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Wildlife in an Ethiopian Valley

By Emil K. Urban and Leslie H. Brown

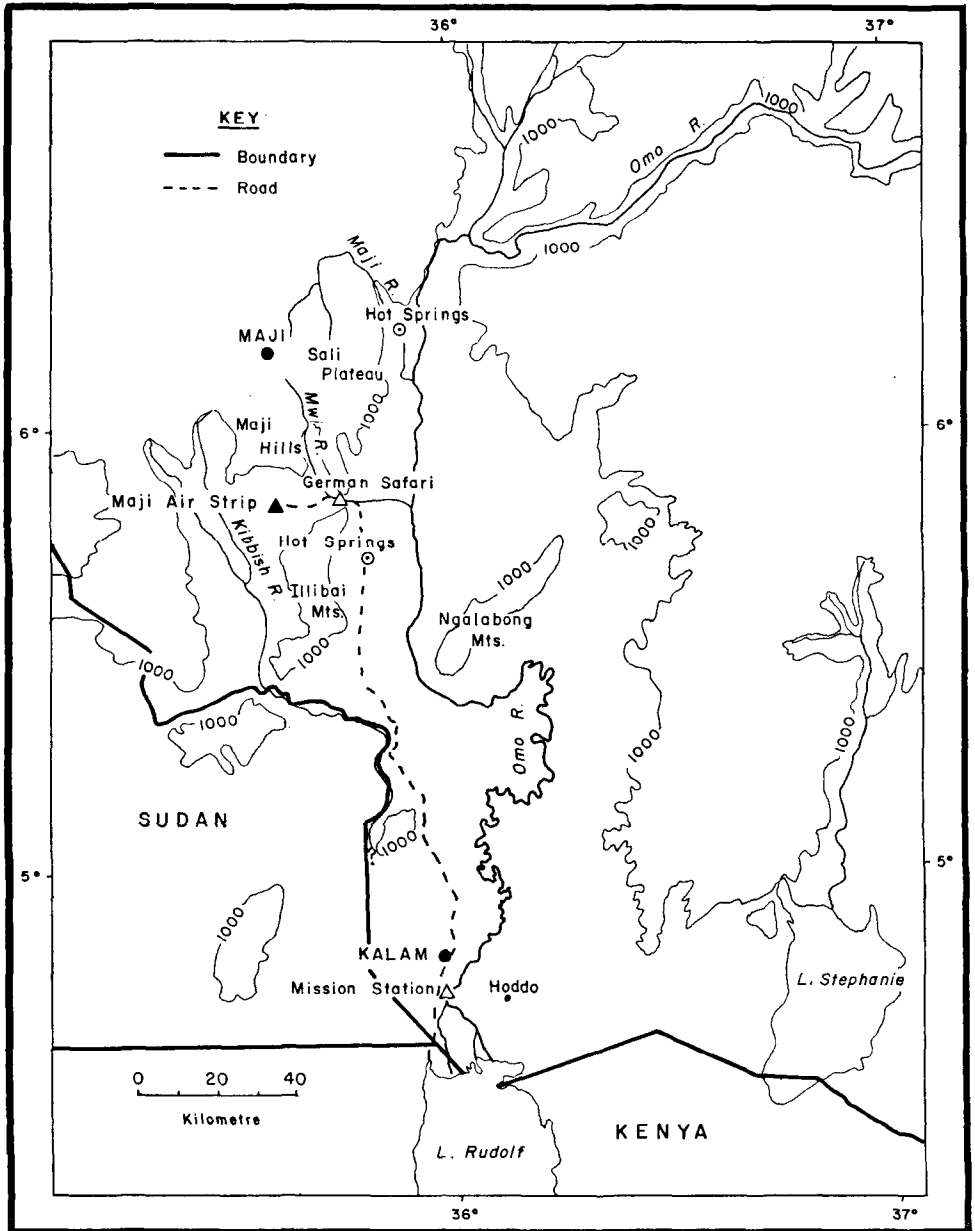
On several flights and safaris in the lower Omo River valley the authors and others recorded the numbers of larger mammals they saw. The results showed no regular general migration pattern, although certain species showed trends, notably eland, zebra, elephant and Lelwel's hartebeest which moved into the area after the rains and out again when the grass died. Dr Urban is working in the Department of Biology in the Haile Sellassie I University in Addis Ababa. Leslie Brown, well known Kenya naturalist, is a UNESCO wildlife consultant.

