Large Mammals and a Brave People

SUBSISTENCE HUNTERS IN ZAMBIA

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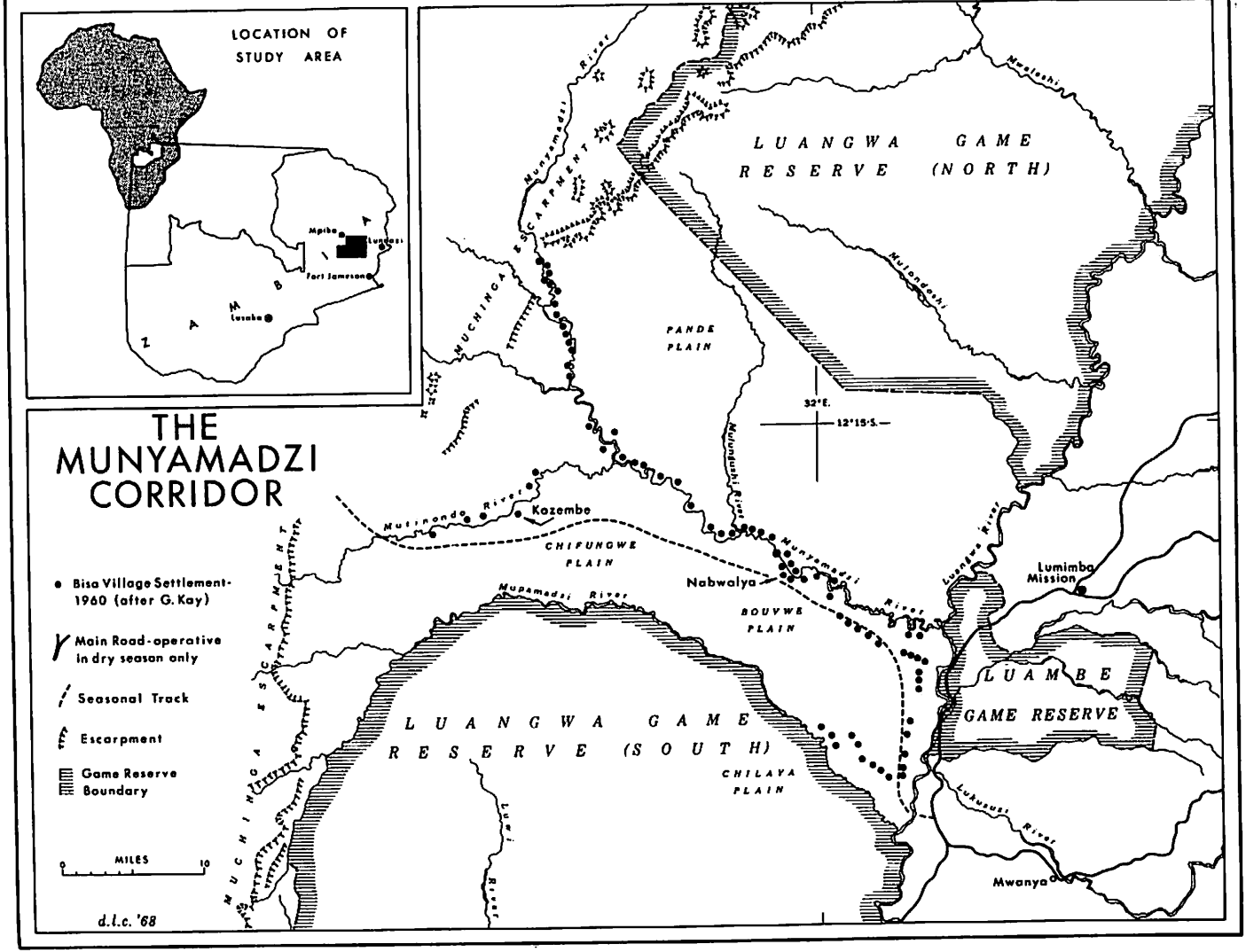
LOCATION OF STUDY AREA
Mpika
Lundazi
Fort Jameson
Lusaka
THE MUNYAMADZI CORRIDOR
Bisa Village Settlement-1960 (after G. Kay)
Main Road-operative in dry season only
Seasonal Track
Escarpment
Game Reserve Boundary
0 MILES 10
d.l.c. '68
LUANGWA GAME RESERVE (NORTH)
LUANGWA GAME RESERVE (SOUTH)
LUAMBE GAME RESERVE
MUNYAMADZI ESCARPMENT
MUCHINGA ESCARPMENT
PANDE PLAIN
CHIFUNGWE PLAIN
BOUVWE PLAIN
CHILAVA PLAIN
Kozembo
Nabwalya
Lumimba Mission
Mwanya
Mutinondo River
Mupamadzi River
Munyamadzi River
Mulundeshi River
Luangwa River
Luwi River
Luhuwusi River
32°E.
12°15'S.

