

## NOTES ON THE MAGADI SECTION OF THE EASTERN RIFT VALLEY

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### *The topography between Suswa and Lake Natron*

THE LAKE MAGADI district is one of the most striking sections of the Rift Valley, not only on account of the great soda lake which is an unique feature, gleaming white against the surrounding sombre hues of the many fault-block ridges east and west and flat lake beds to north and south, but also because the lake level is below 2000 feet and forms one of the lowest parts of the Rift Valley; it is in fact the termination of a 5000 feet fall from the high point on the Longonot ridge a little over 60 miles to the north-north-east. Much has been written about the soda lake with its hot alkaline springs and inexhaustible white, green, and pink deposits of soda, and it is well known to many visitors, particularly ornithologists. The interesting section of country which lies to the north is less familiar. Before the foundering of the Rift Valley floor, it formed a continuation of Lake Magadi when the latter was joined to the ancient Lake Sueß in the Kedong, which in turn was joined through Lake Naivasha and Lake Elmenteita to Lake Nakuru. Indeed, it is probable that at one time an almost continuous freshwater lake extended from Natron to Nakuru, a distance of nearly 200 miles. This may have been in early Pluvial times, before the Rift Valley was formed, when East Africa was colder and far wetter than at present.

A glance at most maps of the section of the Rift Valley between Magadi and the Suswa volcano reveals an almost complete blank of about 30 miles in length except for one or two tentative contour lines. Until recently, few, if any, Europeans had traversed this area from north to south, although several had traversed it from east to west across the Rift Valley. The late Dr. Parkinson records that he travelled some distance up the Valley, where he traced the northward continuation of the lacustrine beds.<sup>1</sup>

A few weeks before I visited Magadi in May 1945, the Locust Control had begun work on the construction of a rough road leading north from Magadi to join the Narok road. This enabled me to make a journey by lorry as far as the southern slopes of Suswa and presented me with an opportunity of seeing something of this little-known section of the Rift Valley. Our camp was situated at about 4200 feet, due south of the denuded volcano of Soit Amut on the slopes of Suswa. I had heard reports of steam vents on the south side of this cone and a search revealed about twenty-five vents of varying size at a height of about 4700 feet. Most of them were situated in two north-south aligned fissures a few yards apart. I estimated one fissure at 25-30 feet deep, and large specimens of a giant nettle were flourishing in the steamy atmosphere. Following this fissure northward, I found that it ended in a dyke of

<sup>1</sup> J. Parkinson, "The East African trough in the neighbourhood of the soda lakes," *Geogr. J.* 44 (1914) 33-49.

reddish phonolitic lava. Several vents issued from other and similar raised dykes. My visit to the summit of Suswa in 1943 had not revealed these vents, but they were probably hidden from view by the bulk of Soit Amut.

The view from this point was impressive and I was able to see the general structure of the Rift Valley as far south as Magadi. It was obvious that this was the lowest part of the valley in transverse section, for on either side to east and west the land rose in successive steps and plateaux. I could clearly see too that, in longitudinal section, the floor of the Rift Valley was composed of several successive lake beds, divided from each other by scarps and progressively falling by steps until the Magadi level of 2000 feet was reached. I noticed that on the west side a section of lake bed formed a terrace approximately 200 feet above the lower lake bed, from which it was bounded by an escarpment aligned north and south. The general appearance of this section of the Rift Valley was of a rift within a rift, or a succession of rift valleys. I concluded that a sudden sinking must have occurred between here and Magadi, leaving sections of the original lake "high and dry" on either side. The lake beds were covered with a good growth of thick green grass, among which the Masai and their cattle roamed. I saw no permanent water. The valley was quite beautiful in parts, with these green expanses bounded by magnificent and precipitous scarps.

