

The heavy mallet is an interesting shape, rather like an Indian club, and is called a Mubeto. A lighter hammer is called a Kabulu, and the equipment is completed with the anvil (Sika) and a pair of tongs (Lumana) that would not disgrace any hearth.

Anthropological studies lead one to expect a wealth of mysticism connected with this work, but apart from the sacrifice of a cockerel the only unnatural aspect is a complete prohibition of any feminine influence. Women may not see the Lutengo, nor may any persons as remotely connected with the work as the Woodcutters have intercourse until the kiln has been fired. Failure to obey these precepts requires a formal confession to the other workers who release the contaminated one from any further work. The first two firings of the Kalabo kiln were failures and this was attributed to women visiting the site. It was, one surmises, only coincidence that the subsequent successful firings followed official enforcement of this traditional taboo.

LAND APPORTIONMENT IN NORTHERN RHODESIA

The Information Department put out the following Press communique on 26th March, 1957—

Because roughly 6 per cent. of Northern Rhodesia was Crown Land it did not mean that there was 94 per cent. of the land left for African inhabitants to live in, Mr. D. B. Hall, Secretary for Native Affairs, told the Northern Rhodesia Legislative Council last week.

Giving figures for land apportionment in the Territory, Mr. Hall said that the area of Northern Rhodesia was about 288,000 square miles. Of this, 16,270 square miles was Crown Land—a trifle less than 6 per cent. of the total. The Barotseland Protectorate covered 46,000 square miles—it was not Native Reserve, it was not Native Trust Land, it was not Crown Land.

Native Reserves covered 54,250 square miles and the remainder of the Territory—171,150 square miles—was Native Trust Land. Of the total area of the Territory, 59 per cent. was Native Trust Land.

Of the combined area of Native Reserve and Native Trust Land—225,400 square miles—26 per cent. was at present forest reserve, 9 per cent. was game reserve, and 10 per cent. was useless for agricultural purposes. "It is either in the form of lakes or mountain tops, or completely infertile plains—and anthraps", said Mr. Hall. There were certainly fish in the lakes, "but you cannot actually live in a lake without getting pretty uncomfortable", said Mr. Hall.

Mr. Hall also explained, 5 per cent. of the land was in the form of low-lying plains which were of very little use, 5 per cent. was classified as good land, 20 per cent. as medium and 24 per cent. as poor. In other words, some 50 per cent. of the combined area of Native Reserve and Native Trust Land was usable for agricultural purposes, but he had included in that the poor land.

Mr. Hall concluded that, to sum up, out of the 16,270 square miles of Crown Land in the Territory, 7,300 square miles—"not far off half"—still remained to be taken up.

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NOTES ON THE DISTRIBUTION OF GAME IN NORTHERN RHODESIA, 1904-13

By the late E. KNOWLES JORDAN

(Annotated by W. F. H. ANSELL)

MR. JORDAN starts off his notes with the following letter:

"Dear Mr. Ansell,

I am sending you some notes on the distribution of game in Northern Rhodesia for the period 1904 to 1915. Unfortunately I kept no written records of game except an occasional note but the remarks on the black rhino and Crawshay's¹ (or so-called mountain) zebra may be useful. This animal had dainty little hoofs, like a donkey. I still have one as a paper-weight.

At Old Ndola I once saw a small mammal like a flying squirrel. It was planing from one tree to another. I wonder what it was.²

As regards the colobus, if the natives have not killed it off there should be specimens in the Mukutu Range, Upper Luangwa Valley, Isoka District.³ I will try and send you a small sketch map if you wish. I was told of it by the natives, but as usual I had no time to investigate.

Will send you more notes on the other districts I was in later. I think the zebra was called mountain zebra because it was found in hilly country and escarpments and the makers of the game laws at that time merely wished to distinguish it from the common zebra."

He then goes on with his notes.