All other mammals which have two or more distinct colors on their pelage are grouped as *vizemba*. Included in this category are zebra, leopard, wild cat, bushbuck, kudu, eland, wild dog, cape polecat, and giraffe. Most of those in this class are considered nonedible, yet those which are palatable (eland, kudu, bushbuck, and zebra) may be prohibited to individuals.

Chizwango (*chipondo*) refers abstractly to any wild animal capable of harming or killing human beings. Normally elephant, hippo, buffalo, lion, leopard, venomous snakes, and crocodile are referred to as *chizwango*, although the term may be extended to include an individual hyena, wild dog, rhino, or other wild beast which has killed a human being. *Chizwango* also refers to a person who accidently or purposely kills another human. Dangerous mammals are never addressed or spoken about by their specific names should they be encountered in the bush. Otherwise, their spirits might think they are being summoned and attack rather than flee. All large mammals have nicknames which are used in casual conversation, such as *munyepe* for elephant, *chigwele* for hippo, and *pundangala* for lion.

Since not everyone is knowledgeable about classification, my list was compiled from information gained from hunters. In East Africa, Whiteley (1966) mentions that the variability he recorded in classifying schemes of fish was related to the range of experience and uses of these vertebrates by his respondents. Saleability and size were important categories for merchants ashore, but for fishermen, criteria of behavior or bait selection were the basic categories.

Attributes of Mammals

Each group has its own leader or guide (*ntungulushi* or *chilongozi*). This individual usually has the largest body size and hoofprint and is most often seen in front leading the rest.

> The *ntungulushi* has to lead its group where there is good grazing. Where it goes, others must follow. These *ntungulushi* are very difficult for us to kill, and if one happens to kill such a leader when a herd is raiding crops, it will be a long time before that herd will come back to raid those crops again. This is because there hasn't come another leader to replace their dead one.

Implicit in this and other comments is that such large, powerful leaders possess magic. Some older mammals were said to possess more powerful magic (*bwanga*) than hunters and for this reason are able to escape predation. In particular, eland lends a protective presence to other species with which it associates. Large herds of buffalo have their own protectors, as illustrated in a response to my question about why a large buffalo, which had been wounded, escaped.

> There is a little animal in the form of a spirit which protects the biggest buffalo. It is called *kakoba*. To know that there is this little animal about there will be many animals, black and white grazing together, buffalo and other animals. This "satanic" animal is going around protecting his herd and any hunter will shoot his gun in vain.
>
> Question: What color is this small guard and what are its other characteristics?
>
> Answer: It is white. It is rarely seen. It walks on the buffalo and protects them. The *kakoba* is like a priest (*shimapepo*) among all the animals. It won't be found in small groups of animals, only among many. The hunter will not kill an animal where *kakoba* is because it is like an evil spirit (*chiwa*). If a hunter happens to shoot at an animal which *kakoba* is protecting his bullet will go elsewhere.

Elephants and warthogs, which frequently dig in the ground for roots, are said to be looking for magical substances to protect themselves from predators. Like their human counterparts, lions and other large carnivores are believed to possess powerful hunting magics (*muti wabufundi*).

> The lion is the best of all in searching for magics to help it catch animals. We suspect it to have hunting magics because when it catches an animal it first opens the abdomen and picks out the *kafiza* [one of the several parts of an ungulate's stomach—said to have "pages" like a book]. The qualities of this magic are known only to the lion. Then it digs a hole and buries the *kafiza* before it comes back to feed on the carcass. I have seen this behavior many times, also the hole and its contents.

Mammals also have their protective spirits (*mipashi*) but these spirits are not normally as powerful as those of humans. Like humans, mammals hold certain areas sacred where they worship and solicit assistance from their ancestors.

