It will be of importance for meteorologists in future to ascertain the size, the depth, and temperature of the Gulf Stream area in this part of the ocean, from which we may probably forecast the character of the coming winter. This can be done by means of a few soundings and surface observations executed in the autumn (September), and at the commencement of the winter season (November).

NORTHERN RHODESIA.

I. THE CHOMA DIVISION OF THE MWERU DISTRICT.

By HECTOR CROAD.

The Mweru district lies east of Lake Mweru, and stretches along the boundary of the Congo State. Choma station is, roughly speaking, halfway between Lake Tanganyika and Mweru, and is close to the Belgian line; its native name is Gansenga, and it is on the west bank of the Choma river, which loses itself in what is called the great Mweru swamp. Choma is the British South Africa Company's station, from which this part of the district is administered; an assistant collector is stationed here, who is under the collector at Rhodesia station, on Lake Mweru. The Choma division stretches from the west side of Mkula's village (Mkula is in the Tanganyika district), and, coming along the Belgian boundary, takes off to the south, along the west side of the Mweru swamp. The Choma is the only permanent river in this part; the other streams, though running well in the rainy season, nearly dry up in the winter, but have pools in places along their courses.

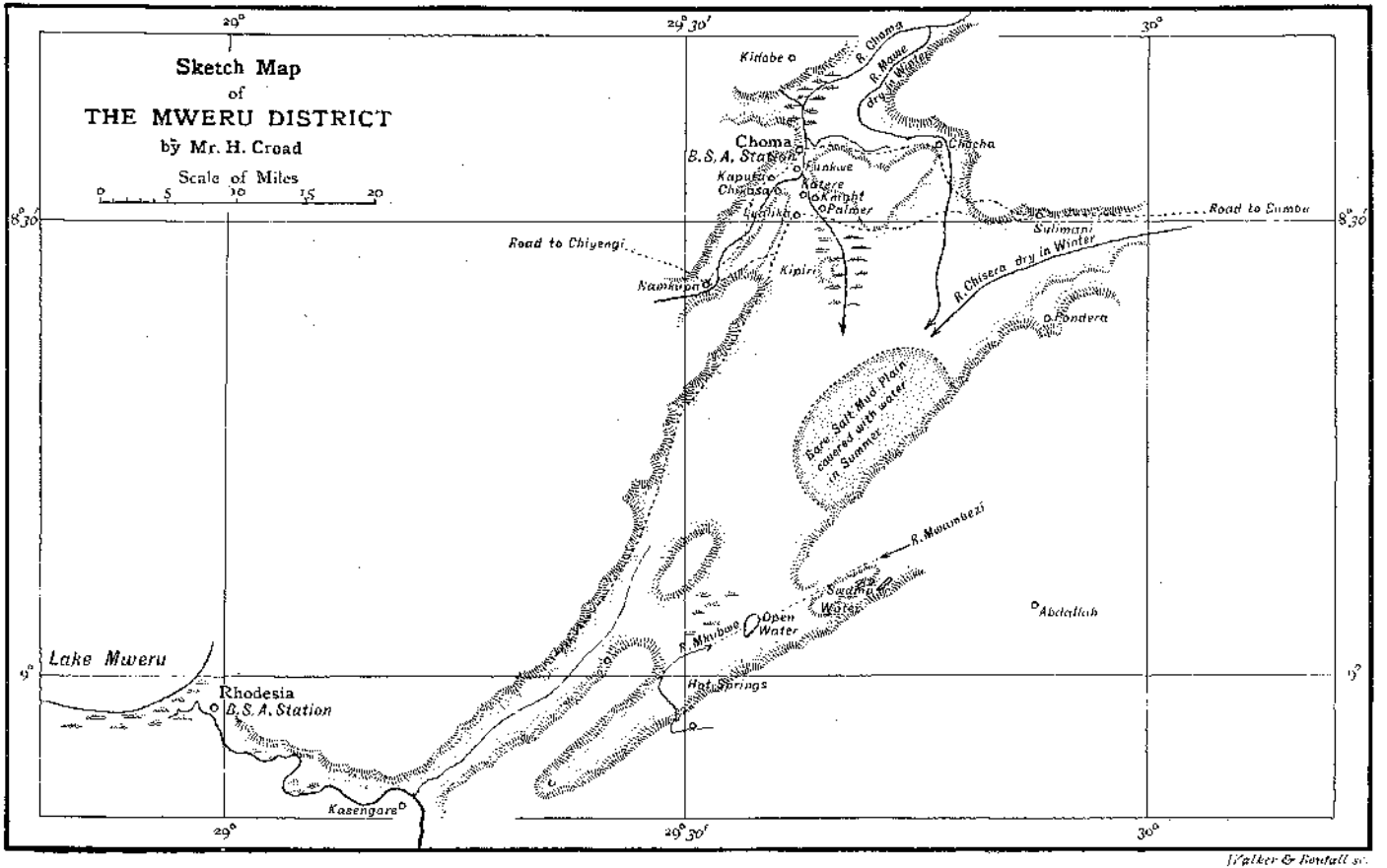
The road from Tanganyika, after leaving Mkula's, skirts the plain along the course of the Chisera stream. There is a village called Simwena's on the south side of the Chisera, a short run from Mkula, and the old road used to cross the stream here through a small swamp; there are generally a lot of hippo between this and Mkula's. The present road goes along the north side, and comes past Sulimani's village, who is the son of the old Mkula. Mkula built this as a sort of hunting-box, as it was a splendid place from which to hunt elephant. Mkula himself was a good elephant-hunter.