In 1904 I was given a few days' leave by the Civil Commissioner, Bulawayo, and took the opportunity of visiting the Falls. The trails of heavy game were still to be seen in the rain forest but the buffalo had now moved some miles up the Zambezi. Together with a friend, I made a hurried trip to the Simaraha Flats up the Zambezi to obtain a couple of game trophies to take back with me. Game on the flats was very plentiful and warthog, zebra, roan, hartebeest, puku and reedbuck were seen in numbers. Near the mouth of the Umgwezi River natives took us to an area of long grass and reeds where we saw a troop of red lechwe. A red lynx was also seen.⁴

In 1905 I joined the Civil Service of North-Western Rhodesia and travelled from a point twenty-five miles from the Falls to Kalomo in the mail cart drawn by trotting bullocks. Wildebeest, zebra and oribi were seen. Big game was plentiful around Kalomo and shooting parties used to go out at week-ends. No excessive shooting was allowed by the Administrator. Troops of wildebeest were common to the west. Sable antelope were seen on the Boma Flats and roan antelope, eland, oribi, waterbuck⁵ and warthog. Lions were plentiful. No elephants

1906/1907 *Baila District*. I reached Namwala by ox-wagon. This was a country teeming with game. Large troops of several hundred red lechwe were to be seen on the plains and in the Batwa Swamps.

A troop of lechwe lived on the island opposite Namwala and we sometimes went over and shot a ram. Hippo occasionally visited the lagoon and crocodiles were numerous, some of them very daring. Blue wildebeest and zebra were common on open flats. Eland were plentiful and I once saw a troop of about 300 up the Kafue and about sixty hippo. Oribi were common, also puku. Buffalo lived in thick bush on the north side and sometimes the Baila would catch an old bull out on the flats and run him down. The animal would be speared to death with their wicked barbed spears. There were no man-eating lions as the Baila would make short work of such a beast! I suppose there were sable but do not remember seeing any. Roan were common. Kudu were not uncommon and some of the bulls carried magnificent horns. Black rhino existed in small numbers in the bush along the Namwala/Kalomo road although I did not see any. I saw their hide-ups several times. The Baila had no guns in those days and they used to make numbers of game-pits in certain areas. Game was very plentiful along a river called Nanzhila and I travelled along it once to reach Kalomo. It was a real game park and droves of impala were to be seen in the Mopane veld as well as many other varieties of antelope.

1908. I spent a few months at Mongu, Barotseland. On the way up from Livingstone by canoe many hippo were encountered. The Simaraha Flats were crowded with game. On a large plain called Libala Matabele on the south⁶ bank were tsessebe, oribi and other animals. Kudu were heard barking in the bush at night. Around Lealui there was little game. The King, Lewanika, had a game reserve which contained a number of animals but I did not have the opportunity of visiting it. He also protected a herd of red lechwe which lived on the flats near the capital. I once saw and finished off an unfortunate young wildebeest which had been wounded by a native hunter. The Barotse possessed a large number of muzzle-loading guns so there was little hope for the game outside a reserve. Bushbuck were found on islands in the Zambezi.

1909. I spent a few months at Magoye in the Monze District. Kudu were not uncommon and most of the ordinary game animals were met with. One or two troops of buffalo existed in the southern portion. A ganger shot a black rhinoceros not knowing what he was firing at. This was the only rhino I heard of in this area. Oribi were common on the flats and I hunted roan antelope where the township of Mazabuka stands. On the opposite bank of the Kafue here I saw a large herd of lechwe. Once I saw a large troop of wild dogs.

1910. About this period I was stationed at Old Ndola but did not have much opportunity of travelling. Ordinary game was plentiful and traces of black rhino were seen not many miles away. There were hippo in the Upper Kafue and buffalo were seen not very far from the Boma. I also saw a white-backed duiker⁷ near a bamboo thicket a couple of miles from the Boma. No wildebeest I think and no elephant. A nasty specimen of a gaboon puff adder⁸ was killed here. The only specimen of this wicked-looking snake I ever saw in Northern Rhodesia.