Of more concern to hunters is the belief that all mammals have evil shades (*vibanda*) capable of afflicting hunters and their relatives should the proper death rituals not be performed. Such *vibanda* are described in the following manner: "Some have very nasty *vibanda*. There are many people who have short tempers. Some game have such tempers also. They have bad hearts and are easily made wild. When you shoot one of these dangerous mammals, elephant, lion, or eland, you must get the ritual substances from an experienced hunter who has killed such a mammal previously." Mammalian shades are ranked, with those of eland, lion, wild dog, and elephant being the most dangerous. The consequences for not placating the spirits of these mammals is sickness or death to the hunter or someone in his lineage. The *vibanda* of other game may enter the hunter's gun and render it impure (*kuikate mfuti*). These consequences are expected to follow should a hunter deviate from traditional patterns of rituals and behavior.

Live mammals show an uncanny awareness of human customs. This thought is apparent in the following account of a tragedy:

In 1961 Chikunda, a game guard, was called to Kalinka Village to kill a bull elephant which had been persistently raiding village granaries. The elephant was surprised and shot within the confines of the village but only feigned dead. At that time it was customary for villagers to present chickens and sorghum to game guards when they had killed a marauding elephant. So when these presents were given, the elephant recognized his tormentor, charged the hunter, knocked him to the ground, mangled his leg and punctured his abdomen with a tusk. Chikunda took a full year in the hospital to recover.

Most mammalian attributes are similar to those ascribed to humans, and in this sense the Valley Bisa are not so different from other preliterate societies. Both mammal and human spirits are believed to interact continuously with the human community and take an interested view in the moral decisions and acts of its members. Yet this is not to say that there are no critical distinctions made between the two. As one informant stressed: "Mammals do not have houses as people do. Also game animals are not selective in their matings. They have intercourse with any other of their species whereas people select man and wife together. Game does not do this; they may have intercourse with their own mothers. Mammals do not have shame. These are some of the ways in which we differ from them."

Ascribing anthropomorphic characteristics to game from a functional standpoint reinforced traditional patterns of social organization and control. The conviction that important game species were infested with malign spirits subjugated young hunters to adepts, and adepts to the chiefs on whose land these species were slain. To avoid mystical alienation, each group had its part in the prescribed rituals. Beliefs attributing haunting shades to lesser species suggested that hunters follow traditional norms in the distribution of meat.

The beliefs about mammals presented above are based upon traditional premises and these patterns have been given substance for some hunters at least by their own experiences. But the degree to which beliefs were expressly held varies among individuals. With recent changes in social organization and weaponry for a few individuals there have been concomitant changes in their cosmology, for I recorded some interpretations at variance with those expressed above. An apparent break with previous traditions was in reference to the nature of mammalian shades, for those who had hunted with Europeans or who had had access to modern breechloading weapons often dismissed the importance of these spirits. One individual claimed that mammals had no spiritual essence, only life (*muoyo*).

Some hunters told me that the spirits of slain game, if properly placated, would influence and send other members of their species to the hunter. But when I asked another about this belief, he replied: "No! If a hunter has magic, his magic will attract (*kuite nama*) animals. It is not another animal's spirit which sends them." However, with few exceptions, the patterns of beliefs described seemed functional in the minds and behavior of most hunters.

Prohibitions on Meats

From the standpoint of cultural adaptation, the most important use of animals is for food. All cultures are selective regarding the palatability of various species and have differing ideas about what people should eat. The Valley Bisa do not indiscriminantly consume all types of game meat, and some individuals regularly abstain from eating one or more types. In addition, there are other meats which they normally will not touch, but with the exception of the hippo, most Valley Bisa consume one or more of the animals listed in Table 14. Most food prohibitions are imposed on the individual by an African diviner who makes the cure of the patient conditional upon the avoidance of certain foods. A few individuals institute their own prohibitions because of a sinister association with a particular species. For example, an elderly woman refused buffalo meat because her father was killed by one.

Striped mammals (*vizemba*) are a group of mammals prohibited in many parts of Central Africa. Among this group zebra, bushbuck, kudu,

TABLE 14

FOOD PROHIBITIONS AMONG ADULT VALLEY BISA

	Males	% Sample	Females	% Sample
Mammal				
Hippo	56	90	91	100
Baboon[1]	27	44	34	37
Zebra[2]	11	18	19	21
Bushbuck[2]	6	10	4	4
Eland[2]	2	3	3	3
Elephant	2	3	1	1
Warthog	2	3	...	...
Other large mammals	3	5	5	6
Fowl				
Chicken	1	2	6	7
Fish				
Kaponta (catfish)[2]	5	8	13	14
Mbubu[2]	2	3	3	3
Other fish	1	2	2	2

Note: The total of respondants for 12 villages was 62 males and 91 females.
1. Probably should show much higher percentage of refusal.
2. *Vizemba:* animals with two or more prominent colors on body.

and eland are edible. In her discussion of food taboos among the Bemba, Richards (1939) writes that pregnant women avoid bushbuck flesh; otherwise their children become spotted like the bushbuck. For the same group, Moore (1940) records that whereas many people ate bushbuck, they did so at the risk of acquiring rashes or blemishes on their skin. The Kaonde refuse bushbuck meat "for the fear of rash" (Melland 1923), and the Konde believe the flesh of eland and bushbuck will cause leprosy in some people (Mackenzie 1925).