THERE are large numbers of mammals in the plains and foothills on either side of the lower Omo River, including game animals, some in large concentrations, that have been reduced or are extinct elsewhere in Ethiopia. These mammals, their seasonal movements and population densities have not been documented and are very little known, although it is suspected that their movements in the lower Omo plains are related to more widespread movements in the Sudan. This paper reports scattered observations of larger mammals in the area between January 1965 and June 1967. They are, needless to say, inadequate for a full picture of the migratory game movements.

Between us we made five trips: January 1965, LHB and Ian Grimwood; March, EKU; September, EKU; December, EKU and John Blower; and March 1967, LHB. In addition John Blower, Senior Game Warden of the Imperial Ethiopian Government's Wild Life Conservation Department, visited the area in October 1965 and February 1966, and G. H. Brown and M. Huxley, of the same department, stayed in the lower Omo valley from November 1966 to January 1967, Brown remaining there until June 1967. The itineraries of these safaris are on page 352.

The Valley and the Climate

The lower Omo River valley lies between 4°30' and 6°45' N, and 35°35' and 36°15' E. In the north and west, in the foothills of the Maji Mountains and Sali Plateau, about 2600 feet high, where the annual rainfall is about 30 inches, there is lush savanna, but in the south and east with lower elevation the rainfall decreases until in the Omo River delta, the lowest point at 1200 feet, there is only about 15 inches a year. Over the whole region the rain tends to fall in two well-separated seasons, as in East Africa: March-May and November-December. In the southern part belts of dense riverine bush and extensive grasslands are interspersed with acacia thickets. Smaller valleys, like those of the Maji, Mwi and Kibbish Rivers, form part of the lower Omo River drainage. The headwaters and plains of the south-flowing Kibbish River are separated from the main Omo plains by the Illibai Mountains, 3000 to 4000 feet high. Along the Mwi River are dense riverine *Acacia tortilis* forests with a heavy undergrowth of shrubs, whereas along the Omo low acacia



South-western Ethiopia including the valley of the lower Omo River

	January 1965	March 1965	October 1965	December 1965	February 1966	November 1966 January 1967	March 1967	6 April 1967	14 April 1967
Common zebra	413	36	numerous	490	0	200-300	73	75	157
Lelwel hartebeest	fairly numerous	8	fairly numerous	10	0	few scattered herds	0	0	1
Tiang	439	1574	numerous	27	few small herds	few scattered herds	about 1000	51	37
Grant's gazelle	169	267	few scattered herds	14	few small herds	?	77	42	25
Beisa oryx	numerous	3	fairly numerous	27	0	few scattered herds	71	31	2
Eland	930	0	numerous	379	0	55-60	241	215	364

Numbers and general impressions of numbers of some large mammals counted during the safaris. Since the September, 1965, safari covered only the extreme southern portion of the lower Omo Valley, counts from that month are not included.

