

The Geographical Journal.

No. 6.

JUNE, 1899.

VOL. XIII.

THE NYASA-TANGANYIKA PLATEAU.*

I.

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WHEN, last year, I was in Africa as a member of the Anglo-German Boundary Commission, the British section of which was under the command of Captain C. F. Close, R.E., I crossed the Nyasa-Tanganyika plateau; and to-night, in compliance with an invitation I have had the honour of receiving from the Council of your Society, I shall place before you some facts about this tract of country and the people, and I shall also give an account of the methods employed in the surveying work of the Commission. But it is desirable, before describing the plateau, to give a brief description of the route followed to reach the plateau. Chinde, the port at one of the mouths of the Zambezi river, is twenty-eight days distant from England *viâ* the Suez canal to Quilimane in a German steamer and on to Chinde in a coasting vessel, or thirty-three days *viâ* Cape Town and Durban, and thence on in a coasting vessel. Starting from Chinde there is first an eight days' passage up the Zambezi and Shire rivers in flat-bottomed stern-wheelers to Katunga's; thence, leaving the river, two days' journey in a machilla (or hammock slung on a pole) along a good road through Blantyre to the river again at Matope, whence Fort Johnston is reached after twenty-four hours' passage in a small stern-wheel steamer. Here a trans-shipment into one of the seven steamers plying on Lake Nyasa is necessary, and, provided that rough weather is not encountered, the traveller should arrive in five days at Karonga, the British station at the head of the lake. This gives about forty-nine days in all for the journey from

* Two papers read at the Royal Geographical Society, April 24, 1899. Map, p. 692.
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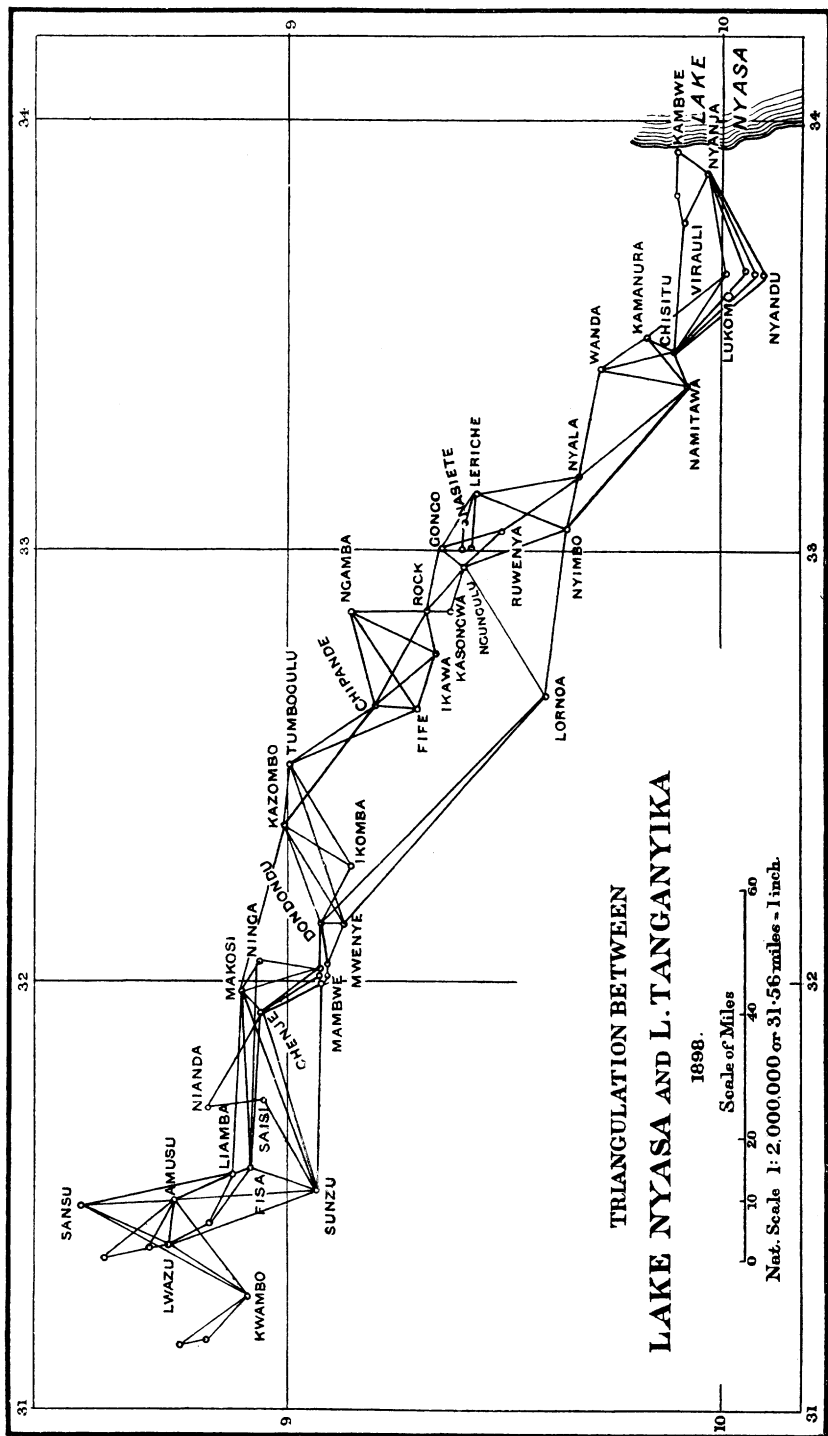
England, provided all the steamers connect, which is hardly probable. At least two and a half months should be allowed. As the so-called Stevenson road, which runs across the plateau to Lake Tanganyika and leads into the heart of Africa, commences at Karonga, this place is to us of some importance. It is the headquarters of the collector of the district, and here the African Lakes Corporation have a store, where a certain amount of calico, for payment of carriers, and provisions for Europeans can be purchased; stores, which owing to the increasing traffic to the Congo and interior should succeed, have just been opened by one or two Germans; a telegraph office has also been recently established by the Trans-continental Telegraph Company. There is also a branch of the Livingstonia Mission, about which I shall speak later.