This class of mammals is also among those meats prohibited to chiefs. Among the Ambo, who reside in the Luangwa Valley south of the Valley Bisa, chiefs are prohibited the flesh of zebra, bushbuck, and rhinoceros (Stefaniszyn 1964a). Kazembe, the paramount chief among the Lunda on the Luapula in Zambia, was prohibited eland meat (Cunnison 1959).

A reigning chief among the Valley Bisa has his own food prohibitions which may not apply to all members of his lineage. The present chief does not eat zebra, for, as he explained, "The first Bisa chief was buried in the skin of a zebra. Thus, the zebra has remained a part of our kin's traditions. Since the death and burial of this first chief, other chiefs have refused to eat it." If zebra is the only meat currently refused by the chief, surely there have been other prohibitions in the past. Bisa chiefs on the plateau reputedly refuse bushbuck and kudu in addition to zebra. Although kudu is not consistently mentioned in the literature, this species is not as widespread in its distribution as the others and is neither plentiful nor conspicuous where it occurs.

But the question still remains, why is the flesh of mammals in the *vizemba* class consistently prohibited? Attempting to find a clue for this avoidance, I solicited comments from many individuals but they never satisfied my curiosity. The following was a typical response:

> Kudu, zebra, bushbuck, and eland were made like this by God (*Leza*). . . . Some people fear leprosy and don't eat animals with spots and stripes. God created such animals as evidence (*buboni*) and warning not to eat game of this type. . . . Sometimes many people eat animals with white stripes on them. If a person gets leprosy, we say that the meat is to blame. Others can eat such meat and never suffer.

Douglas (1966) suggests that the concept of pollution is an unconscious reaction against the inconsistencies of cherished principles and categories. That which is either ambiguous or contradictory from the standpoint of a society's classificatory theories is inclined to be labeled unclean, dirty, or dangerous. Things which fall between categories or combine several components may also share these same labels. According to the Valley Bisa, the pelage of those mammals in the *vizemba* category combines at least two colors, and their white stripes or spots are prominent. Both the ambiguous classification of these mammals and the meanings of basic color patterns in other contexts may be the basis leading to the flesh of these mammals being labeled as dangerous.

The Valley Bisa say that the fear of leprosy legitimizes individual abstentions from the flesh of striped mammals. For them, leprosy is a dread disease, appearing capriciously, and according to district reports, rather common in the Valley until recently. The initial stages of the disease they say appear as spots, blemishes, or open sores; advanced stages of the disease are recognized by everyone, and leprous individuals are isolated from their kinsmen. These are built huts in the bush and are prohibited from eating with other villagers. By nature a gregarious and social people, social isolation and rejection is for them undoubtedly the most feared aspect of contracting this disease. Upon their death, lepers are not buried in the ground like others, but wrapped in their sleeping mats and placed in a tree and left to rot. Stefaniszyn (1964a) suggests the prohibition against burying lepers rests on magical grounds. The body must be willfully rejected; otherwise the disease might reappear among other members of the leper's matrilineage.

Other studies of African societies show the significance ascribed to colors. Lienhardt (1961) shows the interdependence of perception of a color and its shades in nature and in cattle among the Dinka of the Sudan, and suggests that this relationship is a deliberate attempt to link cattle with features of both their natural and social environments. Needham (1967), deciphering the significance of a Nyoro legend, shows the complexity of symbolism and meaning attributed to the legend of a hunter's kill of a curious animal, a part of which resembled a colobus monkey (black and white), and another part a lion (red).

The flesh of other game refused by individuals was prohibited them by African doctors after they had experienced prolonged sickness or vomiting. Those who showed signs of epilepsy or madness (*bulwele buanjili njili*) refused warthog. The name of this sickness is similar to the vernacular name for warthog (*munjili*). According to hunters, warthogs sometimes are found mad and unconscious, and while in this condition may be killed easily with an ax or a pole.