Sulimani's is some half-day's march from Mkula. In the winter he gets his water from a hole below his village, the Chisera being on the south side of the plain. The road from here, after running a little way along the plain, turns to the right into the bush, and comes out on the Mawe plain, a stream that in the summer flows out of the Choma on the Belgian side of the line, and runs into the swamp near the Chisera. After crossing this stream, the road leads by Chocha's village, which

is quite small, and, running along the edge of the plain, turns to the left along the edge of the Choma swamp, and, crossing the Choma by a bridge, arrives at Choma station. The march from Sulimani to Choma may be done in a day. A little over half an hour brings one to Kaputa's village, where the road leaves the woods and again enters the plains. This part is often bad in the summer, as the water does not drain off. There is a small stream that runs into the Choma some 3 miles below the station. It is about 12 miles from the station to Namkupa's, the next village. This is the general camping-place. On leaving Namkupa, the road goes up the side of the hill—a rather steep climb—and passes through some fairly good woods. The next camping-place is generally in the bush, but the water here is never good, and in the winter there is often difficulty in finding it. The next place is Chiyengi, where there is a station of the African Lakes Trading Corporation. This is on Lake Mweru. The road's general direction is west. The country consists of open plains and dense bush, called matesi; there are stretches of open woods, which look charming in the spring, when the new grass is a few inches long, and the trees have just put on their bright green leaves. There are delicious scents as one goes through them; but, unfortunately, this time does not last long. There is very little good timber, as nearly all the trees are small; but there is a clump of good timber at the south end of the swamp, near the head of the Mofwe stream, but it is of no great extent.

Though it is called the swamp, there is not much swamp about it. There is a stretch of swamp at the north end, where the Choma enters the plains, and another at the south end. It is a huge stretch of nearly level plain (with short grass along the edges), anywhere on which, on a clear day, one can see the surrounding hills. When the rains start, the grass grows fast, and reaches to a height in some places of 10 feet and over. There are large stretches covered with a growth that reaches a great height. This growth has a stem sometimes an inch thick, but generally under this, and when green is very sticky, and has a small green leaf. It dries up and becomes extremely brittle, and makes a great noise as it snaps when one passes through it. I mention this, as it is a favourite place for elephant.

The water lies about a foot deep in the summer, over a large stretch of these plains, which at the north end, near the Choma and Chisera, are much cut up by small spruits and hippo tracks. The water soon dries up, however; practically, no water finds its way from the swamp into the Kalungwisi river, on which Rhodesia station is built. The Mofwe, which at one time must have been the outlet, has next to no current now. There used to be far more water here, from what the natives say, as at one time they had to use canoes to get from the edge to the Kipiri (a small hill in the centre), which may now be done with dry feet. In August the grass dries up and is burnt off, but soon springs


