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**FIELD OBSERVATIONS OF LIVING AND DEAD ELEPHANTS
(INCLUDING SOME INTERPRETATIONS)
IN KENYA, UGANDA, AND ZIMBABWE**

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The following short observations on African elephants (Loxodonta africana africana) were made during November and December 1982 while on an extended research trip to Africa (Fig. 1). The observations given below were transferred from the field notebook as written in the field or immediately thereafter (edited at places). Notes and/or writings within parentheses were added for completeness and clarification.

J.S.
1982

JOURNAL

November 8 Mount Elgon National Park, KENYA.

On the way from Kitum Cave to Makingeny Cave and beyond. Altitude: 2,439 meters (8,000 feet above sea level = asl), cloudy, 19°C (66.2°F), no detectable wind. Forested area, thick vegetation in some places. Ground wet.

17:45 Fresh elephant footprints and dung on the road. Prints on road, then on grass. Dung temperature 33°C (91.4°F). Length of fore footprint: 42 cm. Length of fore footprint in grass-mud: 45 cm.

Notes: According to Benedict, F.G. (1936, The physiology of the elephant. Carnegie Institute of Washington, Washington, D.C., 302 pp.) the temperature of feces of an elephant is 0.7°C (1.3°F) higher than body temperature which is equal to urine temperature, 35.9°C (96.6°F). Therefore, the temperature of the feces we encountered was close to the body temperature of an elephant which had been here recently. According to Boyle, D. (1929, Height in elephants. J. Bombay Nat. Hist. Soc., 33:437) twice the forefoot circumference gave the estimated shoulder height in elephants. Using the average of the two measurements we estimated that the elephant which left the footprints behind measured approximately 2.75 meters (8.96 feet) at the shoulder (42+45=87 cm, 87/2=43.5 cm, 43.5x3.14=136.59 cm which is the circumference, 136.59x2=273.18 cm or 2.73 meters).

17:55 18°C (64.4°F), no detectable wind. Prints off the road to the right (downslope). Saw hindquarters of one elephant, mostly dorsum and tail, elephant starts to move slowly.

Notes: We followed the elephant partly because we wanted to identify the exact subspecies of the elephant in this part of the park. Ian Redmond who has been periodically studying the "salt mining elephants" (see Reference Nos. 2112-2114 in this issue) had initially thought that these elephants belong to the subspecies of the forest African elephant (L. a. cyclotis) or perhaps to a hybrid between the forest African elephant and the bush African elephant (L. a. africana).

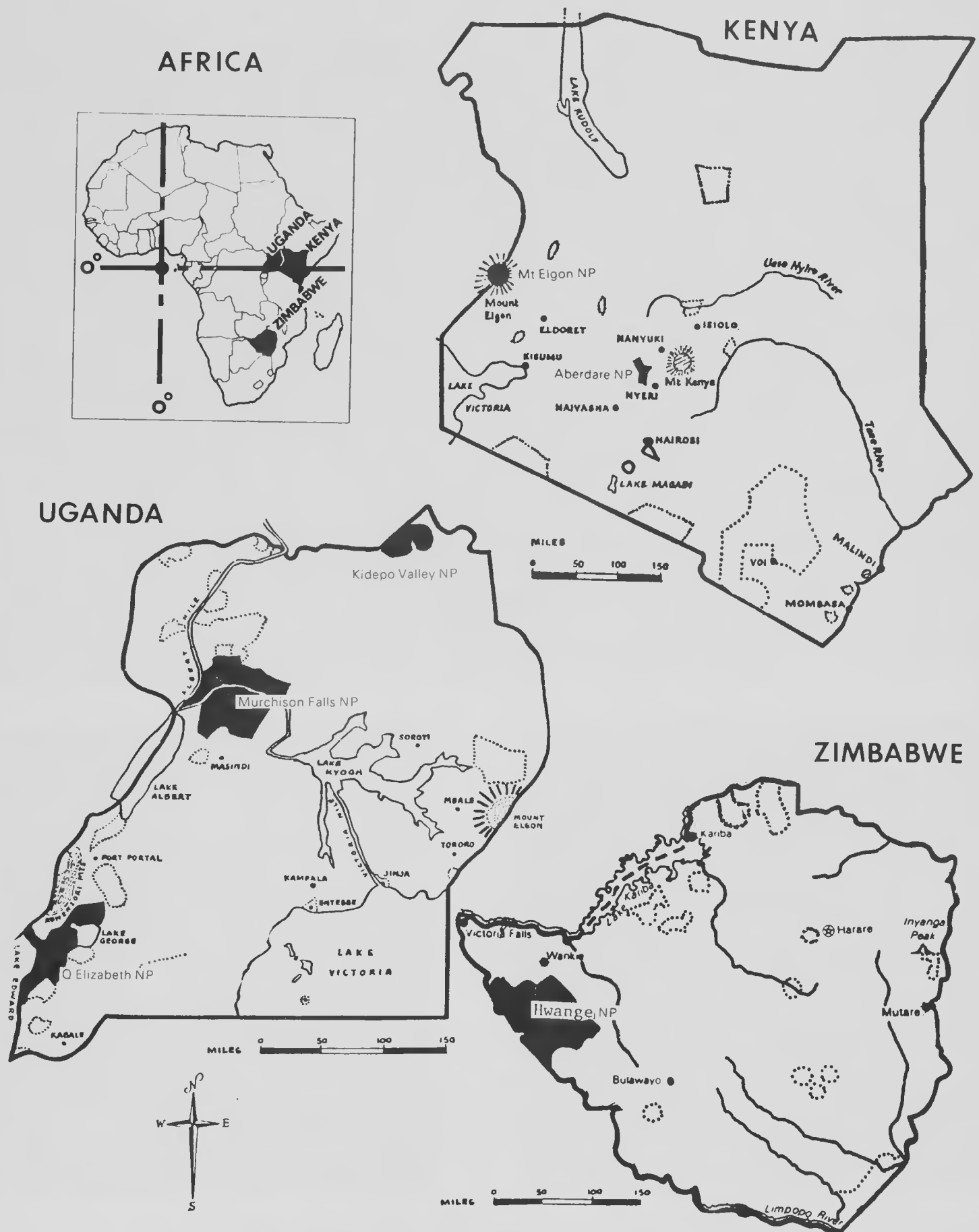


Figure 1. Maps of the African countries visited by the authors during November and December of 1982, showing the national parks (NP, darkened) mentioned in the text. Note that in Zimbabwe, Hwange NP was formerly called Wankie NP. Other parks and game reserves (dotted lines) are included (Layout by J. S. Grimes).

- 18:00 Elephant disappeared in the bush.
- 18:05 Thick bush. Approached on road, saw parts of body and head, large tusks - about one meter long (about three feet). Trunk raised up in the air, possibly a bull. Close to him, about 15 meters (about 50 feet), feeds, seems not to notice us. Heard sounds of gas release.
- 18:10 Elephant noticed us, turned around facing us. head up, tail up, trunk down, ears spread (Fig. 2).
Notes: We could clearly see that his left ear had a large hole at about the center, closer to the margin. Based on the shape and size of the ears, the angle of protrusion of the tusks from the head, and the overall shape of the elephant's head and body we concluded that it was a bull bush African elephant (L. a. africana). Photographs that Ian Redmond took of the "salt mining elephants" in Kitum Cave also depict these elephants as L. a. africana.
- 18:12 Elephant walked backwards and sideways then continued moving. We followed him at a distance but keeping eye-contact.
- 18:15 Becoming darker. Female bushbuck (Tragelaphus scriptus) crossed the road in front of the elephant. Elephant not responding/interacting. We continue to follow him. Footprints in wet ground measured - front: 49 cm long, back: 56 cm long.
- 18:25 Dark falling. No wind. Slight rain. Elephant rests its trunk on left tusk and then on right tusk. Voices of monkeys heard in the background. Saw male colobus monkey (Colobus guereza= C. abyssinicus).
- 18:27 Spotted hyaena (Crocuta crocuta) appeared from the bush and was about to cross the road diagonally close to the elephant. Elephant extended its ears, wide spread; hyaena ran to the right of us and did not cross the road. Colobus monkeys made four sound bouts, each one lasted five second. Elephant proceeded on the road.
- 18:37 Dark. We are about 30 meters (about 100 feet) from the elephant. Elephant dug earth with tusk and sprayed on back. Penis extended a bit. Elephant appeared to be eating some of the dug-out soil and continued walking on the road.
- 18:45 We approached digging site which was diagonally across the road; it measured 110 cm long, 55 cm wide, and 25 cm deep.
- 18:50 Elephant walked into the bush. Heard noises of branches breaking. Our approximate following distance - 1 km (0.621 miles).