In addition to the pied wagtail, several birds and small animals are considered nonedible by adults. Rats and mice inhabiting villages and their immediate surroundings are not edible, although the cane rat and elephant shrew are eaten. But there is ambivalence about the palatability of both species, and some people will eat neither. Wild pig, likewise associated with abandoned village sites, is also refused by some adults. The fork-tailed drongo (*muntyengu*), black kite (*pungwa*), racquet-tailed roller (*chole*), and others frequenting villages or fields are not consumed by discriminating adults, although they may be killed and eaten by children.

8 July. Chibinda wounded a buffalo which entered his field at night. The next morning he followed and killed it with a second shot.

Once wounded, smaller game may be chased in the direction of the village. By Western values this practice appears cruel, but from the standpoint of the Valley Bisa it reduces the distance over which its carcass must be carried to the village. I observed this once.

After hunting unsuccessfully all morning Chizola and I were returning to his village when at 10:22 A.M. we surprised a female warthog in Kawele thicket. His shot entered the warthog's hip, crippling both back legs. Since it was still capable of movement on its forelegs, Chizola prevented me from killing it with my shotgun. Instead he picked branches and tossed them at the warthog which fled from us in the direction of the village. After struggling some one thousand yards the warthog fell exhausted and could be herded no farther. Chizola suggested that I kill it with guineafowl shot rather than waste buckshot.

Hunters say pregnant females are more difficult to kill than males, for according to them the fetus must die before its mother. Also, fat mammals supposedly die quicker than skinny ones.

In approaching downed game, hunters advance toward the carcass along the trail used by the game rather than approaching from the rear as it is common among Europeans. From the front direction they claim it is easier to tell by examining the animal's eyes whether or not it has expired.

If the prey slain is an eland or elephant, the hunter ritually treats the carcass according to the traditions of his lineage, provided, of course, he has previously killed these before and knows their appropriate prescription. It seemed to me that these rituals were directed toward animal spirits as appeasement ceremonies and were similar in form to their ancestral rites. When I broached this to an elder, he replied: "No, one does not appease (*kusekela*) the spirits of animals like one does one's ancestral spirits. One only tries to neutralize (*kusisintila*) the animal's spirit so it won't follow the hunter and cause trouble. In this way, one shuts (*kuisalila*) the spirit in the carcass."

Other species of game such as buffalo and rhino may also be ritually treated each time they are killed but this depends upon lineage traditions and the experience of the individual hunter. An older hunter whom I watched make a kill did not perform a ritual over a buffalo. When I asked him why he had not performed the ritual, he replied: "Being an experienced hunter, I do not always use *muti* [magic] on dead animals. I may do something to the meat when I return to the village. Also I take the bark from *kamulebe* [*Ximenia americana*] bush, soak it in water, and cleanse myself and my gun."

Once the ritual is performed, the hunters tie a knot in the mammal's tail. Hunters claim this behavior prevents those who are to consume its meat from contracting diarrhea or other stomach ailments, but this behavior also may be related to the hunter's wish to "tie up" (*kukaka*) this ailment, or possibly it is a survival of a previous pattern designating ownership of a carcass. A slain animal may be claimed by another party if it shows no sign of ownership.

Timothi killed a buffalo near another village. Apparently he did not cover the carcass or tie a knot in its tail but immediately left for the village into which he had married. When he returned to the carcass with his in-laws that afternoon, he found the carcass already butchered. When he learned the adjacent village was enjoying fresh meat, Timothi asked them from whom they had obtained permission to cut the meat. They replied that they had found the buffalo dead and assumed it had no owner. They delivered the meat to Timothi's village and there was no case.

Before leaving the kill site, hunters generally cover (*kuvimbile nama*) the carcass with thorny branches or grass. This action camouflages the site from aerial scavengers and makes the kill site difficult to detect by other persons who might have heard the shot and be moving toward the kill.

If a kill is made toward evening and the distance to the village is far, the hunter may apply hyena magic (*muti wavimbwi*) to prevent hyenas from locating the carcass. I saw this magic applied once. This hunter took two shreds of mopane bark and with his eyes closed tied a strip to a foreleg and to the opposite back leg; then covered the carcass with branches from a thorn tree. When we returned the next morning, the carcass was intact.

Retrieval and Consumption

Once game is slain, the hunter's attention shifts to his knowledge of gross anatomy and to the distribution of the meat. Meat is a perishable, yet precious commodity, and its distribution by the hunter represents a social strategy which may be used to his immediate advantage or at some future date.