Altogether we crossed five lacustrine beds before reaching the final continuous bed which extends to Magadi. The aneroid determined their respective levels at 4000 feet, 3800 feet (15 miles by road from the camp), 3550 feet, 3000 feet, 2700 feet, and the last started at 2400 feet and gradually descended without a break to 2000 feet. These levels are approximate only, but they serve to show the gradual stepping down of the broken lake bed. The beds were divided from each other by transverse, scrub-covered, lava ridges which often rose 200 feet. There was much of both geological and fossiliferous interest to be seen as further evidence that the lake originally extended north throughout the length of the Valley. I found diatomous deposits at the 3850 feet level, and again 18 miles from Magadi, lime deposits also diatomous in places. Near these latter deposits a dry stream bed revealed silico-calcareous rocks full of hollows in which reposed masses of freshwater shell fossils. This was only one of many such deposits, and other eroding stream beds clearly showed the lacustrine silt deposits, often overlain by lava flows and fragmentary lavas. About 8 miles from Magadi a large section was exposed in a cliff face, revealing many strata of alternate sediments and lava tufts and agglomerates; here I found traces of fish-bones among the sediments. The last section of the Valley to Magadi was notable for its succession of "whale-backed" hills, surmounted in one instance by a pintle-shaped rock and in others by large square masses of lava. These features contribute to the immature character of the topography, which is characteristic of the, geologically speaking, youthful Rift Valley.

On my journey south from Magadi I was fortunate in being able to travel with a locust scout who was going as far as the northern shore of Lake Natron. Passing over the southern arm of Lake Magadi provided me with a close view of the birds for which the lake is famous, in particular marabou stork, flamingo, tern, pelican, and plover. The most striking feature of the landscape

was the consistency of level. There can be no doubt that the two lakes were once joined and, in marked contrast to the Magadi to Suswa route, not a single transverse ridge of any consequence was crossed and the country was almost free from north-south scarps or ridges. Our route lay south-west, past the great massif of Shombole, to the flat swampy area which forms the delta of the Uaso Nyiro river. We pitched camp on a low two-peaked ridge, running north and south between the river and one of the western arms of the lake. A cairn on the ridge marks the boundary between Kenya and Tanganyika. On the north-east side of the summit of the southern peak I found what appeared to be a deposit of large fossilized bones, which may mark the site of a midden. I collected samples which in due course will be examined by experts.

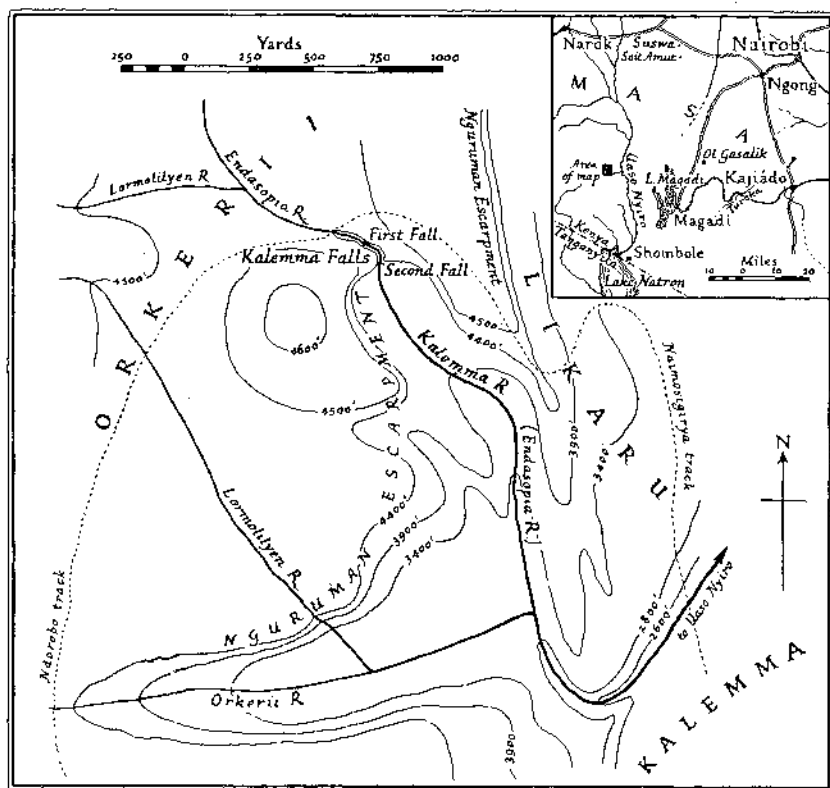
The view to the south looking across the lake was most impressive. Beyond the vast expanse of brown mud flats, partly covered by shallow water in the foreground and areas of white soda deposits in the background, stood a series of peaks: to the south-east the curious-shaped peak of Longido; to the south-south-east the great mass of Gelai; in the centre and due south the beautiful symmetrical summit of Ol Doinyo Lengai (the most active volcano in this area), with its cone streaked white with soda; and to the south-south-west the impressive height of Jaeger Summit. These peaks are the vanguard of one of the finest volcanic regions of East Africa—the Giant Cauldron mountains, which include the enormous Ngorongoro crater. Immediately to the west lay the Nguruman escarpment; to the east was the mass of Shombole.