November 9 Makingeny Cave to Mt. Elgon Crater (caldera), Mount Elgon National Park, KENYA.

Altitude: 3,109 meters (10,200 feet asl). Forested area. [In the car with us: Ian Redmond, Park Warden J.M. Wamae and six park rangers - We were on the way to the "Maji Moto" (=Hot Springs) by the Suan River.]

05:00 Elephant footprints and dung.

Notes: Sikes (1971:117-118, The natural history of the African elephant. Weidenfeld and Nicolson, London, 397 pp.) related her own encounters with elephants "below freezing point on Kinangop Mountain in Kenya" and noted "fresh evidence of elephant herds at over 10,000 feet on mount Kilimanjaro in Tanzania." Sikes also included the observations of Stockley (1953) who sighted elephants "at over 15,000 feet in Kenya - i.e. above the snow line."



Figure 2. Top: A lone bull African elephant (Loxodonta africana africana) on the eastern slopes of Mount Elgon, Mount Elgon National Park, Kenya. Bottom, left: First spoors water-filled footprints and dung (note the thermometer in bolus) of the elephant shown above; right: "Elephant noticed us, turned around facing us, head up, tail up, trunk down, ears spread." All photographs in this article are by J. Shoshani.)

November 15 The Ark (Safari Lodge), Aberdare National Park, KENYA.

Altitude: 2,286 meters (7,500 feet asl), montane forest. An artificial waterhole and salt-licks attract many wildlife species that can be easily viewed from a short distance. At dark the area is artificially lit.

19:10 African buffalo (Syncerus caffer) and black rhinoceros (Diceros bicornis) on location. Subadult elephant (L. a. africana) approached the salt-lick.

19:15 At the hideout. Environmental temperature: 15°C (59°F). Elephant is observed from about 15 meters. A young bull, approx. 10-15 years old, tusks about 40-50 cm long (left is sharp), penis extended, tail moves slightly. Elephant uses trunk to pick up mud in small to large clumps and to insert them into mouth. Count of 44 bouts. During this first round of eating the elephant used his left foot a few times to dig or loosen the soil/mud. Intermittently we heard frogs croaking at the pond. Steam came out of the elephant's mouth; his ears had no cuts. A common genet (Genetta genetta) came in and out of the bush. Elephant moved to buffalo site and returned to eat from 'his' spot.

19:26 Elephant uses left foot to dig clumps of about a fist-size, and ate them. Count of 20 bouts. Tail swayed. Elephant used left and right feet interchangeably to dig. Count of 30 bouts. Tail still.

19:45 Temperature: 13°C (55.4°F). Elephant uses right tusk to dig and collects mud from it. Count of 31 bouts. Elephant digs with both tusks and eats mud. count of 13 bouts. A white spot was observed close to the eye of the elephant. An Egyptian mongoose (Herpestes ichneumon) was seen in passing. Elephant cleans tusks, sucks trunk, very close to us (about 5-7 meters), shakes head, licks nostrils.

20:00 Elephant left feeding site. Three giant forest hogs (Hylochoerus meinertzhageni) and a rabbit (or a hare) were seen at the bush.

Notes: Each trunkful (1 bout) that the elephant ate weighed about 100-150 grams. This means that $(44+20+30+31+13) \times 100$ grams = 13.8 kg (30.4 lbs), or 138×150 grams = 20.7 kg (45.6 lbs). That is, the elephant ate between 13.8 kg and 20.7 kg of salty soil in 45 minutes. We greatly appreciate the cordial hospitality extended by J.F. (Sam) Weller who enabled us to observe many wildlife species including the elusive bongo (Boocercus eurycerus). Sam also taught us how to produce a sound similar to "elephant belly rumbling." The sound is made by cupping one's hands with the thumbs side by side to form a small opening. Next, thumbs are brought close to the lips, a deep breath is taken and air is blown into the cupped hands while the person vibrates his/her lips. Sam and we made this "elephant belly rumbling" close to elephants in the field, some reacted (by turning their head toward us, raising their trunks and extending their ears) while others seemed either not to hear us or to be non-responsive.

November 29 Queen Elizabeth National Park, UGANDA.

Notes: Queen Elizabeth National Park (QENP) was the original name given when the park was established in 1952. During the 1970's the park's name was changed to Rwenzori (or Ruwenzori) National Park (Ruwenzori=Mountain of the Moon), and during the 1980's the original name, QENP, was re-established. The park (2,000 km² or 767 mi²) is located in western Uganda, sharing its borders with Lake Edward and

Lake George, and has a variation in altitude from 600-5,000 meters (about 650-5470 yards asl). While preparing for our excursion at the Warden's office, Mweya Safari lodge, we heard the following radio message between Kampala and Kidepo Valley National Park: "An elephant charged and killed a ranger near Apoka in Kidepo Valley National Park." (See detail on this incident in the notes of December 7.) We drove with the landrover for an excursion around the park. In the car with us were: Gabriel Akorio, Henry Balyebuga, Abukaker Bukonya, and Antoni Opika.

10:45 Standing with landrover on the north side of the Kazinga Channel (a natural waterway joining Lake George and Lake Edward), QENP.

Slight southerly wind. Partly cloudy. Temperature 26°C (78.8°F). Spotted a herd of elephants (L. a. africana) at the southern shore moving westward and close to the water. We are about 800-900 meters (875-985 yards) from the herd. 23 elephants, one of which is less than one year old. Hippopotami (Hippopotamus amphibius) and fish eagle (Cuncuma vocifer) are heard. 14 elephants by the water, rest are spread about 300 meters apart - feeding. 14-15 out of 23 have tusks, about 50-80 cm long (1.5-2.5 feet). All look in good shape, dark grey/brownish in color.

11:00 Flap ears gently, not all. One elephant into water.

11:05 Six more elephants in water, young not (Fig. 3).

11:10 Young and adults splashing water all over, two others scratching hindquarters on channel's bank. A large male with relatively long tusks (hereafter the "large male") that was standing at about 150 meters east of the herd, began to approach the herd; later he entered the water. (It is plausible that this large male was not part of the herd but was at the waterfront or close by before the herd arrived.)

11:15 Only four elephants in the water, including the large male.

11:20 Two elephants in the water, one of which is the large male. Herd in slight movement spreading eastward and southward up the slopes of the channel. One male (?) on the eastern periphery of herd seen eating soil, aided with tusks and left foot to dig.

11:25 Elephant stopped eating soil. 26°C. The two elephants in water seem to engage in play or intercourse behavior.

11:26 One (the male) on top of the other (a female), head (of male) above water on top of other elephant. Back in water, submerged.

11:28 Once more, an attempt in the water (?), and big splash (after the male returned to the water).

11:32 Another attempt and soon after into water, both disappeared. Another attempt (?) (Fig. 3).

11:34 Another attempt. This time the head of the male was held high above the water, his tusks were directed almost straight upwards, his forelegs were on her hindquarters; the female was standing in water that reached about her chin level. They remained in this position for about 30 seconds.

11:36 Elephants are separated a few meters apart. A hippo is seen at about 20 meters to the left. The herd in bush, three elephants close by.

11:40 Head of male and tusks and almost all ears out of water. Female's head in and out of water. Both are close to shore. 26°C. Hippo sound most of the time, loud. We also heard the elephants very clearly and relatively loud.