My field notes for 21 December 1966 describe the butcher of a male buffalo.

Chizola surprised a small band of buffalo near Ndozi hill. His shot, audible from the village at 7:30 A.M., entered the thoracic cavity and heart of a large bull. The wounded animal ran some fifteen hundred yards before dying at the edge of Kawele thicket. Chizola found the carcass, covered it with branches, and returned to the village at 8:30 A.M.

At 11:15 A.M., accompanied by seven men, six women, and three boys we left for the kill site. Upon our arrival at the carcass, Chizola removed the branches and instructed a small child to tie a knot in its tail. Then he plucked a blade of *luiba* grass [*Digitaria milanjiana*] and placed it in the animal's nose.

The buffalo was an adult male, although not old if judged by the wear on its teeth and the spread of its horn bosses. However it was fat and this condition became the main topic of conversation by the assembled group. They poked

sequent abandonment in riverine savanna increase the amount of plant material on the ground and in the shrub layers of these habitats. During the dry season, this increase in food and cover together with the water in the river, accounts for the high density of game, particularly impala and zebra, in the vicinity of villages. Whereas at this season, water is a crucial environmental variable, these other factors probably play a larger role than one might suspect, for the Valley Bisa, through their activities, create a more diverse and structured environment than would exist otherwise. In the next chapter I present some evidence which shows heavy use by game within these habitats during the dry season.

My mention of this effect on vegetation in a treatise on hunting is to suggest that whereas some men in their roles as hunters do kill game, these same individuals together with others in their building and agricultural chores engage in activities which bring about changes in the structure of the vegetation which increases the use of these same areas for game. Although my description does not allow me to qualify these associations, it suggests that the number of Valley Bisa presently on the study area did not necessarily mean less game.

IX

Population Structure and Ecology of the Larger Mammals

Hide near the animal's crossing point. There will be a noise.
Bisa Song

IMPRESSIONS OF GAME ABUNDANCE IN THE MUNYAMADZI CORRIDOR

THE varieties and abundance of wild animals inhabiting the central Luangwa Valley have impressed Europeans for more than a century. Therefore, reviewing the notes of the early explorers and administrators and the tour reports of game rangers provides a historical perspective for assessing population trends of mammals in the Munyamadzi Corridor.

Dr. Lacerda in 1798 (Burton 1873) and Gamitto in 1831–32 (1960), both Portuguese explorers on a mission to King Kazembe of the Lunda, encountered Bisa hippo trappers encamped along the Luangwa. Gamitto's party offered to kill hippos with their guns, but the Bisa refused because the explosions would have scattered the hippos into less accessible places. Gamitto was impressed with the numbers and variety of game which he found along the banks of the Luangwa which included "all species of tropical quadrupeds" with the exception of the giraffe. The abundance of lions and crocodiles there astonished him.

Subsequent explorers such as Livingstone in 1866, Thomson in 1890, Glave in 1894, and Hoste in 1897 were impressed by the number of tracks and actual game which they saw. It is significant that Livingstone found wildebeest plentiful west of the Luangwa and even killed one, whereas the others did not mention this species at all. During the last decade of the nineteenth century, rinderpest, an epizootic, swept through the Luangwa Valley decimating large numbers of ungulates. This epizootic was severe particularly for buffalo and wildebeest. Hall (1910) a commissioner for three years at Nabwalya recalled that the Valley Bisa mentioned how plentiful the wildebeests were around their villages before this epizootic and Melland (1938), who arrived in the valley shortly thereafter, remembered that "the remains of buffalo that had succumbed were common."

Beginning in 1901, J. E. Hughes spent two years as assistant commissioner of the Nabwalya Division, which then comprised the upper Luangwa Valley. Hughes (1933) described his division as "a hunter's paradise of about 10,000 square miles." According to him all mammals were increasing rapidly in the valley. He describes the tall grass along the Luangwa River as "trodden into paths or tunnelled by rhino, elephant, hippo, or buffalo." In areas where the grass had been burned, he noted "many kinds of game," notably hartebeest, zebra, eland, impala, and reedbuck. On his tours throughout his district in 1902, Hughes killed eleven elephants and mentions that the Mufungushi River north of Nabwalya as "still good elephant country." According to Hughes, impala, puku, and reedbuck were common around Nabwalya.