Two large Belgian expeditions passed through Karonga last year. The first in June, under Monsieur Le Maire, who was to spend two years surveying and prospecting in the country between Lake Tanganyika and Stanley Falls. He sustained a severe loss in the drowning of two of his best officers while crossing Lake Tanganyika from Kituta to Mliro. The other expedition, under Captain Mohun, passed through in November. He is in charge of a telegraph line, which is to be laid through the Congo Free State. The Germans also sent a large expedition by this route to Lake Tanganyika. They were taking up a steamer which is to ply on the lake.

The drawback to Karonga is the want of a harbour where steamers can discharge their cargoes in rough weather. At present they are obliged to go to the Kambwe lagoon, about 3 miles further north, and unfortunately this shelter is fast being silted up.

The height of the surface of Lake Nyasa is 1700 feet above sea-level. The country rises very gently from the lake at about 1:150 to some low hills 5 miles westwards. Then a series of ridges, gradually rising, merge at about 40 miles from Karonga into what is called the Tanganyika plateau, which at the first camp (Kamanura) is 4500 feet above sea-level. The Stevenson road, the construction of which for the first 50 miles is due to the generosity of Mr. Stevenson, who presented £4000 towards this work, was well laid out through these low hills by Messrs. Stewart and McEwan (both of whom died while making the road), at a limiting gradient of about 1:10, and is about 10 feet wide. In the first 40 miles it crosses the Rukuru, Lufira, and Chambo rivers. From the latter a steep ascent brings one to Kamanura (which is merely a camping-place).

The distance by our triangulation of a point on the shore of Tanganyika at Kituta from a point on the shore of the Kambwe lagoon, on Lake Nyasa, is $203\frac{1}{2}$ miles by a geodetic line. Therefore the plateau may be said to be 160 miles across. From Kamanura the plateau gradually rises to Mambwe, where it reaches an altitude of 5700 feet above sea-level. It then maintains a height of about 5000 feet till within 8



miles of Tanganyika, when it falls rapidly to the lake-shore, which is 2680 feet above sea-level. The eastern end of the plateau is broken by high ranges, some of the mountains, like Namitawa, Miniwanda, and Inyala, rising abruptly out of it to an altitude of 6000 to 7000 feet above sea-level. But from Fort Hill to the Saisi the plateau is undulating, most of the pronounced peaks being to the north.