1911/1914 *approximately*. Mkushi District including the Luano Valley. On the plateau game was reasonably plentiful including eland and buffalo. Sable with good

heads not uncommon. Roan antelope and hartebeest (Lichtenstein) common. Reedbuck and klipspringer seen. I once saw a puku in the Boma garden which I am rather afraid I shot.⁹ I wonder where it came from as I do not remember seeing others. I also saw a hippo in a pool off the Mkushi River down towards the Falls. I wonder if it was a solitary. They were not uncommon in the Lunsemfwa River. After two or three attempts I succeeded in cutting my way with carriers to a point overlooking the magnificent gorges of the Lunsemfwa and Mkushi Rivers which I named Bell Point.¹⁰ We saw the vanishing stern of a black rhino here and their trails were all over the place. I also saw two small troops of the attractive little zebra called the mountain zebra (Crawshaw) and shot a specimen to have it identified. Unfortunately the skin was ruined in South Africa by beetles before anything was done about it. I instructed the headmen not to molest these zebra and meant to try and get a small game reserve proclaimed here, but war broke out and I took my leave and eventually went to German East Africa as a Political Officer.

Hinds who was a Native Commissioner at Broken Hill at this time was convinced that there was a type of dwarf Lichtenstein hartebeest around Broken Hill and Mkushi but I cannot say that I noticed it myself.¹¹ Along the escarpments bordering the Luano Valley on both sides, a number of black rhino had their home. As the natives fortunately possessed few guns at this time their chance of survival was good. In the valley which is the bed of an ancient lake, game was plentiful—troops of impala and buffalo, waterbuck, eland and roan. I cannot remember seeing sable but there may have been. Hippo were to be found in the Lunsemfwa River in the valley. I think I can say there were no elephant in the Mkushi District.¹²

1915. Journey with carriers from Ndola through the Belgian strip and skirting the Luapula and Bangweulu Swamps to the Chambeshi River at the old rubber factory and on to Abercorn. Village paths were followed and game was very plentiful in Rhodesian territory. In one morning I encountered roan antelope, reedbuck, oribi, hartebeest, zebra and warthog. Eland were frequently seen and the spoor of many buffalo. A flying visit was made to the Livingstone Memorial and the spoor of buffalo and black rhino seen in the vicinity. Tsessebe were reported on the flats bordering the swamps. The natives had no firearms but possessed large nets for trapping game. At one village a large black-maned lion had fallen into a game pit where it was carefully stabbed so as not to ruin the skin which I purchased for 30s. From Chambeshi to Abercorn game had been driven away from the road owing to heavy traffic. Hundreds of carriers were transporting foodstuffs to the border so that it could be held against the Germans who were making periodical raids.

The Abercorn District contained a fair amount of game such as eland, roan antelope, but I do not remember seeing sable; no wildebeest¹³ and no elephant which were found more to the west. Buffalo lived near the lake and *Nyala*¹⁴ were reported to be found in the area around Kituta Bay. I never saw any but had no time to do much travelling. Marabou storks nested on the ledges of the gorge at Kalambo Falls. A very pretty sight to see these birds floating in the air currents in the gorge.

I have an idea sitatunga were to be found in the swamps of the Saisi River and in the Lofu River not far from its junction with Tanganyika. Hippo lived in the Lofu and in Tanganyika. Puku were seen on the Lofu. Natives possessed very few muzzle loaders.

While I was District Commissioner at Isoka, I heard tell of a monkey which fitted the description of a colobus. It was reported to live in thick patches of forest on the Mukutu Range which is part of the eastern escarpment lying across the Luangwa Valley. It can be seen from the hills around Isoka. The chief in this area used to be Muyombe. I once climbed to the top of one section of the range (probably the first European to reach that point); the summit was a narrow plateau with thousands of tons of up-ended slate sticking up and making walking difficult. There were a couple of primitive, small forests to be seen and I should say this was a likely spot to find the colobus. My stay was limited to a couple of hours so had no time for exploration unfortunately. A very attractive spot. I saw one or two game trails made by the elusive so-called mountain zebra. I dare say something new might be found in this area in the shape of small mammals. To reach this plateau one would need a guide from the nearest village. I made a motor road once which crossed the valley and passed near a petty chief named Katumbi. From his village a path ran up the escarpment to Muyombe. There is now a motor road through Muyombe I believe from Nyasaland so you could follow this from the Tanganyika border and motor to Muyombe, thence by porters. I should think there is a large area from the source of the Luangwa along the escarpment south in which the colobus could be looked for.