Figure 3. Top: standing on the north side of Kazinga Channel (QENP, Uganda) spotted a herd of elephants (arrow) approaching the water. Middle: about 15 minutes later. Bottom: Mating (?) in the water. Note that the back of the male's head is directed towards us and slightly to the left of the picture, the female is not clearly seen.

11:45 A small canoe with three people pass the elephants, they are still in the water, slowly approaching shore.

11:51 Out of water, female rubbing her hindquarters on the channel's bank, male does the same on the same spot (after the female moved). Elephants separated and disappeared in the bush.

Notes: At this point we could clearly see the differences in the sexes as illustrated in Laws (1966), Sikes (1971), and Hanks (1979) - see Reference Nos. 676, 331, 946, respectively, in previous issues of Elephant: the head-profile of the male was rounded and sloping and that of the female was angular; she had no tusks.

According to Sikes (pers. comm.) and Eltringham (pers. comm.) elephant mating in water is not rare. Levin [Levin, A.H. 1964. Elephants mate in Orpen Dam. *Afr. Wild. Life*, 18(3):202-203.] provided four photographs of elephants mating in the water. While on the launch trip on the Nile in Murchison's Falls National Park (see details on December 3), the boat driver Ebrahim Okello told us that he saw elephants mating in the water at the beginning of November this year (1982).

12:00 Continue excursion towards Kikorondo Crater Area and back to Mweya to Safari Lodge, QENP.

17:30 Sunny, temperatures varied between 24-28°C (75-82°F). Tall grass (reaching almost to top of the Landrover) grew on some of the roads. We saw no more elephants but a road-sign and a vivid reminder that they roamed here in the past (Fig. 4).

Species seen (numbers in the high range are approximate):

Mammals

Uganda kob (Kobus (=Adenota) kob thomasi, 600 total)

wart-hog (Phacochoerus ethiopicus, 10)

common bushbuck (Tragelaphus scriptus dama, 20)

Defassa waterbuck (Kobus defassa, 7)

Uganda black buffalo (Syncerus caffer radcliffei, 5)

common hippopotamus (Hippopotamus amphibius, many)

rodents (unidentified, 2)

Crawshay's hare (Lepus crawshayi, 1)

insectivorous bats (Taphozous mauritanus and/or Lavia frons, a few, in the dining room)

Birds

African black kite (Milvus migrans)

African fire finch (Lagonosticta rubricata)

crowned plover (Stephanibyx coronatus)

francolin (Francolinus sp.)

bateleur eagle (Terathopius ecaudatus)

African fish eagle (Cuncuma vocifer)

white-browed coucal (Centropus superciliosus)

Reptiles

blue-bodied agama (Agama atricollis)

We thank all the staff (some mentioned before), especially Innocent Bisongwa for helping us to obtain a vehicle and making these observations possible.



Figure 4. This sign had much meaning prior to 1970 when elephants were roaming this land almost undisturbed. In 1982, the tall grass served as a silent testimony to their absence in this part of Queen Elizabeth National Park. (Note: In the picture, on the sign, the name "Rwenzori" was painted over; the former name will soon be restored.)

December 2 Paraa Lodge, Murchison Falls National Park, UGANDA.

Notes: Murchison Falls National Park (MFNP) was the original name given when the park was gazetted in 1952. During the 1970's the park's name was changed to Kabalega Falls National Park (after an admired king of one of the pre-independence kingdoms in Uganda) and during the 1980's the original name, MFNP, was re-established. The park (3,900 km² or 1,557 mi²) is bounded on the west by Lake Albert and the Albert Nile and is bisected by the Victoria Nile, with the highest elevation at 1,292 meters (4,236 feet asl, of Rabongo Hill). Paraa ("place of the hippo") Lodge is on the north shore of the Victoria Nile about 11.5 km (7.1 miles) from Murchison Falls.

- 23:30 Trumpeting elephants heard just outside our veranda (third floor, room no. 68). Jumped out of bed (we were the only guests in the lodge which can hold 100 people).
- 23:35 Moonlight (moon was almost full), partly cloudy, dense vegetation to close by the Nile River, about 400-500 meters away. Temperature:
- 23:50 25°C (77°F). One male with tusks, less than one meter long feeding about 20 meters from the lodge. Four other elephants seen at about 100 meters (100 yards) away, close to the dining room. All elephants stayed for 15 minutes. Only noises of branches breaking were heard.

December 3 Launch Boat Trip on the Nile from Paraa Lodge to Murchison Falls, MFNP, UGANDA.

On the boat with us are: James Obua, Terensio Odaga and Ebrahim Okello (the boat driver).

09:30 Sunny, 26°C (78.8°F). Start trip at north shore of the Nile, heading east towards the falls. River flows fast, saw many whirlpools in clockwise and counterclockwise direction (mostly the latter). Dense vegetation, thicket with mixed trees away from shores, waterlilies and grasses and other water plants close to shore. Hippopotami plentiful, birds many, some could be easily identified.

09:40 Sunny, 28°C (82.4°F), no detectable wind. Five elephants (L. a. africana) on the northern slope, flapping their ears regularly. A herd of elephants (about 20) with young on northern slope. Forage but move slowly away from river. Elephants appeared dark grey in color, and some had tusks about one meter (one yard) long.

09:50 **Notes:** For the next hour and a half we cruised slowly observing to wildlife in this rich ecosystem. Average temperature in the shade at 11:15 10:05 was 29°C (84.2°F), and in the sun 36°C (96.8°F).

Species seen: Mammals

Hippopotamus with young	Uganda black buffalo
Jackson's hartebeest	Defassa waterbuck
Vervet monkey	

Birds

Goliath heron	Egyptian goose
Marabou stork	Spur-winged plover
Woolly-necked stork	Jacana (lily-trotter) on hippo
Wood ibis (yellow-billed stork)	

Reptiles

Nile crocodile	Monitor lizard
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11:15 Lots of white foam on surface of water especially on the south shore of the river. Both river banks (slopes) are steeper and closing, covered with dense vegetation. Murchison Falls (Fig. 5) seen upstream for the first time. Temperature in the shade: 32°C

11:20 Arrived at the falls (a 40 meter = 40 yard plunge). Water temperature: 25°C (77°F).

Notes: Park staff on the boat drew our attention to the fact that the water level fluctuated regularly. We measured the change on the rocks and found that every 75 seconds the water level rises by 22 cm and then returns to normal.

African darter (Anhinga rufa) flies close by.

11:50 Return trip.

12:00 Nile water temperature: 24.5°C (76.1°F), air temperature: 29.5°C (85.1°F). No detectable wind.

12:10 Baboons (Papio anubis) on northern shore. A herd of elephants, 29 or 30 individuals, on northern shore, about half of them had tusks approximately 1 meter (1 yard) long. Two young about one year old, and two or three about three years old. Elephants flapping their ears regularly at a rate of 25-30 flaps per minute (measured for two elephants). It appeared that some of the elephants bathed in the water because their legs and up to their mid-bellies and ears were dark grey while the upper parts of their bodies (dorsum and top of head) were light grey.



Figure 5. Murchison Falls (that "defy description") as seen from a boat launch on the Victoria Nile, MFNP, Uganda

12:35 28°C (82.4°F). Floodplain of the river on the northern shore is wide while the one on the southern shore is narrow and the bank steeper. Terminalia seen on the northern shore. Eight Jackson's hartebeest sitting, on the ground, in the sun, facing different directions (allows them to observe incoming animals from as many directions as possible, perhaps). A wart-hog (Phacochoerus aethiopicus) passed close by the hartebeest, no apparent movements.

12:50 Arrived at the starting point of our trip.

13:00 Three young elephants seen at the park's staff quarters, two males and one female, all about 4-5 years old, tusks about 30 cm (1 foot) long. We were told that these three elephants are regular visitors, unpredictable, and not to approach too closely to them.