Between the Saisi and Lake Tanganyika the steep Fisa range rising on the road to 6000 feet has to be crossed to reach a sort of basin in which lies the Kawimbe mission. Thence onwards it again becomes monotonously undulating. The crest of the plateau, which forms also the watershed of the Congo basin, is roughly a line joining the north end of Lake Nyasa and the south end of Tanganyika. Towards the south it slopes down gently at an inclination of 20 to 50 feet to a mile, and is drained mainly by the tributaries of the Chozi and Chambezi, whose waters flow into the Congo. The northern slope, draining into Nyasa, Rukwa, or Tanganyika, is steeper and more broken. At 32° 40' a spur runs out from this watershed in a north-westerly direction, called the Chingambo range, which, on account of its abrupt northern slope, has been taken by travellers as the real watershed, and is shown as such on most existing maps. This range, however, is cut by various streams from the real watershed south of it, which is perfectly distinguishable except in the neighbourhood of Ikomba, where a flat swamp draining both ways makes the determination of the watershed difficult.

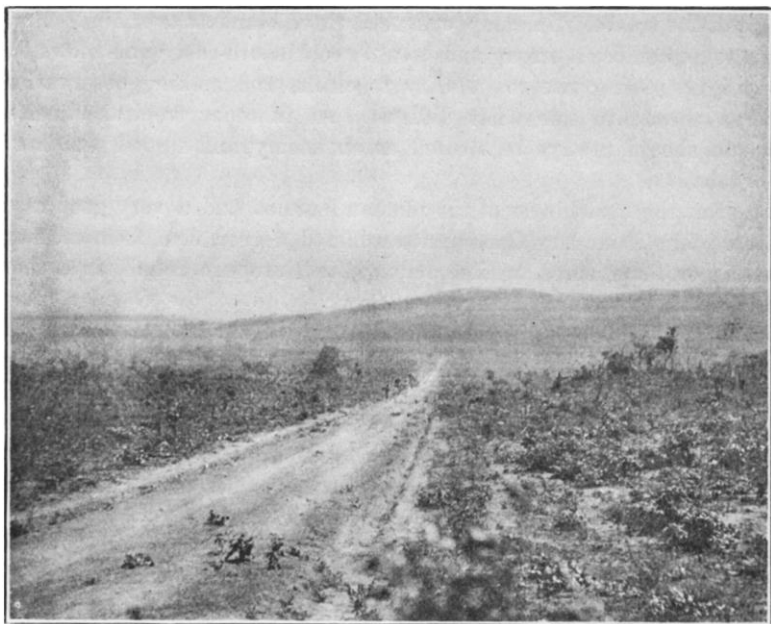
None of the rivers in this area are navigable. At the end of the rains it is possible to ascend the Songwe for 2 miles in a boat not drawing more than 2 feet. A canoe can be paddled for a mile up the Kalambo, but otherwise the rivers cannot be used. On the plateau itself there is a great scarcity of water between July and November, especially at the eastern end. At most halting-places water is obtained from uninviting-looking stagnant pools. In fact, the only streams of any importance on the plateau are the Saisi and Lucheche. The former in the dry season is about 20 yards wide and 4 or 5 feet deep, and in the rains is about 200 yards wide. It is crossed by a very winding and somewhat shaky trestle bridge.

The Lucheche, a pleasant-looking mountain torrent refreshing to see after the succession of dry beds, draws its waters from a small lake close to the Abercorn. Towards the western end of the plateau many of the streams lose themselves in flat swamps, called "dambos;" these are treeless and dry in the hot season, and are often of considerable area, 10 square miles or so, and are the principal resort of game of all kinds.

The plateau is covered with a thin scrub jungle, with grass 4 or 5 feet high growing between trees 12 to 15 feet high. It is not sufficiently thick to prevent walking in any direction. At the eastern

end almost every tree is covered with white ants, and this, together with the want of water, has probably stunted their growth. From Mpanga to within a mile or two of Mbala (or, as it is now called, Abercorn) the country becomes almost treeless, and the sense of relief on reaching these open downs after the endless bush before met with can be imagined.

On nearing Lake Tanganyika the trees are bigger and healthier looking, and are not attacked in the same manner by white ants. The real tropical jungle is only met with in patches on the Misuko range, and occasionally close to springs or where the water is not far below the



THE STEVENSON ROAD NEAR SAISI.

surface. Just before the rains break, the leaves on all the trees turn to a bright brick red, brighter than our autumn tints, but at almost the first shower resume a fresh green colour. There are a few borassus palms on the plateau, and in the damp ravines on the northern slopes of Ngungulu, the rafia palm is common, and grows to a great height.