thickets tend to persist to the river bank. In the dry season the Mwi is dotted with wet areas such as German Safari waterhole. West of the Omo River, east of the Illibai range and north and south of the Mwi River, are the western Omo plains, extensive black cotton soils covered with grasslands. About 15 kilometres south of the Mwi River is a major waterhole of the plains, the Hot Springs, from where one can see, beyond the Omo, the ridge of the Ngalabong Mountains. To the north of the Mwi is an open savanna scattered with large acacias, giving way to open grass plains broken by occasional dry water courses. Still farther north is bush country associated with the Maji River drainage, and in the headwaters of this river is another hot spring, apparently similar to the one in the south. To the north and east the Omo bends from an east-west flowing river to a north-south one. Known as the 'Big Bend' this defines the northern limit of the lower Omo River valley as covered in this paper. The western Omo plains, about 10 kilometres wide, come to an abrupt halt 45 to 50 kilometres to the south of the Mwi at a dense acacia thicket, five to 10 kilometres thick. South of this thicket as far as Kalam and the Omo delta overgrazed sandy soils support relatively dense human and domestic stock and sparse game populations. Along the north end of Lake Rudolf, east of the Omo River to Hoddo and the Kenya border, predominant vegetation habitats include *Acacia tortilis* woodland, thickets of *A. mellifera*, *A. senegal*, and *A. reficiens*, *Salvadora persica* and other broad-leaved shrubs, and limited areas of open grassland.

Account of Species

Vervet monkey* *Cercopithecus aethiops*: fairly common in the riverine forest along the Mwi River and in bushed valleys in the Maji foothills. A few along the forests of the lower Omo River.

Dog-faced baboon *Papio doguera*: common in the riverine bush of the Mwi and the lower Omo River. One troop of 50 noted at German Safari waterhole. None seen in the savannas and grasslands north and south of the Mwi.

Colobus monkey *Colobus polykomos*: no counts made but common along the Mwi riverine forests and in the bushed valleys in the Kibbish river headwaters. None in the forests along the lower Omo River.

Hunting dog *Lycaon pictus*: none seen by us. A few tracks noted along the Mwi River in December 1965. A pack of seven to nine seen by G. H. Brown on February 20th, 1967.

Bat-eared fox *Octocyon megalotis*: one at the Hot Springs in March 1965.

Side-striped jackal *Thos adustus*: all species of jackal seemed surprisingly rare in the area. Four side-striped jackals were seen in January 1965, and three in March 1965 in the western Omo plains south of the Mwi River. In March 1967 LHB, camping on the plains near the acacia thickets, heard many jackals calling at night.

Black-backed jackal *Thos mesomelas*: one on the Omo plains in January 1965, (number ?) in December 1965, and one in the Mwi River drainage

*Our classification follows Allen, 1939. A checklist of African mammals. Brit. Mus. Comp. Zool., Vol. 83.

in March 1967.

Aard wolf *Proteles cristatus*: none seen but thought to occur.

Spotted hyena *Crocuta crocuta*: surprisingly rare but a few heard calling at night on all trips.

Striped hyena *Hyaena hyaena*: none seen but reported to occur.

Cheetah *Acinonyx jubatus*: a pair seen by LHB March 20th, 1967, on the plains near the Mwi River. Probably uncommon.

Wild cat *Felis lybica*: one seen in the acacia thicket 45 to 50 kilometres south of the Mwi River, March 1965.

Lion *Felis leo*: evidently the most numerous large predator of the plains. Heard, or tracks noted, in the foothills of the Maji Mountains, the Kibbish River valley, along the Mwi River, at the Hot Springs, on the western Omo plains south of the Mwi River, and 10 kilometres south of the southern limit of the plains. No evidence of large prides.

Leopard *Felis pardus*: not uncommon; tracks seen in January and December 1965. A pair living in the Mwi River gorge—German Safari area were heard regularly at night between November 1966 and March 1967, and seen twice in March 1967.

Aardvark *Orycteropus afer*: tracks at Hot Springs, March 1965, and at Mwi River, March 1967. The characteristic burrows occur.