Notes: A total of 58 elephants was seen during the boat launch trip. All looked healthy, some with young. All were observed on the northern shore of the Victoria Nile. This is a relatively large number of elephants observed within 3½ hours, considering the time of the day (when elephants are usually less active) and the relatively high environmental temperature (28°C or 82.4°F) which was manifested in the elephants' relatively fast rate of ear flapping [see Buss and

Estes (Buss, I. O, and J. A. Estes. 1971. The functional significance of movements and positions of the pinnae of the African elephant, Loxodonta africana. J. of Mammalogy Vol. 52, No. 1:21-27) for comparisons]. The tusks of these elephants were about 1 meter (1 yard) long or less. We were told by the park staff that this is about the average length of tusks of elephants in the MFNP, an average which is much smaller than the average tusk length during the 1950's and 1960's. A beautiful oil painting hangs in the dining room of Paraa Lodge and depicts a large tusker, "Lord of Mayor of Paraa", with two other elephants; this photograph-quality painting, by Keith Shackleton, 1959, was a vivid reminder of the large-tusked elephants in the past (see also Fig. 6 for comparison).

December 3 On an Excursion from Paraa to Pakwach and back to Paraa Lodge (MFNP, UGANDA).

- 14:45 Sunny, 27°C (80.6°F), grassland, sparse woodland. Four elephants seen at about 800 meters (875 yards) west of Paraa.
- 15:34 An Uganda oribi (Ourebia ourebia aequatoria = O. ourebi) was disturbed in open grassland.
- 15:50 An aardvark's (Orycteropus afer) burrow close to the road. Opening of burrow measures approximately 60 cm in diameter. Many Jackson's hartebeests and black-bellied bustards nearby.
- 16:00 Arrived at Buligi camp - changed guards. Passed by Pakuba Lodge - unused, partly demolished in the war, mostly looted.
- 17:05 A large herd of elephants, about 200, in open savanna. Many cattle egrets (or buff-backed herons, Bubulcus ibis) were also seen associated with the elephants.
- Notes:** This group of elephants was identified by park rangers as the "Tangi Group" (after the Tangi River). We were also told that in the past, elephants in this part of the park were observed to move in large groups, up to 400 individuals in a herd.
- 17:15 Thirteen Uganda or Rothschild's giraffes (Giraffa camelopardalis rothschildi) seen in open savanna, widely spaced, moving west.
- 17:15 A group of six elephants feeding.
- 18:00 Arrived at Pakwach Camp, and were on our return to Paraa.
- 19:30 Dark. Eight lions (Panthera leo), six were young, about six weeks old, seen on the dirt road. Also seen at darkness: East African hare (Lepus capensis), spotted hyaena (Crocuta crocuta), spotted-necked otter (Lutra maculicollis) and some unidentified rodents.

Notes: The 273 elephants (L. a. africana) that we observed during our one and a half day visit to MFNP were spotted from a car or a boat. This number represents approximately 27.8% of the estimated elephant population of the park north of the Nile (see Douglas-Hamilton's article "Back from the Brink" in African Elephant & Rhino Group Newsletter, April 1983, Number 1:13, for 1982 census of elephants in Uganda). At park headquarters we were shown the various equipment used by poachers; these included: guns, spears, traps, wire snares and a harpoon with a float made from the Ambath tree. We are greatly indebted to Chief Park Warden, William A. Ocira, and Head of Anti-poaching Unit, Meshach N. Adupa, for their hospitality and for helping us make the best use of our short visit.

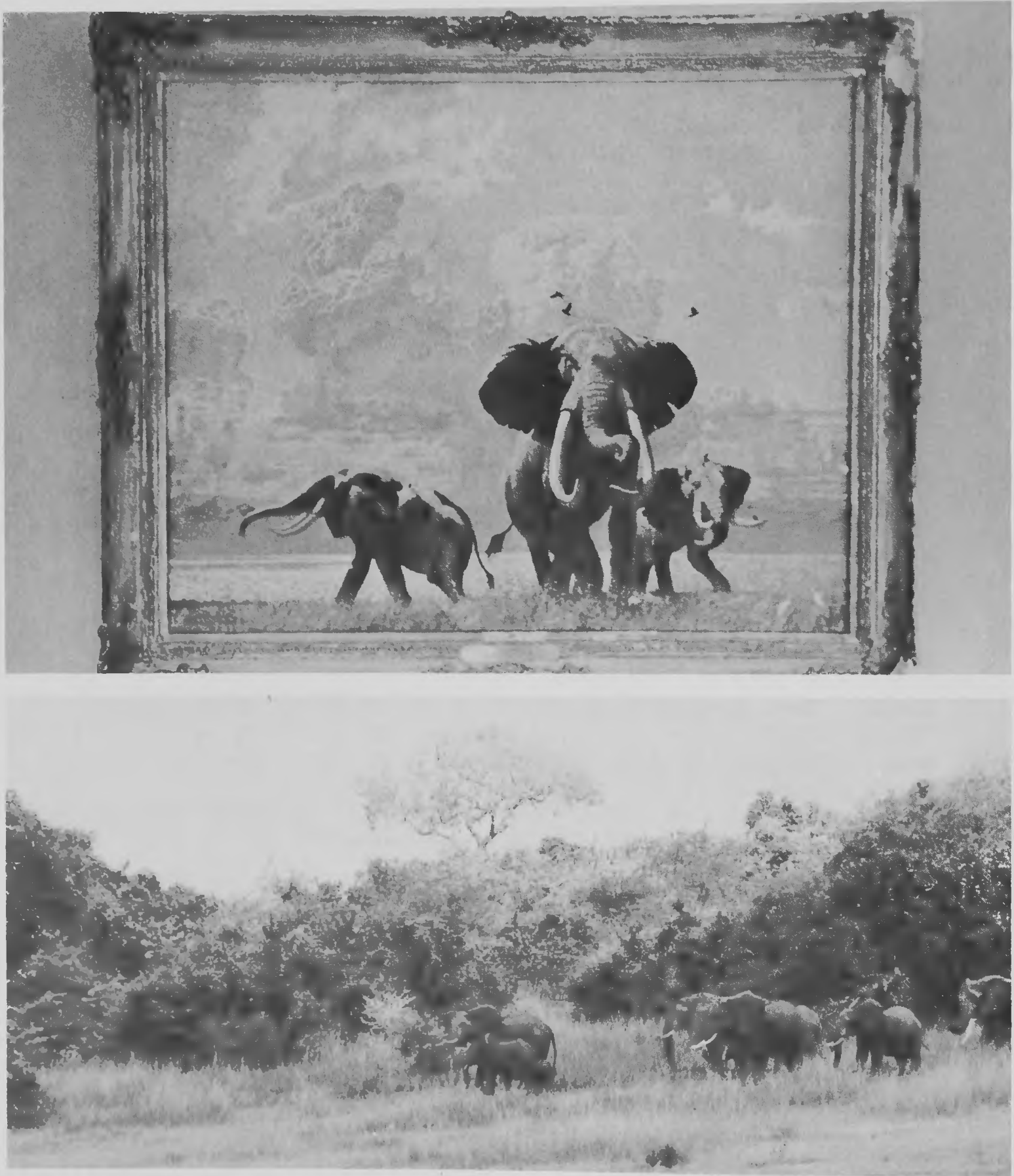


Figure 6. Top: The "Lord of Mayor of Paraa", an oil painting by Keith Shackleton, MFNP, 1959. This beautiful painting was left unlooted, hanging in the dining room at Paraa Lodge during the retreat of Idi Amin's soldiers in 1979. The center tusker is one of a breed of large tusked elephants no longer seen in Uganda due mostly to poaching. Elephants remaining have much smaller tusks (compare to bottom figure). Bottom: Elephants on the northern shore of the Victoria Nile, December 1982, MFNP, Uganda.

December 7 Apoka Rest Camp and Vicinity, Kidepo Valley National Park, UGANDA.

Notes: Kidepo Valley National Park (KVNP) was established in 1962. The park's name was not changed during the 1970's as were those of the other two parks mentioned earlier. The park (1,400 km² or 486 mi²) is located in the northeast, bordering Sudan to the north and the Karamoja District to the south. Altitude of Kidepo Valley basin ranges between 915 meters (3,000 feet) and 1,220 meters (4,000 feet) and some of the mountain peaks rise to over 2,740 meters (9,000 feet) asl. Park Chief Warden, Alfred Labongo, informed us about the current wildlife situation in the park and particularly warned us "not to get too close to elephants, they are wild over here." He reminded us of the writing above the main gate to the park "Kidepo Valley National Park. You enter this park at your own risk." Labongo also told us of the incident a week ago when a park ranger, Kidela Charik, was killed by an elephant when he (Charik) was walking at night in an open field and crossed the elephant's path. Postmortem examination showed tusk wounds below the left scapula and through the lungs.