The soil of the plateau is mostly of a disintegrated granite. Round Ikawa there is a good deal of quartz and marble. The Fisa range is of a sandstone formation. Of gold we saw no traces ourselves, but our German friends told us they washed for it in most streams, and in many had found colour, but nothing more. Iron ore of a fairly rich quality is found in large quantities about a foot below the surface of the swampy plains at the northern end of the plateau. This the natives dig up,

smelt in small earth kilns, and convert into wire, hoes, spears, and arrows.

At the western end of the plateau the rains begin in a half-hearted way about the end of October, while at Karonga, on Lake Nyasa, they begin about a month later and last till about the end of April or the middle of May. At other times, although absolutely rainless, there are occasionally cloudy days. The rainfall on the plateau amounts to about 70 inches, and at Karonga about 50 inches. The maximum temperature at the latter place is about 100° Fahr.—somewhat high—and the relief on getting on to the plateau, where it is only about 85°, is great. The nights are always cool on the plateau, and during June, July, and August, the traveller in camp will need three blankets over him. From June to September a strong and bitterly cold south-east wind blows day and night, giving rise to liability to chills, and making observations with a theodolite somewhat difficult. As in other tropical climates, the sun should always be treated as an enemy, and a good pith hat is desirable.

So far, the healthiness of the plateau has not had a very good reputation. The Boundary Commission suffered a good deal from ordinary malaria or fever sores, whilst among the European inhabitants there were several cases of blackwater fever. One of the German party had it, but recovered. Whilst the Commission was at work, five white people out of the scanty population of about 20 died, four of them from climatic causes. In favour of it, however, it should be added that this happened to be a particularly unhealthy season, owing to the extraordinary duration of the rains; also that there are several men there who have been six to seven years in the country, and, except for a somewhat anæmic complexion, do not seem much the worse for it.

Under no circumstances should the traveller sleep on the ground. This was well exemplified while we were there. Our two N. C. O.'s did it for three days; at the end one had very bad fever, although he had only been three weeks in the country, and had never been out of England before. We met a gentleman at Fort Hill who had had fever. He told us that for three years in Southern Rhodesia he had slept on the ground, and had never been the worse for it. However, he had done the same on the plateau for the previous ten days, and had completely broken down.

It is hardly a country one would recommend the sportsman to visit for shooting purposes. Buffalo, owing to the rinderpest, have almost disappeared from the plateau, although round the Kalambo fresh tracks were seen. There are a few lion and rhino. Eland, roan antelope, hartebeest, zebra, and small deer are met with, but more down in the valleys to the north than on the plateau proper. A great deal of game is killed by the natives. They build a high fence of brushwood and felled trees, sometimes 3 or 4 miles long, with various sorts of traps

at intervals of about 30 yards. The whole village turns out, and drives the game towards these, and at times they make very big "bags." The worst form of trap is the game-pit, which is 6 or 7 feet deep, with six sharp-pointed stakes in the middle. These are carefully covered over with a thin layer of brushwood and earth, through which the animal easily falls. To the uninitiated traveller they are a great source of danger, as they are exceedingly cleverly hidden, and are generally placed in the most convenient routes through those fences and through the jungle. One of our non-commissioned officers walked on to one, and was lucky to escape with only one spike through the calf of his leg, which



THE STEVENSON ROAD NEAR ILNOMBA.

caused him considerable trouble for many months. Of snakes there are various sorts, the worst of them being the puff adder, but they are not nearly so common as in India. The matikenia, or jigger, is found on the plateau, especially about Kawimbe. This unpleasant insect, somewhat smaller than a flea, gets under the toe-nail, and buries a little bag of eggs, which, though easily removed, sets up an unpleasant irritation. The natives, especially the children, suffer considerably from them. Another source of great irritation to the theodolite observer, but curiously enough only on certain hills, is a small fly, which settles in dozens on the unfortunate man; they run up his nostrils, get into his ears, and, unlike other flies, are not kept off by fanning; a fine veil is therefore advisable.

The tsetse fly does not exist on the plateau. There have been

three horses in the neighbourhood of Fife for some years now, and they are still a great source of wonder and terror to the native; they have no name, I believe, for the animal, but call it by the Portuguese name.