Elephant *Loxodonta africana*: in January and March 1965 old tracks of a herd were seen 2 kilometres south of German Safari waterhole. In December 1965 sign and tracks of at least three different groups were discovered in the German Safari—Mwi River region. One set, representing a small family group, was no more than two to five days old; others (numbers ?) were about one month old, while yet another set, representing approximately 50 elephants, had been made during the last rainy season some four to five months before. In the same month old tracks suggesting fairly large numbers were found to the north in the bush along the Maji River. These tracks made in the rains indicated that the animals were moving north into the Big Bend country or possibly even further upstream. In a letter to Blower, R. Borgeson of Maji confirmed this movement when he reported elephants (numbers ?) migrating at the end of the rainy season up the Dincia River to the north of the Big Bend. He suggested as well that elephant may occur to the east and north of Omo River. In the last week of December 1966, Blower and G. H. Brown saw about 50 elephants moving up the Mwi River from the Omo River. On March 23rd, 1967, G. H. Brown saw about 20 elephants along the Mwi River; two days later he noted another herd of 20–35 in the same area. Although apparently uncommon in the lower Omo valley, elephants do make extensive movements into and out of the area. Where these creatures come from, at what time they are there, and where they go are interesting points which await discovery.

Black rhinoceros *Diceros bicornis*: G. H. Brown found spoor of one rhino on the plains south of Mwi River on April 14th, 1967, and in early

June saw a pair there. Although his observations are the only definite records, rhino have been reported on the hills north of the Mwi River. Undoubtedly the species is rare.

Common zebra *Equus burchelli*: common and even abundant at certain times of the year on the western Omo plains north and south of the Mwi and on the open savannas of the Kibbish River drainage. In January 1965 they were abundant and often associated with eland, tiang, and oryx on the plains and in the Kibbish drainage. Of 2080 animals counted, 413 were zebra; they were as numerous as tiang. By March 1965 a large exodus of zebra had occurred as only 18 were seen in the Kibbish drainage and 21 in the western Omo plains between the Mwi River and the Hot Springs. None were seen south of the acacia thicket 45 to 50 kilometres south of the Mwi although they were reported to occur in small numbers in the Hoddo region east of the Omo River. This species had returned to the western Omo plains by mid-October, fair concentrations (numbers ?) having been seen on the plains north and south of the Mwi. In December 1965 zebra were numerous; 375 were counted in the Hot Springs area and between 200–300 on the plains surrounding the Mwi River–German Safari area. None were seen on the plains north of the Mwi nor in the Kibbish River drainage at this time. During a flight over the area on February 8th, 1966, no zebra were seen; undoubtedly they had left the area again. In December 1966 they were again numerous, for 200–300 were seen. In January 1967 most had gone, for only 41 were counted. In March 1967, 73 out of 1390 animals counted were zebra; all were in the Illibai Mountains or near the Mwi River, none on the open plains. In April 1967, with the new rains, zebra were again common; 157 were counted in the vicinity of the Hot Springs on April 14th. The data suggest that they are present during and just after the rains in fair to large numbers, and absent or rare in the latter part of the dry season.

Hippopotamus *Hippopotamus amphibius*: reported to occur in the Omo River, especially in the delta region.

Warthog *Phacochoerus aethiopicus*: seen on all trips to the area. Common in the Kibbish River headwaters and also along the Mwi River, but far from abundant in apparently ideal habitat.

Bushpig *Potamochoerus larvatus*: none seen but tracks were noted in the Mwi riverine bush, especially in the German Safari waterhole area where they are probably common.

Giraffe *Giraffa camelopardalis*: uncommon in apparently suitable habitat. In January 1965 two small herds, probably of *G. c. camelopardalis*, were noted in the savanna north of the Mwi. In October a group of six was seen in the Hot Springs area; in December a few tracks were found at the Hot Springs and three individuals were seen in the savanna north of the Mwi. In December 1966 eleven were seen at the Hot Springs, and nine were observed in the Omo bush on March 20th, 1967. Giraffe were not noted in the Kalam region on either side of the Omo.

Lelwel hartebeest *Alcelaphus buselaphus*: in January 1965 this species was common in small herds of up to 20 in the Kibbish River headwaters but absent in the western Omo plains. In March 1965 only eight were seen in the savanna surrounding the German Safari waterhole; in October they were present (numbers ?) on the plains north and south of the Mwi River, and in December eight were noted on the plains north of the Mwi River, one in the Kibbish headwaters and one between German Safari and Hot Springs. In November 1966 a few scattered herds were observed in the Kibbish headwaters; none were seen in December or in January 1967. None were seen south of the Hot Springs, and in March 1967 there were none either on the plains or in the Kibbish headwaters. Apparently this species is subject to seasonal movements within the area.