14:15 Left the Rest Camp for an afternoon excursion. Open grassland with sparse trees. Slight wind, partly cloudy, 25°C (77°F). Defassa waterbucks, 25 females and one male, and Abyssinian ground hornbil (*Bucorvus abyssinicus*) were seen close to camp.

14:30 Ten elephants spotted in tall grass in the far distance. Other species seen: black-backed jackal (*Canis mesomelas*), Ugandan (or Rothschild's) giraffe, red-knobbed coot (*Fulica cristata*) and chicks.

15:00 Arrived at a site (about 1.5 km from Katurum Lodge) where a young male elephant was speared by poachers 37 days ago (on November 1, 1982). Open grassland, about 1.7-2.0 meters tall. We were told that the elephant had tusks that were about 50 cm (1.5 feet) long and about 0.5 kg each. Nothing remained of the soft parts of the elephant. Six (6) pieces of the cranium and rib parts were found as far as 20 meters away from the spot where the elephant was found dead (bones apparently carried away by scavengers). One of the cranium bones (the maxilla) had the molars still in place. The molar in wear had eight plates, and measured 11.0 cm long and 48 mm wide. Therefore, the foramen mentale formula extrapolated from the upper molar (after Sikes, 1971:174-177), would be FM:IV₃ (an estimated age of 10-12 years). Stomach remains of the elephant were found, and easily identified, by our guides, as the seeds of the Ekorote tree (a local name, humans also eat the fruits of this tree). Also found nearby: vulture feathers and elephant droppings.

16:00 Arrived at a site (Narus Valley about 2.5 km from Apoka Lodge) where an adult elephant was shot by poachers 56 days ago (on October 13, 1982). Open grassland, about 0.5-1.5 meters tall. Nothing remained of the soft parts of the elephant. Bones of the elephant were scattered (apparently by scavengers) as far as 39 meters away. Epiphyses on long bones were not fused and the end of most of them were chewed (mostly by hyaenas and jackals), some deeply in the center of bone as deep as 14 cm. Bones found included: cranium (not all bones fused), mandible (condyles chewed), parts of vertebrae, remains of 22 ribs, scapulae (also chewed), one humerus, right ulna, ½ (right) pelvis, and two femora. The left anterior lower molar had

eight plates (a few plates appear to be missing in front of tooth) and measured 14.0 cm long and 62 mm wide. Therefore, the foramen mentale formula (after Sikes, 1971:174-177) is FM:V₅ (an estimated age of 25-30 years). No stomach remains of the elephant were found. Vultures' feathers and elephants' droppings found nearby.

December 8 Viewing Game From the Veranda, Dining Room, Apoka Rest Camp, KVNP, UGANDA.

- 06:45 19°C (66.2°F), slight southern breeze. The sun just rose, the moon to half full in mid sky, bright outside. Open grasslands and meadow stretches in the foreground, reddish mountain range at the horizon.
- 07:10 Waterbucks (Kobus defassa) by camp, on the plains seen and/or heard: francolin (Francolinus sp.); East African crowned cranes (Balearica regulorum); superb starling (Spreo superbus); male red-cheeked cordon-blue (Uraeginthus bengalus); and a lion (Panthera leo).
- 07:15 A herd of about 20 elephants (L. a. africana) in open grassland at about 2 km away towards the mountains (west), and moving northeast.
- 07:20 The elephant herd split into two subgroups.
- 07:30 All elephants as one group move fast north in the yellow tall grass, only the upper parts of their bodies seen, every so often a tusk is glowing in the early morning sun.
- 07:40 Elephants stopped moving; about half of them were turning south and the other half turning north.
- 07:45 Each half continued in different directions, spread apart.
- 07:55 Clear sky, sunny, 24°C (75.2°F). The two subgroups are re-united and all are moving in one direction - northward. They are in tall grass in the sun.
- Notes:** The grass has grown much due to the prolonged rainy season (into November and early December). Usually in Uganda it rains heavily during March-May and October-November.
- 08:15 Spotted another herd of elephants (hereafter herd No. 2), about 1 km south of the previous herd (hereafter herd No. 1). Herd No. 2 consisted of approximately 10 individuals four of which were young, spread about 100 meters apart in the yellowish tall grass. Herd No. 1 not seen, perhaps behind a clump of trees.
- 08:45 32°C (89.6°F) in the sun. Elephant herd No. 1 not seen yet. Elephant herd no. 2 moves northward fast. A third elephant herd (No. 3) was spotted under a tree, at about 750 meters southwest of herd No. 2.
- 09:45 Left for a safari towards Kidepo Valley, clear sky, sunny, 26°C (78.8°F). Species seen:
- 10:00 Uganda oribi, Bohor reedbuck and four Rothschild's giraffes were seen.
- 10:20 28°C (82.4°F). Eight adult elephants and one baby in shade of Ekorote trees and grass, move east. Another group of four individuals, about 200 meters away.
- 10:35 Saw another six elephants four with piapiac (Ptilostomus afer) birds. to Arrived at Lokayot River and observed the following:
- 10:45 a striped ground squirrel (Xerus erythropus)
bateleur eagle (Terathopius ecaudatus)
and two klipspringers (Oreotragus oreotragus).
- 11:00 Terminalia and Ekale tree (local name) on left side of road, Tongabore to Valley in background. 30°C (86°F). One male (with bright red neck)
- 11:30 and two female (with grey neck) ostriches (Struthio camelus)

- rothschildi) running in open grassland. A lilac-breasted roller (Coracias caudata) seen. A herd of Grant's gazelles (Gazella granti brighti) were seen in association with Jackson's hartebeests.
- 11:45 Arrived at Kidepo Valley, at a site where an adult elephant was killed by poachers 13 years ago (in December of 1969). Open dry habitat, rocky to small stones with short to medium grass, scrub with some scattered trees. A few hills close by with mountains (mostly single, not range, Fig. 7) at a distance. Overall tones of brownish to reddish colors dominate. Clear sky, sunny, 30°C (86°F). Most of the bones were present and concentrated. On the cranium the rostrum was cut (with a sharp object) and the tusks were removed. The mandible weighed 25.4 kgs (about 56 lbs). Part of a stylohyoideum (one of six bones of the hyoid apparatus) was also found. All cervical (7), thoracic (21), lumbar (?3), sacral (4, fused) vertebrae, 21 pairs of ribs, and 4 sternebrae were found. All long bones (including scapulae and pelvis) were present. Most epiphyses on long bones are fused, a crack at the epiphyseal plate seen on some of them (appears to be a crack resulted from exposure to differential temperature rather than age-dependent). Epiphyses on distal end of ulnae not present, also epiphyses on vertebrae not fused. Left humerus distal end broken. Scapulae (when tested on the approximately levelled surface of the back of the landrover): they balanced between the infraspinous and supraspinous fossae (see Elephant, 2(1):41). The right femur weighed 21 kgs (46.4 lbs), and when tested on the back of the Landrover, the head remained raised up above the surface while the condyles touched the surface (in Elephas maximus the head of the femur tilts and touches the surface when the bone is laid on its posterior side). On the pelvis the acetabular fossa (the socket where the head of the femur fits) measured 16.2 x 15.5 cm, and the obturator foramen (the large opening next to it) measured 17.7 x 10.5 cm. Some footbones were found 10 meters away from the skeleton. In the mandible, the left anterior molar had six plates (some plates appear to be missing in front of tooth) and measured 14.5 cm long and 84 mm wide; another tooth developing behind. Therefore the foramen mentale formula (after Sikes, 1971:174-177) is FM:V7 (an estimated age of 35 years). Most likely a male.
- 12:30 On the return trip to camp, observed the following:
to red-billed hornbill (Tockus erythrorhynchus), brown parrot (Poicephalus
- 14:15 meyeri), and termite hill column (reddish brown in color) measuring 3.32 meters tall.
- 14:30 At camp, in the museum we were shown various "tools" confiscated from poachers. We were also shown a door of a Landrover with a note attached that read, "This door was damaged during the filming in this park (Kidepo Valley National Park) 'Two Men of Karamoja'." (Note: The first public showing of this movie was on 25 April 1974 and in that movie a scene depicts an elephant smashing into the door of the Landrover.)