One native name for Lake Tanganyika is Liemba. The surface of the lake is 2680 feet above sea-level. The water of Lake Tanganyika, unlike that of Lake Nyasa, which is sparkling and delicious to drink, is insipid and tasteless. Captain Gibson, of the *Good News*, the small steamer on Lake Tanganyika, told me he always drinks it, but found it not so thirst-quenching as spring water. Hippopotami and crocodiles abound in the lake; the shore is covered with shells of various sorts, and Mr. Moore, a specialist who went up there about two years ago, found, chiefly, at considerable depths in Lake Tanganyika, a set of water-snails unlike anything elsewhere, and which he could only compare to certain Jurassic fossil forms. A curious thing on Lake Nyasa, but which I did not hear of on Lake Tanganyika, is the nkungu fly. It is slightly larger than a gnat, and rises in swarms, which in the distance look like clouds, off the surface of the lake. As they are blown over the land, natives hold up baskets to catch them. When they have caught a large quantity, they mash them up between their hands and roll them into balls and eat them. They are said to be most delicate.

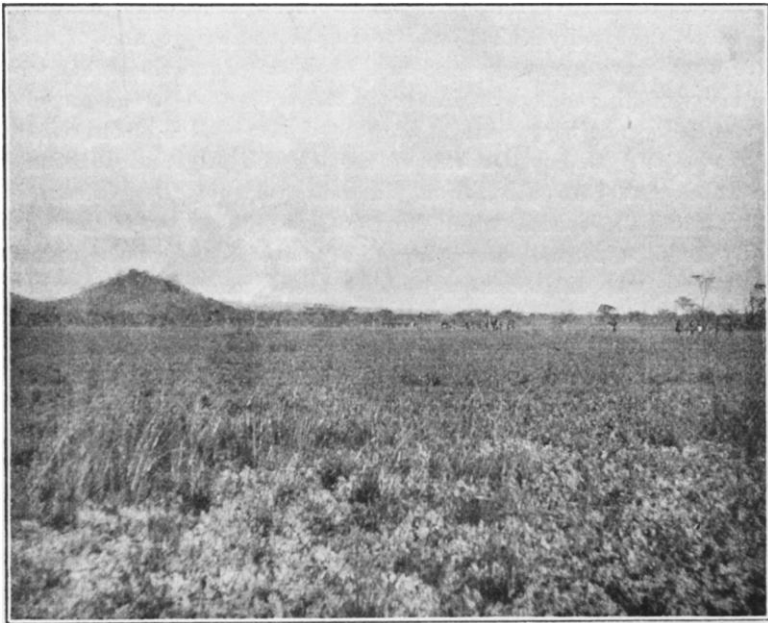
Now a few words about the natives. Starting from Lake Nyasa, and marching west to Tanganyika, the following tribes are passed through: Nkonde, who are principally on the German side of the frontier; Namwanga, about equally divided on each side; Mambwe, about two-thirds on the English side; Urungu, almost entirely on the English side. The Fipa live somewhat north of the line between the lakes, while a large and important tribe called the Awemba lie some 70 miles south of the Stevenson road.

The boundaries between the tribes are not very definite. Villages of alien tribes are found in many places, and near the administration stations villages of mixed tribes have sprung up. The villages are very small as a rule; a village would ordinarily consist of 30 huts, and hold less than 100 men, women, and children. The largest villages are near the Saisi river. In this neighbourhood there are one or two villages of 200 huts or more, but there is nowhere on the plateau a village of 1000 inhabitants.

Since the arrival of the white man, the chiefs in the administered country have lost nearly all their power. The tribal organization, practically, does not exist, except with the Awemba. The headman or chief of a village is nearly powerless, except to carry out local customs or the opinion of the majority. Many villages are in process of disintegration by the formation of smaller villages out in the bush by the younger people. The population is nearly everywhere far smaller than the country can support. This is particularly due to the raiding of the

Awemba, a practice which has now ceased, but which went on as late as 1895. Internal fighting and sacrifice, though prevalent up to a few years ago, were not on a sufficient scale to materially affect the population. The density of the population in the neighbourhood of Fife is eight to the square mile; in the neighbourhood of Mambwe, six to the square mile.