There was a rumour of nyala round about a place marked by that name on the Stevenson Road along the Tanganyika Territory border but I never had time to investigate it. Nyala were also supposed to exist in the area around Kituta Bay on Lake Tanganyika, near Abercorn. I never saw the animals myself.

I think there were two types of lemurs in the Isoka District. One was known as a bush baby and makes a cry of *kaa, kaa, kaa*, towards sundown and at night.

I saw a couple walking along the branch of a tall tree in the Luangwa once at Katumbi. Then there is a much smaller one. I caught one of the small ones on the Isoka aerodrome once. They have enormous eyes. Can you give me the correct names for the bush baby and the small one please?¹⁵

Feira on the Zambezi, 1919/1920. Ordinary game such as eland, buffalo, roan antelope, etc., but not very plentiful. There may have been an odd black rhino in the hills. However, I did not travel much of the district. Baboons and leopards were very plentiful along the Zambezi and a few hippo were to be seen from the Boma itself.

Chinsali, 1921/1922. On the high plateau and embracing a portion of the famous Luangwa Valley. Game was very abundant in this district. With the aid of the Awemba Chief, Nkula, I created a small unofficial game reserve near the Boma extending from the Luvu River and Chambeshi to the main road leading to Kasama and Isoka. It contained about twenty-three elephant, a troop of buffalo, a fine herd of sable, sitatunga, black lechwe, three or four rhino and many other animals. The rhino and elephant lived in a small forest of magnificent mahogany trees named Chiri. In the thick bush lived a small buck similar to the blue buck of South Africa.¹⁶ All the animals lived within a few miles of Chinsali. Hippo were found in the Chambeshi River. Big game was plentiful in most parts of the district. In the Luangwa Valley were many elephant and rhino, waterbuck, impala, etc. The senga cob (puku) were not plentiful. Bush babies

(lemurs) were occasionally seen in the forest. Kudu were mostly found in the Luangwa Valley.¹⁷ A three-horned rhino was shot at Shiwa Ngandu by a Mr. Austin and the head sent to the Kensington Museum, London. The Awemba spoke of freak elephants called *Chinsala* which were supposed to have four tusks. I daresay there were freaks among so many elephant as I once saw five small tusks which fitted together to make one tusk. The other tusk was normal. The animal was, however, shot in Portuguese territory I think. I saw the freak tusk in Nyasaland.

Opposite Chinsali border in Lundazi District was a troop of wildebeest. As the country did not appear to be country suited for wildebeest I wondered how they came to be here. I imagine they must have been driven or migrated from Nyasaland, a good long period ago.¹⁸ Hippo were common in the Luangwa. Small mongooses were very common in the jungle hunting in large parties.¹⁹ Wild dogs and all the carnivora were well represented. Man-eaters (lions) often reported on plateau. Natives possessed very few guns.

Fort Jameson, 1924/1925. I only travelled over a small area of this district. Kudu were fairly common on the plateau and used to damage cotton fields. In the Luangwa Valley section, game was very plentiful. The kudu bulls carried exceptionally fine heads. I saw the spoor of Thornicroft's giraffe but not the animals. They may have migrated or been driven from the north (Tanganyika Territory) as there was no steep escarpment in the north to prevent their entry into the valley.²⁰ I once saw a badger.²¹ Natives possessed very few firearms.

Mpika, 1925/1926. A district in which all types of game were very plentiful. On the plains bordering the swamps of Bangweulu, tsessebe were found. They were not plentiful. Thousands of lechwe lived in the swamps, also sitatunga. Natives traded large numbers of otter skins.