Tiang *Damaliscus korrigum*: abundant on the plains north and south of the Mwi River in January 1965, often in large herds of up to 250. Of 2080 animals counted, 439 were tiang. At this time there were a few in herds of up to 20 in the savannas of the Kibbish River headwaters. Tiang were by far the most numerous mammal in March 1965, when about 1600 were estimated on the plains surrounding the Hot Springs, and a few were seen in the Kibbish River headwaters, but none in the Kalam region. Similar concentrations occurred in March 1967, when of 1390 animals counted 872 were tiang. Of these, 735 were near the Hot Springs on the plains and represented only a proportion of the total numbers present. With the increase in rains in April 1967 most of the tiang left the area. For in the Hot Springs region G. H. Brown counted only 51 on April 6th, and 37 on April 14th. In mid-October 1965 fair concentrations of tiang along with eland and zebra were on the plains between the Mwi and the Hot Springs; by December 1965 numbers had definitely decreased: twelve were found in the Kibbish River headwaters, eleven on the plains south of, and seven north of the Mwi. During the flight of February 8th 1966 a few small herds of tiang were noted in the Hot Springs area, and in November 1966 a few scattered herds were noted on the plains. Numbers increased as the area became drier, for two months later, in January 1967, 400 to 500 were seen. Like several other species tiang apparently move extensively and (based on the March 1965 observations) seem to be the dominant animal in the area when it is at its driest.

Common duiker *Sylvicapra grimmia*: apparently not common for in January 1965 only three were seen in the Kibbish River headwaters, and along the Mwi River in December 1965 there were three in the German Safari area and one north of the river.

Oribi *Ourebia ourebi*: only small parties or single individuals were seen in the Kibbish River headwaters and the Maji foothills in January 1965; none on the plains. In December 1965 two were observed in the German Safari area and six in the savanna country north of the Mwi River. In March 1967 one pair and two single animals were seen in the German Safari area. Apparently this species is uncommon.

Dikdik *Rhynchotragus* sp.: unaccountably rare despite suitable habitat. Only two individuals were seen in the German Safari area, one in January

and one in December 1965.

Defassa waterbuck *Kobus defassa*: fairly common along the fringes of the Mwi River bush in the German Safari waterhole area. In January 1965 tracks were common along the Mwi River and herds of not more than ten individuals were seen. In March 18 were noted in the German Safari vicinity, in mid-October, two, and in December three. None were seen farther south. On March 17th, 1967, nine were seen on the hills about the Mwi River in the German Safari area.

Gazelle sp. *Gazella sp.*: fifty unidentified gazelles were noted in the Kalam region both in March and September 1965, probably Mongalla gazelle *G. thomsoni albonotatus*.

Grant's gazelle *Gazella granti*: fairly common on the plains between the Mwi River and the Hot Springs. In January 1965 herds of up to 30 were seen in the drier parts. Of 2080 animals counted, 169 were Grant's gazelles. In March about 200 were observed in the same area; none were identified south of the acacia thicket which marks the southern border of the western Omo plains. In mid-October a few scattered groups were on the plains in the region of the Hot Springs, and in December only 14 individuals were discovered on the open plains between the Mwi and the Hot Springs. From the air, on February 8th 1966, a few small herds (numbers ?) were seen near the Hot Springs; in March 1967, of 1390 animals counted, 77 were Grant's gazelle, distributed in small parties over the plains. In April 1967, 42 gazelles were seen on the 6th, and 25 on the 14th.

Gerenuk *Litocranius walleri*: thirty were noted in the acacia country of the Kalam region, east of the Omo River in September 1965.