Not the least interesting part of my visit to Magadi was the rail journey back to Konza, for it gave me a good view of the way in which the country between Lake Magadi and the Turoka river is broken up into many parallel north-south fault-blocks and secondary rift valleys. These faults were most impressive in their clean-cut sharpness. As the train wound its way up between them, I obtained a general view of Lake Magadi in relation to the Nguruman escarpment and the gradually descending fault-lines on either side of the Rift Valley, which enabled me to see how the Magadi sector had sunk in relation to its surroundings to east and west. I was regretful when the train finally wound its way out of sight of this grand and broken landscape, when the great mass of Ol Gasalik was lost to view, and we began to traverse the mild and uninteresting undulations of the Kapiti plains. P. C. S.

#### *The Nguruman escarpment*

About 14 miles west of Lake Magadi, the Rift Valley is bounded by the impressive Nguruman escarpment, which extends north and south for some miles and rises to heights of between 6000 and 7000 feet. The escarpment rises in steps by two grassy and well-wooded plateaux, and is divided transversely into sections by deep and precipitous valleys down which run numerous streams. Indeed it is a remarkably well-watered district, in marked contrast to the eastern escarpments of the Rift Valley, which in general are dry areas on the lee side of their hinterlands, whereas the Nguruman escarpment is the windward side of a large block of highland and consequently enjoys a good rainfall. The maps of the escarpment that I have seen are most inadequate: rivers are vaguely shown as descending and joining the Uaso Nyiro River, but they are mostly unnamed and their courses indefinite.

I was fortunate to find that my host, Mr. Stevens of the Magadi Soda Company, was anxious to explore a section of the escarpment which contains the valley of the Endasopia river, with the object of learning something of the hydrology of the river, its rate of flow, etc. Little is known about the Endasopia. It is not known for certain where it rises, although it is believed to have its source in marshy ground on the higher of the two plateaux; nor is it certain whether it joins the Uaso Nyiro, as the Masai says it does, or whether it



*Nguruman escarpment and Endasopia river (based on original map by J. A. Stevens)*

tapers out in the porous silty country below the escarpment, which is the fate of many initially vigorous rivers in East Africa. We suspected that large waterfalls must exist on account of the steep valley gradient, but the maps showed no evidence to confirm this. As far as we knew no European had reported an outstandingly large waterfall on this river, although Magadi residents had occasionally seen a faint white streak against the dark background of the escarpment, usually during the wet seasons when the river would normally be in spate.

A car journey took us along the Lake Magadi causeway and over several fault ridges, before we crossed the Uaso Nyiro and continued across flat

country to the edge of a large delta area at a height of about 2200 feet, which had evidently been formed by the many streams running off the escarpment during Pluvial times. Walking from there, we crossed many water-worn boulders of all types of rock of which the escarpment is composed, until the ascent began. After a steep climb we came to the first plateau and began the second lap, much of which lay over quartzite rock. At a short distance below the upper plateau we came to the edge of a very deep valley, thickly covered with large trees, where the roar of the Endasopia could be heard far below. Presently we continued higher until we attained a level reach of the river at approximately 4450 feet. The air temperature at 1030 hours was 70° F., and the water temperature 65° F. Large timber grew along the banks and the water was beautifully clear and pleasant to drink. Altogether the atmosphere was delightful and in marked contrast to the heat and dry stuffiness of Magadi 2400 feet below. Here was a well-watered country with long grass, large trees, and numerous rivers, a Masai reserve, but unfortunately tsetse-fly country. Game was plentiful, particularly buffalo and rhino, of whose presence there was much evidence.