Before European occupation, villages were larger, the headman exercised considerable authority, and the chief of a village was a despot, but slightly controlled by public opinion. The Mambwe and Namwanga tribes separated from the same stock about eighty years ago. Even at



SONGWE VALLEY.

that date the rigidity of the tribal organization depended on the personal ability of the dominant chief. Internal fighting was not uncommon. The paramount chief would put his sons or influential men, called "capitaos," in charge of important villages, and the brothers would not infrequently fight amongst themselves. The internal troubles were varied by raids from the Awemba. In a few cases the latter were beaten off, but usually the terror of their name was sufficient to send all the villagers flying into the bush at the news of their approach. It is not uncommon to see even now on the plateau men who have been mutilated by the Awemba, with hands, toes, nose, ears, lips, etc., cut off; this was done mainly to keep up their reputation. Mutilation

not a long step. At the height of his power he built the strongly entrenched village of Sakaliro, in the most populous part of Rukwa, and thence raided amongst all the tribes round him, eastward amongst the Aungu, and northward through the Afipa to the Amambwe, almost meeting the Babemba, who from the south-west were raiding this same tribe. The ruins of large villages strewn with skulls, and 30 miles of road which he had forced the natives to cut and keep clean from Sakaliro to the river Saisi, were pointed out as Chimaraunga's work. In 1894, having become the scourge of the country, he was attacked and defeated by the Germans, and driven from Sakaliro; he then crossed Rukwa, and as he was not followed up he settled amongst the Akamba, and has built his new village, in spite of her protest, alongside that of Mwene-Kamba, and where she has an outlying village he also has built another. He is much too strong for her to drive away, but he is too much afraid of the German Government to openly fight her and take her country, so they live in a sort of armed peace, Chimaraunga, however, having much the best position. On my journey I had to pass his village to get to hers, and I should in all probability have gone to see him, but this was not at all Mwene-Kamba's idea. She was the chief of the country, and on her I must call first, and in her village I must stay. Miles before I got to the village, I saw her with a dozen headmen and thirty or forty villagers coming to meet me, and I was led by her in triumph close past Chimaraunga's town to hers, in which her own enclosure, newly swept, was set aside for me, and the German flag hoisted in my honour.

It was a small triumph to her that Chimaraunga had to come to her village to visit me, and under the protection of a white man, and perhaps a little under the influence of the beer which she had lavishly given out to welcome me, she could not help showing that she enjoyed her triumph, nor refrain from angrily giving her enemy a piece of her mind in the presence of the crowds of their followers, who with my men had assembled to watch the interview. Apparently trying to calm her anger, Chimaraunga said he was getting old and only wanted to settle in peace; but the angry chieftainess refused to be pacified, and wanted to know on whose land he could settle, having none of his own; nor was she satisfied by his acknowledgment that the land was hers, nor by his assertion that he only wished to settle until he could collect enough food to enable him to leave the country quietly with all his people. Judging from his history and the manner of his people, this statement did not seem, even to me, very credible, and Mwene-Kamba asserts that it is only one of his ways of lying, and that, unless the white man comes soon and takes him away, she will be murdered in her village, and her country will become his. She knows their ways and may be right, but he has a wholesome fear of the German power, and is likely to be cautious. Every village has some

complaint against him, and when I told them I was not a German and could not interfere in their affairs, they all seemed truly disappointed, except perhaps Chimaraunga, and I think he was glad. He brought me presents of a goat and much flour and beer, and later, when I was ill, nothing would persuade my people that he had not used medicine or bewitched the goat in order to kill me. It was useless to point out that they had eaten most of the goat and all the flour, and had got drunk on the beer. The medicine, they said, was only intended for me—I was ill, and that proved it. Though he has been defeated since 1894, the people have by no means lost their fear of him, and all down the Fipa side of the plain, when we came suddenly on them, they bolted at sight of us, and the women especially disappeared like rabbits in the bush. A call from some of my men who were known soon brought them back, when they laughed good temperedly and invariably explained that they had thought I was Chimaraunga.

