (Cadamosto 1948):

"In the Rio de Gambia there are many large sea horses, larger than an ox, of all colours that horses have; they have the shapes of their bodies like an ox, and have the nails of the feet and hands with cracks like the ox; the neck, face, ears as a horse, and they have two horns and teeth of two palms fall of one size and width of a man's arm. They go into the river in the shallows where the water reach the stomach and also in the highest level when they want, and then go out of the water into the land to graze grass and sleep in the sun, and so they shown in the water and on earth the majesty of their great nature".

According to 15th and 16th century chronicles, hippos were very abundant in the rivers of West Africa, especially in the Gambia River. These animals were utilized in traditional medicine by local people (nails and teeth) and were killed for two other purposes as reported by de Lemos Coelho (1990) referring to the Gambia River:

"Blacks kill many of these horses in their crops and eat them. And kill them for two things: because they eat their rice and like their meat. They stop in these rivers staying underwater and when there is some female with her baby small boats may run the risk of being overturned or destroyed. As soon as the babies are able to walk go with their mothers on the ground."

Although these fascinating mammals are still found in many West African nations, overall population sizes tend to be much smaller today, either because of less available habitat or the higher density of human populations. The conservation status of the common hippo is considered Vulnerable (IUCN 2016).

Other artiodactyls were mentioned by Portuguese explorers. The species most frequently cited and which can be identified based on authors' descriptions are: the buffalo (Syncerus caffer Sparrman, 1779), the bush pig (*Potamochoerus* porcus Linnaeus, 1758), antelopes of many species such as waterbucks and kobs (Kobus spp.), the giant eland, Taurotragus derbians Gray, 1847 (the subspecie *T. d. derbianus* native of West Africa is no longer present in many west coast countries and nowadays lives in a Senegal reserve) and the roan antelope, Hippotragus equinus É. Geoffroy Saint-Hilaire, 1803. All of these descriptions express wonder at the sheer numbers of herds of buffalo, antelopes, gazelle and wild pigs observed. Several authors noted that these animals were used for food by local people while they skins were used for making

shields (Almada, de 1594; Donelha 1977). Skins were also bought and exported by Europeans in many ports of West Africa, as Donelha (1977) reported:

"These animals and many others are hunted to take advantage of the flesh. In the Gambia and Senegal also take advantage of leathers and lead them to sell to the French and other strangers; they carry their boats with leathers and they salted them and bring them to France and England."

Carnivores (felids, canids and viverrids) were often noted for their diffusion and abundance throughout the West African coast as noted by Almada de (1594) who commented: "There are also many bad animals such as lions, tigers, onças (leopards) and wolfs (hyenas and jackals)". Among carnivores, the Family of Viverrids is one of the most cited by Portuguese travellers (e.g. Monod et al. 1951; Donelha 1977; de Lemos Coelho 1990). They especially reported the presence of the civet cat (gato de algalia) because this animal was valuable for its production of an odoriferous secretion of the perineal glands used in traditional medicines and cosmetics. Although the African civet cat, Civettictis civetta (Schreber, 1776), native to Ethiopia, Guinea, Senegal, and other places in equatorial Africa, was probably the most explored species for aromatic civet also other species of this carnivouros family provide the odoriferous secretion, but in smaller quantities (e.g. some Asiatic species of the genus Viverra). The fame and availability of civet musk in Europe seems to have followed European expansion and its trade first in Africa and ultimately on other continents. Its property began to be known since the early fifteenth in Europe, though it was already used since the first century A.D. in China and in the 13th century Arabian world (cf. Dannenfeldt 1985). Moreover the trade of civet cats seems to be really ancient. In the Lesser Sunda (Indonesia), for example, there is evidence of the transfer of civets in islands beyond their natural range of distribution starting at least from 4500 years BP (cf. Glover 1986).

In 1456, the already cited Venetian captain Alvise da Cadamosto reported that the natives along the Gambia River "brought for sale civet, and the skins of cats from which civet is obtained. They gave an ounce of civet in exchange for an article not worth forty or fifty *marchetti*". By 1469 civet was considered such a valuable product of the newly discovered lands that King Alfonso V on

19 October 1470 declared a royal monopoly on the products of Guinea, including civet, malagueta pepper, unicorn, spices, and precious stones (Vogel 1989). More than a century later, in 1591, Odoardo Lopez (Lopez 1970 *apud* Dannenfeldt 1985), a settler in the Congo, reported that before the Portuguese came to the Congo as traders, the natives had tamed some of the many civet cats (*Algazia*) there for the sake of their perfume.

Among other terrestrial mammals reported by 15th and 16th literary sources, we can identify rodents such as the crested porcupine (*Hystrix cristata* Linnaeus, 1758) "who has the whole body covered with spines and for defending itself he becomes swollen and round and spears barbs" (Donelha 1977), and large fruit-eating bats or flying foxes (Megachiroptera), described by Cadamosto as "*vespertilioni*, bats similar to ours, large three or more palms", or reported by Fernandes (Monod et al. 1951) as "resting in an island (of Guinea) during the day and in the night going to the ground (*terra firme*) for feeding."

CONCLUSIONS

Europeans' perception and description of the fauna of West Africa are central themes in many areas of culture and important tools for our understanding of the early modern period. Old African travel reports can provide us with precious information about former geographical distribution, density and human use of terrestrial mammals. They also offer unique first-hand accounts of folkloric and ethnographic data from pre-colonial Africa. In the chronicles examined some main aspects emerge: a) the description of morphology and behaviour of the West African chimpanzee and his comparison with human beings; b) the abundance of other non-human primates and their trade; c) a great number and huge size of elephants and a frequent ivory trade; d) the abundance of artiodactyl herds throughout the West African coast, their use for food by local populations, and trade of their skins; e) a great diffusion of carnivorous species and a frequent trade of civets cats and their odoriferous secretion.

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