In the Luangwa Valley game was very plentiful and numerous rhino were to be found at the foot of the Muchinga Escarpment.

Mpika was a great place for man-eating lions. I think some of them came up from the valley driven out by younger animals.

Puku were found along the banks of the Chambeshi and at other localities. A large troop of buffalo lived in a valley not far from the Boma. Oribi were found on open flats if I remember rightly. Natives possessed few firearms.

Isoka, 1926/1932. A district embracing a large area of lightly wooded plateau, a portion of the Luangwa Valley and a high plateau adjoining Nyasaland. Sable were very scarce and I only heard of one troop which lived in the hills north of Isoka. Headmen were told not to molest them.

As the plateau was well populated, game was not plentiful. The usual animals were to be found in different parts such as buffalo, eland, roan, waterbuck, reedbuck, etc. In the valley game was more plentiful but not towards the source of the Luangwa.

Lower down there were stretches of very wild country with heavy game such as elephant, rhino, buffalo, etc. A few Senga cob (puku) were seen but unless protection was given them it looked as if they were threatened with extinction in the Isoka District. Sitatunga were found on the plateau in a swamp not many miles from Isoka. I had them protected. I also suggested the formation of a game reserve in the Luangwa Valley but the Government was not prepared to form this on account of tsetse fly.

On the plateau adjoining Nyasaland there was a certain amount of big game but not plentiful; I do not think there were any elephant or rhino there. On the summit of the Mukutu Range could be found small patches of primeval forest in which a monkey which might be the colobus was reported to exist. I never saw them but had no time to make a search. On the summit of the range I also saw the small footprints of the so-called mountain zebra. This area would repay some study.

There was a rumour of nyala near the Stevenson Road near the border of Tanganyika Territory, but I do not know if they really were to be found there.

I discovered a new tortoise²² and a dormouse²³ in the Isoka District. Elephant shrews were found near the Boma.²⁴ Bush babies were not uncommon. No man-eating lions were reported in this district.

Towards 1930 or before natives began to acquire muzzle-loading firearms from the Congo and quantities of gunpowder, also shotguns. I remember the District Commissioner, Serenje, writing me about the destruction of game that was commencing with the arming of the natives.

I have two or three letters from Pitman regarding game which are on an old file. You are welcome to them if you would like to have them.

The Kafue Game Reserve is the right place for many animals. I was told of a dwarf form of some antelope that was found there but cannot remember what it was—something like a puku I think.²⁵ I saw a herd of about 300 eland once not far from the Hook of the Kafue on the north bank.

ANNOTATIONS BY W. F. H. ANSELL, F.Z.S., GAME AND TSETSE CONTROL DEPARTMENT

References to the annotations are indicated at the first mention in Mr. Jordan's writings of the species concerned. They are, except where the context may otherwise demand, applicable in all subsequent reference to the same animal.

1 *Crawshay's zebra*. The only species of zebra found in Northern Rhodesia is *Equus burchelli*. It may at times frequent hilly country as well as plains, and spoor was in fact recently reported by Major Grimwood on the very summit ridge of the Mafinga Mountains. The subspecies occurring in the Territory are even to-day not properly known, but in the localities referred to by Mr. Knowles Jordan *E. b. crawshayi* de Winton may be the one in Isoka on the Mukutu Range. In Mkushi there is no reason to suppose it is any other than *E. b. boehmi* Matschie which occurs all over the Territory west of the Luangwa and east of the upper Zambezi. The true mountain zebra (*E. zebra*) has, of course, never existed in Northern Rhodesia.

2 *Anomalurus derbianus naevii* Dollman.

3 *Colobus angolensis sharpei* Thomas occurs in south-west Tanganyika and (very rarely) may just overlap the Northern Rhodesia border in Isoka and Abercorn districts. But in spite of much inquiry no evidence has come to hand that it has ever been resident in any part of Northern Rhodesia.