Beisa oryx *Oryx beisa*: common on the drier Omo plains south of the Mwi in January 1965, when herds of up to 60 were seen; none were seen in the Kibbish River basin. In March 1965 only three were found in the Hot Springs area. In the mid-October flight a few (numbers ?) were seen in the drier regions of the plains in the Hot Springs area, and in December 27 were seen in the same area. One individual was recorded east of the Omo River in the Kalam-Hoddo area in September 1965. In November and December 1966 and January 1967 only a few scattered herds were noted. In March 1967 of 1390 animals counted, 70 were oryx; on March 19th 1967 they appeared to be moving into the Hot Springs area from the south. Rare north of the Mwi River, oryx appear to favour black cotton soil plains interspersed with acacia thickets. From these observations, it seems reasonable to conclude that these animals too are subject to seasonal movements in the lower Omo Valley.

Lesser kudu *Strepsiceros imberbis*: in small numbers in the bush along the Mwi River and surrounding slopes in January and December 1965, and relatively numerous in the riverine bush along the Omo in mid-October. Three bulls were seen along the Mwi River in March 1967. One was found in the Kalam region in March 1965.

Greater kudu *Strepsiceros strepsiceros*: none seen but rumoured to occur in the Illibai mountains and on the Maji foothills.

Eland *Taurotragus oryx*: abundant on the Omo plains north and south of the Mwi River at certain times of year and fairly common in the Kibbish River drainage area. In January 1965, of 2080 animals counted on the plains south of the Mwi, 930 or nearly half were eland, in herds of up to 180, often in association with large herds of tiang and zebra. This was thought to be probably the greatest concentration of eland anywhere in Africa. But in March, only two months later, they had all disappeared; no eland were identified. During the mid-October flight large concentrations of eland were noted on the western Omo plains, close to the belt of riverine bush along the Omo and in the Hot Springs area. On the foot-safari in December 1965, 300 or more eland were counted on the plains between the Mwi and the Hot Springs. However, north of the Mwi only 14 were seen on the foot safari, and on the flight, only ten were noted as the plane left the area. During the February 8th, 1966, flight no eland were observed. Again, they had apparently moved elsewhere. In November and December 1966 and January 1967 they were not common; 40-50 were counted in November, and 20 in January. Then in March 1967, of 1390 animals counted, 241 (plus) were eland, nearly all in two large herds, one near the Hot Springs, the other between German Safari and Maji Air Strip. They had clearly moved into the area within the previous two weeks probably following the first rains, remaining there at least through April. The indications are that they are present in numbers when the grass is green but move out when the area dries.

Bushbuck *Tragelaphus scriptus*: evidently not common in the area despite an abundance of suitable habitat. Tracks were found in the Maji foothills and along the Mwi River where one individual was sighted in December 1965.

African buffalo *Syncerus caffer*: fairly abundant in the bush along the Mwi River, in the German Safari waterhole area, and in the Kibbish drainage near the Maji Air Strip, but not observed in the large herds one would expect this area to support. In January 1965 the largest herd, about 80 animals, was seen in the German Safari area. In March 1965 a small herd came to water at German Safari, and nine were seen in the hills to the east of the Hot Springs. One dead buffalo was found in the acacia thicket 45 to 50 kilometres south of the Mwi River, but none were seen farther south. In mid-October 1965 only 12 were counted. In December one herd of at least 80 was confronted and there were numerous sign in the German Safari-Mwi River region; tracks were found at the Hot Springs and twelve were seen during the foot-safari north of the Mwi. In November and December 1966 and January 1967 only a few herds of 20-25 each were seen in the Mwi River-German Safari region. In March 1967 none were seen, but on the evidence of tracks a number of herds and small parties were present in the Mwi bush and in the area between German Safari and the Maji air strip. In April 1967 at least two herds, numbering 46 and 126, were reported in the Mwi River-German Safari region.