We walked downstream until we reached a waterfall known to Stevens. The water had a fall of about 25 feet over a solid lava shelf (the river was flowing over and between lava rock most of the way). While Stevens busied himself measuring the flow of the water, I managed to negotiate the waterfall after a steep scramble, and continued to walk on downstream in the hope of coming across another fall. I was rewarded more generously than I expected, for the rather enclosed, tree-hung surroundings suddenly opened out into one of the most splendid views I have ever seen in Kenya. The river divided in two against a large lava mass and disappeared before me over a cliff which I estimated to have at least a 300-350 feet sheer fall into a large pool surrounded by tall trees. The timbered valley framed a magnificent V-shaped view to the south-east, revealing the distant Rift Valley over 2000 feet below. Immediately on either side towered immense bare lava cliffs, and above all was the continual roar of water falling into the pool far beneath. On looking over the edge I was struck by a blast of cool air which was continuously displaced upwards by the falling water. Later we looked down on the fall from bluffs on either side of the valley and obtained a good view of the beautiful twin cascades, though from neither point could we see the full extent of the fall, since the pool below was screened by tall trees. There can be few, if any, falls in Kenya more impressive than these, which in full flood must present a particularly fine spectacle. They certainly compare favourably with the well-known Thompson Falls on the eastern escarpment of the Rift Valley.

We walked over to the next valley to the south and could hear the roar of the Orkerii river far below. Because of their steep gradient it would seem that all these lateral valleys must contain deep waterfalls, as yet undiscovered by Europeans. For the same reason, it is thought that the Endasopia may contain another fall of considerable size. An aerial photographic survey of the Nguruman escarpment would enable some estimate to be made of the water resources of this well-watered and little-known region. P. C. S.

*The history of the Nguruman district*

With the assistance of Mr. C. Gillman of Dar-es-Salaam, Tanganyika Territory, I was able recently to study the records of some early exploration in the Nguruman district, and my reconstruction of its history is as follows.

For many years prior to 1883 Ngurumani must have been an important place on an Arab or Swahili trade route from Zanzibar to Lake Victoria, and probably appears on the Mombasa Mission map of 1850 and on Denhardt's map of 1881, though I have not been able to verify this. There can be no doubt that G. A. Fischer had seen maps of his proposed route before he made the first journey by a European through Masai-land in 1883 and officially discovered Ngurumani on the Bagasi river. "Ngurumani" is not a specific name, but is used by the Masai for any place in their country where crops are grown, and there is a second Ngurumani, also called Kalemma, two days' march farther north, which is watered by the Endasopia river. Endasopia is the name given by the Masai to the river above the falls, and from the falls downward it is referred to as Kalemma; for this reason I have applied the name Kalemma to the falls. Fischer crossed the Kalemma river on the second day after leaving the Bagasi Ngurumani, and pushed on northwards along the Uaso Nyiro river. A number of European travellers followed him in later years; and in 1896 von Trotha (*Deutsche Kolonial Blatt*, 7 (1896) 102) also reached Kalemma. From there he climbed the Nguruman escarpment by the Naimo-sigirya track, used by Lieut.-Commander Spink and me, followed the Endasopia towards its source, and made his way thence to Lake Victoria. As a result of this journey, the Endasopia first appeared on a German map, of which I have a copy, under the name "Dashobia," though in the account of the journey the river is not mentioned. The river is also shown on the June 1944 edition of the East Africa Survey Group map (E.A.F. No. 1539 1/500,000 sheet, Nairobi SAA371), for which I supplied some revised material, including the lower course of the Endasopia. My first visit to the lower river was late in 1937, and my first climb to the upper river was made in November 1941. I was interested in the Kalemma falls for power generation, and I found that the existing British maps of the district were based on the work of the Kenya-Tanganyika Boundary Commission,<sup>1</sup> and did not show either the escarpment or the rivers in this area with any accuracy except sometimes on the Uaso Nyiro level. Accordingly I set about making a rough sketch-map to cover primarily the Endasopia-Magadi district, and this I have revised from time to time as fresh details came to light.

J. A. S.

<sup>1</sup> See G. E. [Smith, "From the Victoria Nyanza to Kilimanjaro," *Geogr. J.* 29 (1907) 249-72.