December 9 Viewing game from the Veranda, Dining room, Apoka Rest Camp.
(See description of habitat in previous day.)

06:45 A total of 39 elephants, four of which were young, were
to observed. Most of the species that were observed from the



Figure 7. "Arrived at Kidepo Valley (KVNP, UGANDA), at a site where an adult elephant was killed by poachers 13 years ago (in December of 1969)."

09:10 veranda yesterday morning were seen and/or heard today, and we also spotted the following species:
 black-headed bush shrike (Tchagra senegala),
 fiscal shrike (Lanius collaris),
 purple glossy starling (Lamprocolius purpureus),
 tufted guinea-fowl (Numida meleagris),
 red-eyed dove (Streptopelia semitorquata),
 black-backed jackal (Canis mesomelas),
 Burchell's zebra (Equus burchelli), and
 Jackson's hartebeast for Kongoni (Alcephalus buselaphus jacksoni).

Notes: Before we left the park Chief Warden Alfred Labongo informed us that the Sudanese had already settled some areas adjacent to the park in the south. This means that it would be close to impossible to extend the Kidepo Valley National Park into Sudan in order to ensure a better conservation for the wildlife. We conveyed to the staff at the park that although they are isolated geographically, they are not isolated morally; many people around the world support them and appreciate their service to the parks in helping to conserve one of the world's richest wildlife sanctuaries. Readers who wish to help

(donations or otherwise) in conservation of wildlife in Uganda, Please write to: PEOPLES TRUST FOR ENDANGERED SPECIES, UGANDA APPEAL, 19 Quarry Street, Guildford, Surrey GU1 3EH, ENGLAND.

December 15 From Harare (the capital) to Wankie (now Hwange) National Park, ZIMBABWE (formerly RHODESIA).

10:18 The plane landed at Kariba airport, cloudy and raining. Five elephants (*L. a. africana*) seen from the air among bushes just prior to landing. At the little shop, among other items for sale, they had ivory bracelets in one piece for Zimbabwean \$44.98 (=US \$48.37), and ivory earrings for Zimbabwean \$8.80 (=US \$9.46). From Kariba after another 1 hour of flight we arrived in Hwange National Park Airport; the park is 15 minutes drive away.

Hwange National Park (HNP), ZIMBABWE.

Notes: The HNP (14,540 km² or 5,614 sq. miles, the largest in the country) was gazetted in 1949, it is located in the northwest and bordered by Botswana. The elephant population in the park and vicinity is roughly 20,000 and there is an exchange with Botswana's elephants. Culling operations take place periodically. The habitat is mostly woodland, open woodland and sand-scrub with varied topography. The rainy season stretches from November to April.

17:30 A late afternoon game drive, Main Camp area, HNP.

to With us is Kit Hustler, one of the staff in the Park.

19:45 Sunny, clear sky, 25°C (77°F when started), pleasant. During the 2 hour and 15 minute trip we observed 14 species of mammals, 16 of birds, and 2 of reptiles. No elephants were seen. We were shown, however, the process of elephant skin preservation after all the meat ("nyama") is removed: for about 10 days the skin is kept flat on the ground with common salt sandwiched between each skin layer and subsequently it is kept in the sun for about 3 days.

December 17 Between Main Camp and Sinamatella Camp, HNP.

07:35 Sunny, about 23°C (73°F). Elephant dung fresh and old on main road. Five dark-grey elephants of different ages crossed the road to the north between Longone Pan and Guvalala Pan.

08:45 Many butterflies on elephant dung, some look different than those seen on carnivore dung 15 minutes earlier (Fig. 8).

08:55 White Hill Pan, HNP.

to Sunny, 31°C (88°F). A lone bull, dark in color, almost black, stood in a puddle of water/mud and sprayed himself with muddy water and flapped his ears. Based on measurements of his footprints he was approximately 3.18 meters tall at the shoulder.

09:30 Between White Hill, Shapi and Baobab Pans, HNP.

to Sunny, temperatures varied. Observed many wildlife species (mostly mammals and birds) but only six elephants, also dark in color.

14:55 Baobab Pan, HNP.

Sunny, about 25°C (77°F). The Pan is dry, many footprints of animals could be easily seen, most noticeable those of elephants, some of which contained rain water. Found seven skeletons of terrapins (?) in waterless elephant footprints, insects and micro-organisms in prints filled with water (Fig. 8).

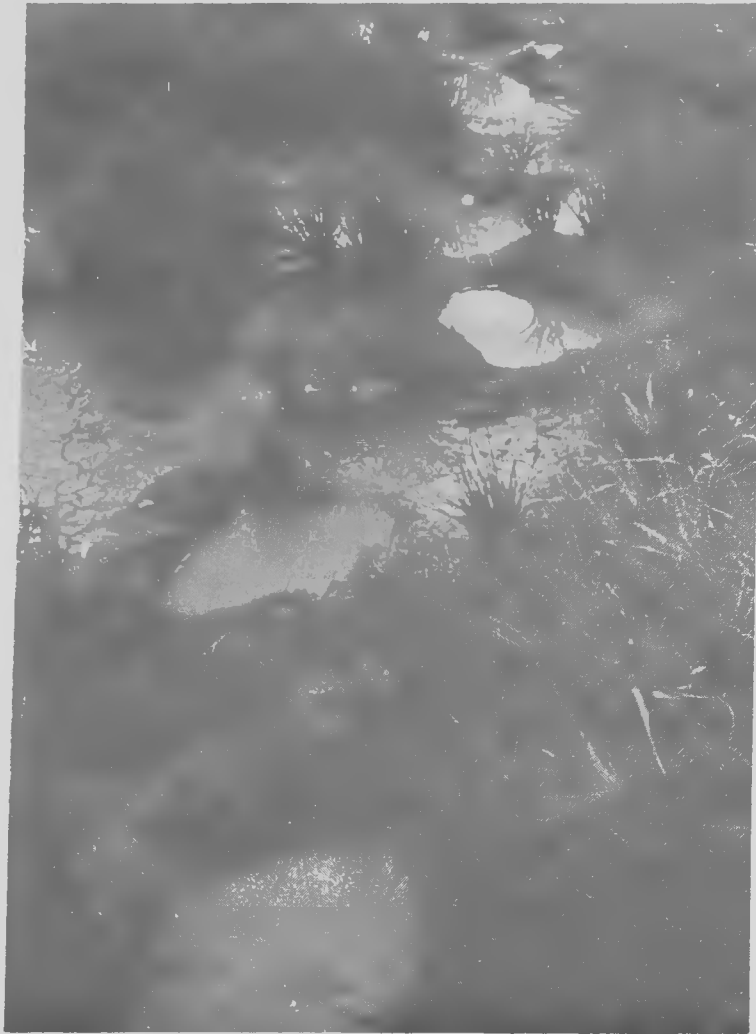


Figure 8. Left: Water-filled elephant footprints provide habitat and drinks to animals in an otherwise dry Baobab Pan, HNP, Zimbabwe. Right: Butterfly-covered elephant dung on the main road between Main Camp and Sinamatella Camp, HNP, Zimbabwe.

17:55 Sinamatella River, near camp, HNP.

With us is Park Warden Tore Ballance (carrying a gun, "just in case"). Sunny, 25°C (77°F). slight wind. A lone bull elephant on other (south) side of river feeding gently on tall grass, flapping its ears at a rate of 12 flaps per minute. Its body color not so dark as previous elephants seen, tusks about 50 cm (1.5 feet) long (about 35 lbs in weight).