Except the growing of food, the only industry of the people round Rukwa is the making of cloth. In most villages, and especially in those of the Afipa and Awanda, a large portion of the men are engaged in this work, either spinning the cotton or weaving the cloth. The cotton is from the seed-pods of a weedy-looking shrub, which, like the castor-oil plant and hemp, is planted when their gardens are started, and then left to take care of itself. The men do all the spinning and weaving, using a long spindled spool, and giving it the necessary twirl by a smart rub of the spindle between the palm of the hand and the thigh. The loom is a rough frame so arranged that the alternate threads can be raised or lowered past the rest, and cross-threads are then passed through on a long wooden lath. The cloth is open and heavy, but strong and much more durable than the cheap calico and coloured prints which are rapidly taking its place. The commonest patterns are white with black striped borders, though checks and black cloths are seen. It is generally made in pieces of about 6 feet by 5, each cloth being sufficient for a dress. All the men and women round Rukwa wear them, but I think there are few now exported, for just to the south on the plateau European calicoes are worn, and a little further south, the Babemba are dressed in bark cloth. A portion is traded to the Afipa on the plateau for iron hoes, and a small quantity even now gets as far as the Mweru marsh for the purchase of salt.

Food was very plentiful the whole way round, and in presents alone I got almost enough to feed my caravan of over one hundred men. It consisted principally of flour, beans, pumpkins, and maize, and mostly a few fowls and a goat were given to me at each village. Cattle I only saw twice—the first were a few at Mwini-wungu's, and at Uchiya there were three, belonging to the chief Kapufi on the plateau above, but sent down there to be attended to. Fishing was carried on to a small extent, and altogether there were six small canoes on the lake used for

this purpose. They were only built for one man each, and were small even for one, the opening on the top being but a slit of a few inches wide, giving hardly room for one's foot to enter. They were propelled entirely by poling.

Johnston thought Rukwa unlovely and uninhabitable, possessed of seven devils—hunger, thirst, a scorching and skinning wind, thorns, a blazing sun, venomous flies, and wicked and sullen men, though he acknowledged that, after all, they did not receive him badly. It had not rained when he was there for two years, and the people had been harassed by slavery for a long time. Under such circumstances, there are few parts of Africa, I imagine, that would be either lovely or pleasant to live in. I found the people very friendly, and I hardly ever arrived at any village without being met and escorted to it, for the last half-mile or more, by the chief and some of his or her headmen. A portion of the chief's enclosure was set aside for me, and huts found for my carriers, and beyond a visit or two of ceremony from the chief, with presents of food, and other visits, perhaps, from the headmen of villages near, I was left fairly quiet and not pestered by the crowd of curious men and women who, in most villages, press round and criticize or mimic one's every action. The villages, it is true, were generally dirty and dilapidated, and compared very unfavourably with those in the higher country.

The politeness of the people to one another was very noticeable. Their salutation on meeting was a low curtsey and a light clapping of the hands, with a set formula of phrases, which in itself seemed almost a conversation. To a white man, however, here, as in almost all of Central Africa, the salute is simply the English "Good morning," or as near an approach to those two words as an African can manage.

After leaving Rukwa, where I found no elephants, and after spending a month to recover at Abercorn, I went to the Mweru marsh, where I had shot with some success the year before, and hoped there to retrieve my bad luck before the season was finished. This marsh is not so interesting, and was better known than Rukwa; it is situated 40 miles to the east of Lake Mweru, and was described in a short paper read by Mr. Alfred Sharpe, but it had never been mapped before my visit. Mr. Croad also contributed a short paper, which was accompanied by a small sketch of it. This sketch, however, was a little in error, as I had not completed the working out of my observations when I gave it to him.

Mweru marsh is a large and generally swampy plain, 3000 feet above the sea, about 35 geographical miles in length from north to south, with a breadth varying from 10 to 15 miles; two narrow arms extend up the Mawe and Chisera rivers on the north, and one down the Mofwe on the south. It is bounded by steep hills on the east, and on the west by hills which rise less abruptly from it, but are equally well defined.

It cannot be described as a lake, and in the driest season only part of it is marsh. It was in September, 1896, that I went there first, but before actually entering the swamp I journeyed all round it, as it was then said to be too early to go in; the water was still deep, and the grass had not been burnt. All down the western side low bushy hills rise gently out of the plain, which here was firm ground covered with short grass near its edge, but with beds of high weeds a mile or more further out. It showed signs of being swampy in places during the rains, but not of open water lying anywhere. At one place on this side, well up in the grass, was the wreck of a canoe, which must have been stranded there at a time not far distant, for the wood was not much injured by fire nor touched by white ants. Tracks of elephants and rhinoceros were plentiful, and once while resting in the heat of noon, the men all lying about on their loads, a bull elephant strolled up from the weeds, and, standing lazily flapping his ears in the plain within a short distance of us, seemed irresolute as to where he should go, until we decided for him.