I think it probable that reports given to Mr. Jordan in the Mukutu area may really have referred to one or other race of *Cercopithecus mitis*, possibly *C. m. moloneyi* Sclater (Moloney's monkey).

4 *Felis caracal*, frequently spoken of as "red lynx"—by no means an inappropriate English name for the animal.

5 On the plateau the waterbuck would be *Kobus defassa penricei* Rothschild. This is the southernmost definite record of the animal (no longer found around Kalomo Boma). A waterbuck is, however, believed to exist on Luezi Ranch, Zimba, which may be this species.

6 Strictly speaking "west bank" would be more correct for this place.

7 *Cephalophus sylvicultor*. More correctly known as the "yellow-backed" duiker.

8 Gaboon viper (*Bitis gabonica*). Not by any means uncommon in the Copperbelt, and now known to occur also in many other parts of Northern Rhodesia. Like the yellow-backed duiker (see note 7 above) this is part of the West African sub-region element in our fauna.

9 Mkushi (old) Boma was at 29° 22' E., 14° 22' S.

10 Bell Point is 29° 10' E., 14° 40' S.

11 There is no reason to suppose such an animal has ever occurred. Among various animals (e.g. leopards, zebra, etc.) one often hears stories of dwarf kinds, not infrequently a "hills" and a "plains" form. But generally these are without any sort of supporting evidence in the way of specimens, and if taken at face value may obscure proper appreciation of such variations as really do occur.

12 I understand elephant do occur to-day in the Mkushi district (plateau).

13 Wildebeest have never authentically been recorded anywhere in the Northern Province plateau areas.

14 Nyala (*Tragelaphus angasi* Gray) has never been authentically confirmed in any part of Northern Rhodesia, and there is no reason to suppose it occurs.

15 *Galago crassicaudatus monteiri* Gray and *Galago senegalensis moholi* A. Smith.

16 *Cephalophus monticola* (blue duiker). In the area quoted by Mr. Knowles Jordan they may be intermediate between the races *C. m. defriesi* Rothschild and *C. m. hecki* Matschie (synonym *nyasae* Thomas).

17 The kudu is absent from nearly all the Northern Province plateau; but has recently been recorded between Chinsali and Isoka (D. Stewart *in litt*).

18 *Connochaetes taurinus cooksoni* Blaine—the well-known Cookson's wildebeest, confined to the Luangwa Valley. Possibly in former times extending into Nyasaland, but no actual record of this. There is in any case no reason whatever to suppose *C. t. cooksoni* was "driven" from Nyasaland into Luangwa Valley as a result of human activity, as implied by Mr. Jordan's note (see also note 20 below).

19 These would undoubtedly be *Mungos mungo* subsp.

20 There does not seem any reason at all to suppose such a migration actually occurred, and most certainly not in historical times. The expression "driven from the north" clearly implies human agency. But habitat considerations are what decides the distribution of animals, and were there favourable conditions for the species in a place that could be reached by southward migration from Tanganyika territory the giraffe would doubtless have occupied such a niche long before human influence was of any consequence. The idea of overhunting (or, equally, development such as agriculture or industry) causing animals to move away and occupy an area previously unoccupied by, though physically accessible to, the species indicates a quite wrong conception of the manner in which distribution takes place. A species may indeed, as the result of human activity, become restricted to limited areas, its original range thus being fragmented and remaining only as "islands", so to speak, in the original area of occupation. But as to a whole population, or a substantial part of it, being "driven away" to an area where it was previously unknown—it simply does not happen.

21 The honey badger or ratel (*Mellivora capensis*).

22 *Kinixys jordani* Hewitt.

23 *Graphiurus angolensis jordani* Roberts. Regarded as a race of *G. platyops* Thomas by Ellerman, Morrison-Scott and Hayman (*Southern African Mammals*, 1953).

24 The elephant shrews mentioned might be *Nasilio brachyrhynchus*, *Petrodromus tetradactylus*, *Petrodromus rotumae*, or *Rhynchocyon cirnei*, all of which occur in Isoka District.