18:10 Temporal gland draining, only slight narrow seepage, flapping ears regularly, "rumbles" heard, tail flapping gently antero-posteriorly, continues to feed.

December 18 At the site where an elephant was killed 8 days ago (December 10, 1982), 1 hour drive from Sinamatella Camp, HNP, ZIMBABWE.

09:00 With us Sargeant Jeremaya Kashiri, the driver and his helper Jairos to Ncube. We drove on roads-no-roads through bush country, scrub mopane,

12:30 hilly country and rocky outcrops. Species seen on way: a square-lipped rhinoceros (Ceratotherium simum), seven light colored giraffes (Giraffa camelopardalis), reedbucks (Redunca arundinum), and rock hyraxes (Procavia capensis). At 09:00 the skies were cloudy and the environmental temperature was 25°C (77°F).

We were told that this young male elephant was shot by park staff on Friday (December 10), skinned, and most of the meat ("nyama") was removed. By Saturday the bones were cleaned of the meat and some scattered, apparently by scavengers.

Description of the site:

15 x 8 meters of clearance, short to medium tall grass, ground moist, slight putrid smell, lots of feathers of vulture and marabou storks, bones scattered, some with dried meat on them, dermestid beetles (family Dermestidae, present mostly on the side where bones touch the ground), other kinds of insects were also present (smaller than dermestids and green in color), maggots on maxilla, molars, remains of stomach and intestinal content, a piece of skin on the ground close to upper molars (Fig. 9).

Description of bones:

All bones present were chewed upon especially at the epiphyseal plate regions (ends). Bones of cranium and epiphyses on long bones (when present) - not fused. Bones found included: posterior part of cranium (15.5 kg, weight includes attached 7 neck and 1 thoracic vertebrae), plus two upper molars and some unfused plates, mandible (12.0 kg), parts of cervical (neck) vertebrae, parts of vertebrae (mostly spinous processes), remains of 18 ribs, pelvis (oily at ends, left side 7.0 kg, right side 8.0 kg; see other measurements at end), left femur (also oily and heavily chewed at ends, up to 11 cm deep; it measured 81 cm long and 27 cm in circumference at the narrowest point, and weighed 7.5 kg). In the pelvis, measurements of the obturator foramen and the acetabular fossa (socket for the femur) of the left and right pelvis, respectively, were (in cm): 11.5 x 8.4, 11.5 x 11.5; and 12.5 x 8.0, 13.0 x 13.0.

Pattern of bone distribution:

Bones were scattered in every possible orientation in a large, almost triangular area in the following manner. The left and right pelvis

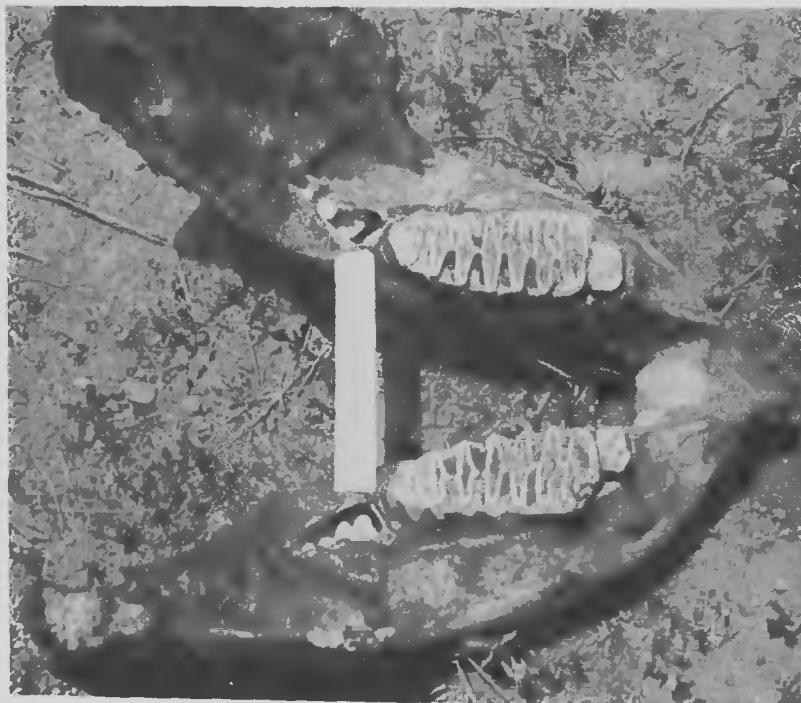


Figure 9. General view of the site (+ as in Fig. 10) where an elephant was shot by park staff 8 days ago (December 10, 1982), HNP, Zimbabwe. Bottom: Weighing of the femur (left), and close-up of the mandible (right).

were 58 paces (about 80-100 cm) and 68 paces, respectively, due north from the center where the elephant was killed. The left femur was 60 paces due southwest (120° in counter-clockwise direction) from the center. The cranium and the still attached 7 cervical and 1st thoracic vertebrae were directly opposite (180°) the femur 158 paces from the center, and the mandible was between the pelvis and the cranium 118 paces from center and 66 paces from cranium. Rib fragments, spinous processes, and other bones were spread between the center on one hand and the pelvis, mandible and cranium on the other. We searched for the remaining bones at a distance of 150-200 meters from the kill site, but found none (Fig. 10).

Age estimation:

The first clue that this elephant was young came from the fact that all the epiphyses (the ends) were missing from the long bones. [In elephants, complete fusion of the epiphyses to the shafts of most long bones occurs at about 30 years; in Hwange NP fusion of epiphyses in males occurs after the age of 35, and in females at about 32 years of age, G. Haynes (pers. comm.).] The relatively small size of bones also indicated that they belonged to a young elephant. The best criterion for age estimation, of course, is the condition of the grinding teeth (or the molars). In the mandible the left anterior tooth was 2.5 cm long (remnants of plates only), and the molar behind it had 8 plates and measured 12.5 cm long and 53 mm wide. There was yet another tooth developing at the posterior alveolus. Therefore, the foramen mentale formula (after Sikes, 1971:174-177) is FM:IV₀, an estimated age of 8-10 years old. (Complete citation for Sikes' book is: Sikes, S. K. 1971. The natural history of the African elephant. Weidenfeld and Nicolson, London, 397 pp.) According to Laws' (1966:7) scale this elephant fits between Group X and Group XI and its estimated age is 14 years old. [Complete citation of Laws' article is: Laws, R. M. 1966. Age criteria for the African elephant (Loxodonta a. africana). E. Afr. Wildl. J., 4:1-37.]

In reviewing our observations on elephants the highlights were:

In Kenya. The elephant we saw (also those elephants observed by Ian Redmond) at Mount Elgon National Park was the Bush African elephant (Loxodonta africana africana), not the Forest African elephant (L. a. cyclotis) (November 8, 18:10). The young bull elephant, 10-15 years old, that was observed at the Ark (Safari Lodge) Aberdare National Park ate between 13.8-20.7 kgs (30.4-45.5 lbs) of salty soil in 45 minutes (November 15, 20:00).