Discussion

The movement of game into and out of the lower Omo River valley is the most interesting feature noted on the safaris. Our scanty observations indicate that there is no regular pattern of movement. It would appear as though Lelwel's hartebeest, common zebra, especially eland, and even elephant move into the area after the rains (September–January and also probably March–May) and then, as the grass dies, move out again; during the drier periods, tiang, oryx and even Grant's gazelle move in. This was seen most clearly when, in January 1965, large eland and zebra herds were seen, yet two months later no eland were identified and few zebra observed. This pattern was repeated a year later; in December 1965 eland and zebra were common, but on the flight of February 8th, 1966, none were seen at all. In March and April 1967 there was a sharp apparent increase in the numbers of eland, with larger herds than had been seen for some time previously. These animals had probably moved in shortly before, following the earliest rains.

Movements of tiang during these periods are confusing. Tiang were common in January 1965, and became even more so in March, and again in March 1967; it seemed as though they were migrating into the area in drier periods. Yet, in the 1966 dry season (February 8th) only a few small herds were counted, certainly fewer than in December 1965. In March 1967 it appeared that large herds of up to 200 were moving into the area near the Hot Springs where early rain had fallen; in April most tiang had left the area, for the large herds of the previous month were not seen. From these records tiang movements appear to be irregular.

Where these creatures come from and where they go is indeed puzzling. Woodman (ORYX, August 1965) suggests that in May when the swamps of the Upper Nile rise, there is a general movement of game from the famous 'Ilemi Triangle' (on the frontiers of Kenya, Ethiopia and the Sudan), passing through the plains 160 kilometres west of Maji, and heading towards the arid Kenya border. Possibly the movements of game in the western Omo plains are associated with these migrations. To be part of this, game from the western Omo plains might travel from the plains through the Kibbish valley towards the Sudan border. An alternative explanation is possible. In March 1967 tracks indicated that the large herds of tiang gathering near the Hot Springs on new green flush had come from the south-east. They may have come from an area enclosed by a loop of the Omo River south of the Ngalabong range, or they may have crossed the Omo at some fordable point from the plains east of the river. This possibility is suggested as tribesmen living on the east bank of the Omo brought large numbers of cattle across the river to the Hot Springs to obtain salt; on March 18th, 1967 they said that they did this each year and had to do it before the Omo became unfordable.

Still other questions remain. Are movements of elephant in the area associated with seasonal movements of other game? Do these massive animals move extensive distances or do they wander locally along such streams as the Mwi River? What evidence we have gathered indicates that they certainly travel extensively, at least within the lower Omo

valley. Why were there so few large mammals south of the acacia thicket bordering the southern part of the western Omo plains? Have the over-grazing due to the large human population and the dryness of the Kalam area made the habitat unsuitable for most game mammals, or does the extensive acacia thicket act as a barrier for movements of mammals from north to south?

Because of the lack of complete data, we can offer no certain explanation of the problems associated with seasonal movements of game in the western Omo plains, or of the other questions raised above. Extensive study such as the Wild Life Conservation Department is now doing (they have a warden in the area) or even regular monthly aerial surveys are obviously necessary in this remote part of Africa before the answers will be found.

Safari Itineraries

January 2nd-9th, 1965. LHB and Ian Grimwood, UNESCO Wild Life Consultants, drove from the Maji Air Strip to German Safari waterhole and thence south across the western edge of the western Omo plains via the Hot Springs to the dense acacia thicket 45-50 kilometres south of the Mwi River. They traveled east along the edge of the thicket to the eastern side of the western Omo plains, from there returning to German Safari and the Maji Air Strip.

March 13th-26th, 1965. Covering much the same track as LHB and Grimwood, EKU drove from the Maji Air Strip via German Safari waterhole and the Hot Springs to the dense acacia thicket. At this point EKU retraced his track back to the Hot Springs and German Safari. He then returned to the dense acacia thicket via the Hot Springs and continued on to Kalam and the Omo River American Mission Station, some 10 kilometres north of Lake Rudolf.