25 See note 11.

FIRST RECORDS No. 15—THE FIRST BAR

According to Bob Beaton there were two bars at the Old Drift (moved to Livingstone in 1905). One owned by Mopane Clark and the other by Freddie Mills. Both comprised trestle tables set on the sandy floor of pole and dagga huts. Every morning the servants used to sieve the sand to collect coins that had dropped and not been heard.

When the new Livingstone township was established Mills and Mopane tossed a coin to decide which of them should move to Livingstone. It was the loser who had to go because no one of the Old Drifters believed that Livingstone would have a future. Eventually it is said that they had to be forced to leave the Old Drift by the health authorities.

HORSES AT MONGU

The following is an extract from a Minute by the Chief Secretary, 22nd October, 1930

Mr. Sylvester pointed out that the only means of transport available to officials in the valley is horse transport, and that transfers of officials from the valley to stations on the plateau or in the fly belt discouraged an officer from investing in his own horse. Please note this for estimates and bring it up in connection with the Barotse estimates for consideration by His Excellency as to whether provision should be made for two horses at Mongu. I understand that the Provincial Commissioner is to be seen careering about the plain mounted upon a homely ass and this does not appear to me to consort with the dignity of the Governor's representative in the Barotse Province.

"MIST" FORESTS OF THE BWINGIMFUMU HILLS

By D. B. FANSHAWE

THE Bwingimfumu Hills lie in the Chinsali District of the Northern Province forming part of the east-west divide of Southern Central Africa. This watershed feeds the Chambeshi and Luapula Rivers on the west and the Munyamadze and Luangwa Rivers on the east. The Great North Road cuts through the hills between the Lufuni and the Kabali Rivers. Artesian wells and springs, a few of them mineralised, can be found in or adjacent to the Bwingimfumu Hills. The area is native trust land.

The country is hilly and broken with rounded peaks running up to 6,122 feet. Streams are perennial and have their sources in permanent seepage areas on the lower slopes around the 5,000 foot contour.

The rocks consist of Upper Basement sediments of pre-Cambrian age mainly quartzites with a north-east strike. Intercalated shales and slaty schists also occur.

Soils are sands or sandy loams, highly siliceous, thin on the crests and upper slopes, deepening on the lower slopes and in the valleys. The predominant colour is reddish-buff on the hills.

The higher rocky slopes are covered with a sparse, very open scrub woodland, composed of the hardier or more catholic elements of the "miombo" woodland such as *Brachystegia spiciformis*, *Fulbernardia globiflora* and *F. paniculata* mixed with the typical rocky hill endemics like *Disotis caloneura*, *Euclea dekindtii*, *Hymenodictyon*, *Iboza*, the ginger plant of gardens, *Maytenus acuminatus*, *Myrothamnus*, the Resurrection plant, *Olinia* and *Rapanea*. The tree heath (*Philippia*) has even spread on to the hills. Aloes and Brooms and Brushes (*Vellozia*) are abundant.

Around the 5,000 foot contour percolating rainwater comes up against a clay pan and seeps out all around the hills. Where the seepage waters gather together to form a stream-head there is still, in places, high forest, the so-called "mist" forest. At one time the mist forest belt may have been continuous around the 5,000 foot contour. Elsewhere seepage waters produce moist dambos fringed with tree heath (*Philippia*) and odd shrubs and starred with a multitude of flowering herbs including one of the very showy scarlet *Disa* orchids, almost two feet high.

The "mist" forests are high-level swamp forests and have no connection with the true mist forests of other parts of the world. The canopy is closed between 80-90 feet. These forests do not differ essentially from swamp forest elsewhere in the high rainfall belt between Balovale and Abercorn where, as here, *Syzygium owariense* and *Xylopia aethiopica* are nearly always the dominant trees. But because of their situation near the top end of the Muchinga escarpment and the Isoka hills and their altitude, a number of unusual woody species occur at all levels in their composition.