If Hughes' (1933) recollections that reedbuck were numerous at the turn of the century near the Luangwa and at Nabwalya were correct, then this species has suffered a considerable reduction in range. None of the other hunters or administrators who hunted around or resided at Nabwalya during the same decade mentioned the occurrence of reedbuck in either place. Since Hughes' hunting notes were written many years after his experiences, he may have confused or exaggerated some of his impressions. Rather, it would seem that reedbuck have never been plentiful in the corridor, and that their habitat requirements are mostly met around Chifungwe Plains, nearer the base of the escarpment where they are still found in numbers today.

On 25 September 1905, Lyell, a big game hunter, left Fort Jameson for his shooting grounds in the valley northwest of Nabwalya. By the time of his return to Fort Jameson on 31 October, he had shot forty-nine head of game including three elephants, one rhino, two zebra, one kudu, seven warthog, two hartebeest, two reedbuck, three roan, fourteen puku, five waterbuck, six impala, one bushbuck, one klipspringer, and one crocodile (Lyell 1910). In another volume Lyell (1913) records shooting six hippo from a single pool of the Luangwa.

During September and October 1909, Letcher (1911), another hunter, encountered forty-nine elephants on nine separate occasions; the largest herd contained eight animals. He found buffalo tracks common in places but the few survivors of rinderpest were shy. Rhinoceros, roan, eland, and hartebeest were widely distributed but plentiful. Letcher estimated the average size of the eland herds he observed in the valley at thirty. He encountered between 150 and 200 roan antelopes, mostly in small herds ranging from eight to thirteen each. He saw two small herds of wildebeests and secured a trophy with difficulty. Female kudus were numerous but Letcher saw only six males. Of zebra, Letcher says "there are more zebra in North-Eastern Rhodesia than any other animals" and mentions their annoying habit of getting in his way when stalking more prized game. He found impala "plentiful" in the riverine belts, and also puku and waterbuck.

Between 1910 and 1940, there is little information on wildlife populations in the Munyamadzi Corridor. Because of sleeping sickness, the valley was closed to hunting and outsiders from 1912 to 1925 and 1927 to 1934 (Pitman 1934). What few references there are suggest that game was abundant.

In 1931, Captain C.R.S. Pitman, Game Warden of Uganda, was employed to make a faunal survey of Northern Rhodesia. His reports on game numbers, gathered from officials and through correspondence, suggest that all species in the valley were increasing, with the exception of the rhino which was "wickedly poached and undoubtedly decreasing rapidly" (Pitman 1934). Another species for which Pitman showed concern was the Cookson's wildebeest of Saidi's country. Elephant he found "abundant," buffalo "everywhere," klipspringer "noticeably plentiful among the Muchingas," and kudu "and the usual antelopes with the exception of the sable, abounded in the valley" (Pitman 1934). He suggested that Mpika District contained more game in greater variety than any other in Northern Rhodesia save possibly Namwala.

Pitman's survey, the results of which are contained in a lengthy publication, defies an easy summary. But one of his strong recommendations was that the greater part of the unoccupied land between the west bank of the Luangwa River and the base of the escarpment should be set aside as a game sanctuary. He suggested that a corridor be established between the two sections of this game reserve and that this area should continue to be occupied by its inhabitants. The two sections of the Luangwa Valley Game Reserve were established on 27 May 1938 (Denman 1957).

In 1934, C. Ross was appointed elephant control officer for Mpika District and in 1937 was credited with averaging seven elephants a month (Mpika District Notebook). But in the valley on 29 May 1938, while attempting to kill his 350th elephant, Ross was himself killed. Another elephant control officer, Langham (1953) mentions the hazards of elephant hunting in the middle Luangwa Valley, for according to him, "every elephant carries suppurating sores from muzzle-loader gun shots" and "the harassed herds charge as soon as the hated scent of man is sensed."

Although the Luangwa Game Reserves were created prior to 1940, proper staff for their protection was not assured until after the conclusion of the Second World War. One of the first game rangers stationed at Mpika was E. Poles. His term of service covered the period from 1946 to 1958 and to his credit belongs the first attempt to systematize the numbers of game sighted while on tour. In his reports, Poles was repeatedly of the opinion that populations of eland, roan, kudu, rhino, and hartebeest were decreasing and he suspected local hunters were responsible for reductions in their num-

I encountered eland infrequently and often at such a distance that determinations of age and sex were impossible. Since cows also bear horns, it is necessary to be close to a herd to differentiate between subadult males and cows. As far as I could determine eland herds were not decreasing, and hunting, irrespective of its influence on herd levels in the past, was not a critical factor during my residence at Nabwalya.