In Uganda. We observed two elephants (part of a herd of 23 elephants) in the Kazinga Channel, Queen Elizabeth National Park, that appeared to be engaged in mating behavior in the water (November 29, 11:34). In Murchison Falls National Park (MFNP) we saw 273 elephants in one day and a half, and all were observed on the north shore of the Victoria Nile. At MFNP the measured rate of ear flapping for two elephants (on December 23, 12:10, 29.5°C, no detectable wind) was 25-30 flaps per minute. Note that in Hwange National Park, Zimbabwe (December 17, 17:55, 25°C, slight wind) a lone bull

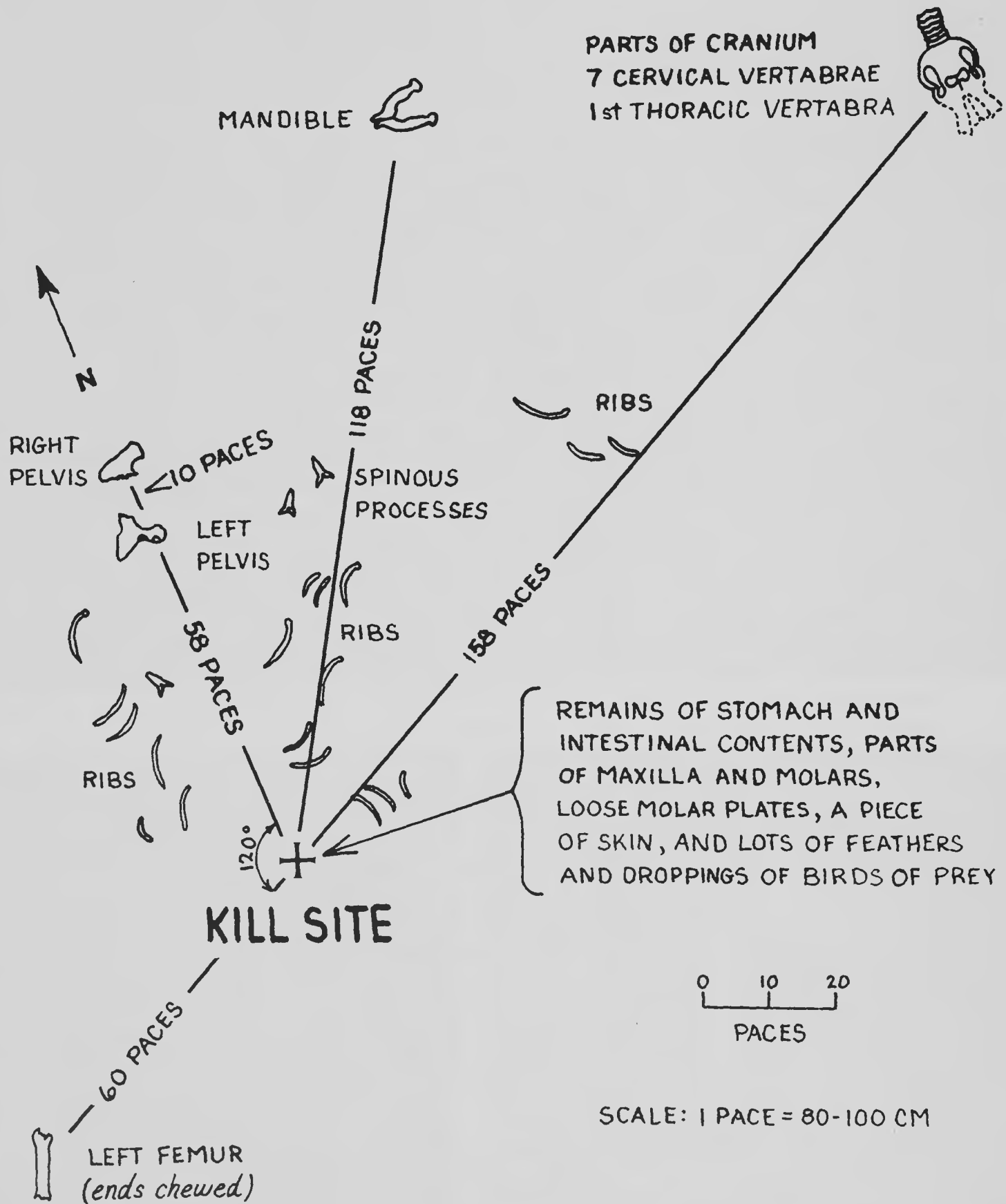


Figure 10. A general sketch of bone distribution 8 days after the death of a young elephant, 8-10 years old, at HNP, Zimbabwe (redrawn by J.S. Grimes from field sketches by J. Shoshani).

elephant flapped its ears at a rate of 12 flaps per minute. In Kidepo Valley National Park we saw 93 elephants (see details below).

In Zimbabwe. We observed 18 elephants (most of which were darker in color than those seen in Kenya and Uganda) and remains of one dead elephant (see details below). We also noticed that the butterflies that landed on elephants' dung were different from those seen on carnivores' dung (December 17, 08:45).

Comparing notes on remains of dead elephants:

1. Remains of an 8-10 year old after 8 days, wet season, short grass, bushveld. Bones and parts of them (skull plus at least 30 bones) were scattered as far as 125-150 meters from the site, all were chewed by scavengers/carnivores, a piece of skin and contents' remains of stomach and intestine were also found. We searched for the remaining bones at a distance of 150-200 meters from the site and found none (HNP, Zimbabwe, December 18, 09:00-12:30).
2. Remains of a 10-12 year old after 37 days, wet season, tall grass. Only parts of a few bones and teeth were found as far as 20 meters from the site, no soft tissues, only some stomach remains (KVNP, Uganda, December 7, 15:00).
3. Remains of a 25-30 year old after 56 days, wet season, tall grass. Bones and parts of them (skull and at least 35 bones) were scattered as far as 39 meters from the site, almost all were chewed by scavengers/carnivores. No soft tissues nor remains of stomach were found (KVNP, Uganda, December 7, 16:00).
4. Remains of a 35 year old after 13 years, end of rainy season, short to medium grass, open savannah. Most of the bones were present and concentrated in a confined area; no signs of chewing on bones were found (KVNP, Uganda, December 8, 11:45).

The above four cases provide an interesting comparison among remains of dead elephants of different ages, because they all occurred under similar conditions (wet seasons, grasslands with scattered trees), and almost the same species of scavengers/carnivores were present. Another factor involved was the time that elapsed between death and our visit; this time was different in each case. As can be noted the remains of the youngest elephant were carried the farthest distance even though only 8 days passed since the animal was killed (case No. 1). Almost nothing remained of the young elephant (case No. 2) after 37 days, compared to the remains of an older elephant after 56 days (case No. 3). Note that most of the bones of the mature elephant, 35 years old after 13 years, remained in place (case No. 4). These summary notes would be incomplete without mentioning that the elephant described in case No. 1 was killed by park staff, skinned, and fleshed, whereas the other elephants were poached and only the tusks were removed. Whether or not the bones of this youngest elephant would have had the widest bone-scattering, regardless of skinning and fleshing (and assuming that other

factors are as described), remains to be investigated. We hypothesize that the size of bones rather than treatment of the carcass is a more significant factor in bone consumption and distribution.

We hope that these observations will be useful for field researchers who study the taphonomy (what happened to the carcass and/or the bones after death) of elephants (see example article by Gary Haynes in this issue).

We are indebted to all the staffs at the headquarters in Nairobi (Kenya), Kampala (Uganda), and Harare (Zimbabwe) for all their help. Acknowledgments to the staffs of each of the national parks in Kenya and Uganda were given at the end of, or during our observations for those parks. We thank the staff at HNP (A. Conybeare, J. Dyer, R. Elliot, and R. Thompson; and those mentioned in our observations) for making the best of our trip. We welcome any comments (interpretations?) on any of the observations mentioned above. Particularly, we are interested to hear comments on the elephants' mating (?) behavior in the water of Kazinga Channel (November 29) and on the observations of elephant penile erection [see observation at 18:37 November 8, and 19:15 November 15; see also Elephant 1(3):pages 23 (12:10 and 12:21), and 28 (18:25)].

In addition to maps and brochures, the following field guides were used extensively during our trip:

- Dorset, J., and P. Dandelot. 1970. A field guide to the larger mammals of Africa. Collins, London, 287 pp.
- FitzSimons, V. F. M. 1970. A field guide to the snakes of southern Africa. Collins, London, 221 pp.
- Schmutterer, H. 1976. Plants of East Africa with special reference to Kenya. Tz-Verlagsgesellschaft MBH, Darmstadt, Germany, 372 pp.
- Synge, R. (ed.). 1977. Traveller's guide to Africa (second edition). The Garden City Press Ltd., Letchworth, Herts. (England), 431 pp.
- Uganda National Park Trustees. 1971. Uganda national parks handbook (fifth edition). Longman Uganda Ltd., Kampala, 160 pp. + 41 color photographs.
- Williams, J. G. 1963. A field guide to the birds of East and Central Africa. Collins, London, 288 pp.
- Williams, J. G. 1967. A field guide to the national parks of East Africa. Collins, London, 352 pp.