All down this side, except on the Choma and Mkubwe rivers, water was scarce, and generally, except at the rivers, all round the swamp it was only obtained from small holes dug about 2 or 3 feet in the ground, well above the marsh, but not in it. Into these holes trickles a running silt as thick as gruel, which settles and leaves 1 to 3 inches of water on top. This is patiently dipped off by the natives. We tried in places to get more by digging deeper, but the silt only ran from one very thin stratum, and the holes filled up to the level of this, leaving, as before, a few inches of water on the surface. This water is, when constantly dipped and not allowed to stagnate, cool and fresh, but tastes of mud, and is of a greyish colour. It seems quite wholesome, and is preferable to that from the rivers running into the marsh, which is often high-smelling, especially after the first rains, when it positively stinks.

On the south-east the hills in places rise precipitously from the plain some 800 feet or more, but soon turn away to the east, and others not so high, but also with a steep slope to the swamp, close it in all up the eastern side. Close under the highest hills are many hot springs, of a temperature of 115° Fahr., and near these are some patches of open water formed by the rivers Mkubwe and Mwambezi, which flow in from the heights above. The plain to the south is generally a swampy jungle, but further north, on the east side, it soon changes to a level expanse of bare mud, which extends from the foot of the hills to as far out as one could see. Water lies on this perhaps a foot or more deep in the summer, but we only found a dried and cracked crust all over it, so that walking on it was like walking on loose tiles. Here and there was a narrow channel of stagnant purple and intensely salt water, and near the edges of these channels, where one of us happened to break through the crust, he sank to the knees in sticky and stinking mud. This mud was not, however, very deep, for there were tracks where

elephant had crossed it even before the crust was quite dry. The mud plain, and the swamp south of it, are known by the natives as Mweru Wantipa, or the lake of mud. We found no drinking-water at all up the east side, and had to sleep one night there without it. Starting long before dawn next day, I arrived at 10 a.m. at a village in the north-west corner, the chief of which sent back about fifty women and boys with water to bring in the rest of my men, who straggled in, in twos and threes, between one and two o'clock. From this village again there was no water until we crossed to the river Choma, 20 miles further across the north of the plain.

The Mweru marsh receives the rivers Mkubwe and Mwambezi on the south, and Choma and Chisera on the north, the first three running all the year, and the last only during the summer. The Mawe is little more than a waterway, which drains that arm of the swamp in which it lies and takes some of the flood-water from the Choma; it then connects the Choma and Chisera rivers. Besides these rivers, the hot springs on the south-east carry in between them perhaps as much water as the Mkubwe and Mwambezi rivers during winter. This hot water is clear, odourless, and tasteless; at one time we cooked with it and drank it freely. The outlet is down the Mofwe plain to the river Kalongwisi and Lake Mweru.

Near the rivers and open water hippopotami abound, and during the winter elephants are plentiful all over the plain; sometimes two or three large herds may be seen in a day, leisurely strolling through the low jungle, dusting themselves with roots of grass, and generally accompanied by flocks of white birds, which hover around and settle thickly on them. I may mention, for the benefit of any one who might think of going out to shoot on the swamp, that it has since I was there been proclaimed a preserve by the order of the British South Africa Company. All the rivers carry fresh water to the marsh, but in places where it has lain in shallow pools and been dried up it leaves a thin crust of salt on the surface of the soil. The crust is collected by the inhabitants, packed into funnel-shaped baskets, and water filtered through it into troughs below. The water is then evaporated for the salt it has absorbed, and the salt supplies the country for over 100 miles around. Salt is the trade of the marsh, and all the villages on the west side are engaged in it. Men make journeys from long distances to buy it, and probably from 15,000 to 20,000 lbs. weight is thus exported per annum.

The people around the marsh are Atawa, a tribe united, when Livingstone was there in 1867, under one chief, Nsama, but now broken up by Arab and Babemba oppression into many divisions, some of them still under members of the Nasama family, but not one strong enough to take the lead of the rest. Nor will the chance for this be likely to arise now that the British have occupied the country.

Before arriving at the Mweru marsh, I had always been under the



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