Hippopotamus. Hippopotami are large, weighing up to five thousand pounds, semiaquatic mammals which spend most of the daylight hours sleeping in deep river pools or lagoons. During the evening they exit from the water along well-defined trails and spread out into the surrounding bush to feed. In an evening these large beasts can consume large quantities of vegetation and where their wallows occur in the proximity of cultivated sites they do considerable damage to gardens. Toward morning, they return to their pools.

Hippos are gregarious and are encountered in large groups during the day but occasional solitaries are also seen. With the desiccation of most lagoons and a drop in the water level of the river during the dry season, the hippo population of the study area in 1966–67 was confined mainly to Chinama lagoon. In October 1966 I counted 161 hippopotami from one spot along the shoreline of this lagoon, and in November, 181. During the rains, hippos scatter and take up stations in the river and other lagoons.

Apparently populations of hippopotami are vulnerable to overhunting especially in areas where they are restricted to few wallows during the dry season. With legal protection from hunting, their population in some valley streams is now high (Attwell 1963; Ansell 1965) and may be "approaching maximum density" (Grimwood, Benson, and Ansell 1960).

Kudu. Kudu are shy and their fawny grey coats with faint white striping on the sides blend with the background of vegetation in which they are frequently encountered. Bulls are encountered individually and if in cover remain stationary unless approached closely. This behavior coupled with their solitary tendencies may account for the underrepresentation of males in my samples (47 adult males per 100 adult females). Females are more gregarious and often consort with other adult females and offspring. At Nabwalya kudu could not be considered plentiful; yet my counts suggest that they were holding their own in population numbers (68 juveniles per 100 adult females).

Puku. Puku are about the same size as impala but more substantially built. Puku are found in riverine savanna, closely associated with habitats flanking the river and lagoons. On the study area, they were found along the river, around Chinama and Mupete lagoons and infrequently in the open glade to the east of Ngala ridge. Puku were more frequently encountered at Chinama than elsewhere, and here I counted nineteen in a single herd. Elsewhere they were usually observed as singles or in small

groups of up to three. This species is more common along the Luangwa and Mupamadzi flood plains than on the study area. My observations on puku elsewhere within the corridor shows a more even sex ratio than that recorded at Nabwalya (79 adult males versus 56 adult males per 100 adult females).

Bushbuck. Although bushbuck (*Tragelaphus scriptus*) are common, their distribution is limited to thickets and dense brush; they are largely nocturnal. Whereas I saw bushbuck only eight times, I frequently noticed their hoofprints along paths and in the fields. Bushbuck are shy and wary by nature, and when alarmed they utter a sharp, deep bark similar to a dog's.

Lichtenstein's Hartebeest. These antelopes are rather large, up to four feet at the shoulders, with high shoulders and sloping quarters. They are readily recognized by their long "melancholy" faces. Both sexes bear horns which are heavily ringed and thick at the bases and rapidly attenuate to backfacing points.

On the study area hartebeests were seen on four occasions. Their favored haunts were in the hinterland, back from the river, and along and in the escarpment foothills. At Nabwalya I encountered them around Malanda hot springs and I was told that they were more common to the south. A small herd of hartebeest seen at Malanda on 8 December 1966, contained a young calf, and on 28 September 1966, I observed two young hartebeests unaccompanied by adults between Nabwalya and Kazembe.

Rhinoceros. At the turn of the century the black rhinoceros was "met with everywhere especially in the Muchingas from the slopes by Mpika to the foothills of the Luangwa side" (Mpika District Notebook). Although extirpated throughout much of their former range in Zambia (Grimwood, Benson, and Ansell, 1958), they seem to be holding their own in numbers in the Munyamadzi Corridor. Ansell (1969) estimates a population of forty-three to fifty rhino for the corridor—undoubtedly a minimal estimate. I saw rhino on five occasions around Nabwalya. Twice I observed them singly and three times in groups of two. One of these latter groups included a female and subadult.

The curiosity of rhinos is well known and when found without their almost continuous escort of tick birds they can be approached closely. Game ranger reports contain several references to rhinos which were shot when they charged caravans in the corridor. A hunter confided that he had shot one in the Ngala foothills in 1963 and I know of one that was killed in 1967 near Malanda. But because rhinos are infrequently encountered in the bush and I could detect no predetermined efforts to kill rhino, my impression is that they are not shot commonly nowadays.

Giraffe. Although I did not see a giraffe on the study area, there is evidence that giraffes are occasionally sighted as far north in the valley as