September 2nd-15th, 1965. EKU travelled by boat down the Omo River from the Omo River Mission Station through the delta to Lake Rudolf, and also drove from the mission to Kalam, crossing the Omo River, and continuing south-east to Hoddo and the Kenya border.

Mid-October, 1965. Blower made a reconnaissance flight over the area in an Ethiopian Air Force DC-3 airplane, flying down the Omo River to approximately the same latitude as the Hot Springs, then westward to the Hot Springs and over the western Omo plains south and north of the Mwi River and the Kibbish valley to the west, with a hurried visit by jeep from the Maji Air Strip to the German Safari waterhole.

December 11th-21st, 1965. On a foot-safari Blower and EKU walked from the Maji Air Strip to the German Safari waterhole, thence to the Hot Springs and back to German Safari. After establishing a new camp on the Mwi River several kilometres east of German Safari, Blower walked north of the Mwi River on the western Omo plains to another hot springs on the Maji River approximately 6°14' N, 35°53' E, returning to the German Safari area via the foothills of the Sali Plateau to the west of the plains. After walking back to the Maji Air Strip, Blower and EKU flew over the western Omo plains north of the Mwi River.

February 8th, 1966. Blower again surveyed the area in a twin-engined Piper Astec airplane, flying over the Omo River to the Omo River Mission Station south of Kalam, with a westward deviation over the plains to look at the Hot Springs.

November 1966–January 1967. G. H. Brown and M. Huxley resided in the area as game wardens. They surveyed the area between the Maji Air Strip and German Safari, the German Safari–Mwi River region, and the plains surrounding the Hot Springs.

March 15th–21st, 1967. LHB made careful counts on the Omo and Mwi plains in 115 kilometres of traverse by jeep, and other observations from hill tops overlooking the area. His route was close to that followed by the Grimwood–LHB survey on January 2nd–9th, 1965; many of the same places were visited. Conditions were dry with little lush grazing on the plains though recent rains had stimulated early grass growth.

February–June 1967. Observations made by the Game Warden, G. H. Brown, in the German Safari–Mwi River and Hot Springs areas from February to June, 1967, including his April 6th and 14th trips to the Hot Springs, have been incorporated in this paper.

Amphibians North of the Zambezi

Amphibians of Malawi by **Margaret M. Stewart.** State University of New York Press, US \$7.50.

The non-specialist who takes an interest in the amphibian fauna of any part of Africa north of the Zambezi, is likely to find himself in difficulties over the dearth of literature. Of course there are numerous technical papers, but these are scattered through journals which are not easily obtainable outside a few large libraries, and the assessment and correlation of their contents can present problems. In these circumstances, Dr Stewart's book will be welcomed by the enthusiastic amateur, and indeed the specialist as well.

The bulk of the book consists of separate accounts of the 62 forms known, or likely, to occur in the country. Each is clearly described and considerable attention is paid to intraspecific differences, due either to age, sex or individual variation – a favourable contrast to many semi-popular books; features allowing discrimination between similar species are emphasised. Other subheadings deal with distribution, both within and beyond Malawi, breeding behaviour, voice, habits and habitat. The introduction gives adequate information on the capture of amphibians, preparation of research specimens and maintenance in captivity. There is a good key for identification and the text is illustrated by 67 line drawings of high quality and 20 colour plates. One or two of the latter might be improved on, and it would have been nice, in a book which rightly places emphasis on the living animal, to see some mention of H. B. Cott's work on the feeding behaviour of some of the small frogs. However, these are very minor criticisms of a book which will provide a great stimulus to the study of the amphibians both of Malawi and of the surrounding countries.

E. N. ARNOLD

Threat to Coppermine

New Zealand conservationists, supported by the International Council for Bird Preservation, have petitioned parliament against the proposed mining of copper on Coppermine Island, an important nature reserve with almost the only surviving population of the endemic North Island saddleback and a large colony of the flesh-footed shearwater *Puffinus carneipes* which nests in burrows with the rare tuatara lizard.