Sketch Map
of
THE MWERU DISTRICT
by Mr. H. Croad
Scale of Miles
0 5 10 15 20
29°
29° 30'
30°
8° 30'
9°
Kitabe
R. Choma
R. Mowe
dry in Winter
Choma
B.S.A. Station
Chipeba
Kapusio
Chimbasa
Katere
Knight
Palmer
Road to Sumbe
Sulimani
Road to Chiyengi
Namkipa
Kipiri
R. Chisera dry in Winter
Pondera
Bare Salt Mud Plain covered with water in Summer
R. Mwimbezi
Abelallah
Open Water
R. Mwibwe
Hot Springs
Lake Mweru
Rhodesia
B.S.A. Station
Kasengare
Walker & Tomfall sc.

up again and gets dry; and the fires seem to go on burning below the surface, for as soon as a little wind springs up, the fires run through again, sometimes three times. The ash left is very thick, coming in some places halfway up to the knee, and it is too hot below the ash, often for a couple of days after the grass has burnt, for the natives to walk through it. South there is a large stretch of salt mud, cracked in every direction, as it has dried up. Old hippo paths are the only thing to break the monotony.

The Choma runs a good way west of the Kipiri, but one does not notice any current in the dry season below this. As the rains start and the water comes down, this stream overflows, and the water runs over the plain. This is a splendid spot for elephant. Mr. Knight and myself have seen from the Kipiri fully six hundred elephant, stretching right across the plain. The shores of the plain are sandy, and I have not the least doubt that it was once a large lake. In fact, almost up to Mkula's, one sees along the sides of the hills a line, sometimes more than one, of round wave-washed stones, showing where the old shores were; and, coming down to these, one sees the paths that hippo make when they nightly leave the water. That there must have been large lakes, and a huge rainfall, in this part of Africa is, I think, without question.

On the hill round these plains is the dense elephant bush, all tangled together and almost impassable, but for the elephant paths that cut it in all directions. The ground looks like clay, half burnt into red brick, and there is in places what looks like iron slag, often polished on the surface, as if fused into iron by lightning. This red clay seems to be the same as on the south cliffs of Kilwa island, on Lake Mweru; but on Kilwa it seems to have been better burnt, and has become like paving-stones, lying in strata, and easily detached. All this country seems to speak of great heat and upheavals of nature. This red ground is often cut into great holes by the elephant when digging for the roots of the trees that grow in this bush, and often tearing up large stones that may come in their way, with their tusks. These roots are often as thick as a man's leg.

The country is not of much use for cultivation in this part, except along the plains, where the natives get large crops. The crops along the Choma river are good, but the ground is very salt. The plains between Choma station and Namkupa's are the large salt-producing part of this country. People come for a long way south of Tanganyika, and, with the permission of Kaputa or Namkupa, build grass huts and set to work to make salt, which they take back with them. One often sees the white salt on the open spots, left by the evaporation of the water. The natives make a salt of rather dirty character, which is not much to be wondered at, considering the rough method they have for making it. They go out with baskets, and, having cut off the top grass, fill them with

the soil, and take it to where they have prepared filters. These filters are made of grass, tied thickly round a hoop, and brought to a point at the bottom; they are supported on four sticks driven into the ground, and a vessel, made of the bark of a tree, taken green and dried in shape, is placed underneath. Making a mixture of the earth and water, they pour it into the filter, and let it drop through; they then empty the salt water into pots placed over fires, and evaporate the water. This salt could be bought for four yards of calico a load, of about 40 lbs., but I believe the price has gone up.

There is plenty of game in this part—puku, hartebeeste, roan, sable, and eland. Situtunga and inyala are to be seen in the swamps, but are hard to find. There is an occasional buffalo or rhino; there are a good many of these across the line in Belgian territory. There are bush-buck, duiker, and impala in the bush country, and plenty of water-buck. There are huge herds of zebra along the Mweru swamp; klipspringer may be found on the hills north of the Mawe, and an occasional blue-buck. The elephant-hunting is, I believe, as good as any south of the Equator, but though there are any number, they must be hunted for; men must not expect to see them when on the march with a caravan, as is the case, indeed, with all the game.

There are plenty of geese and duck, and the partridge and guinea-fowl swarm. There are a lot of hyæna and leopard, and the lions are far too numerous for the good of the buck. The lion goes about in herds of twelve or more together, and has been seen in herds of this number hunting zebra on the plains. They sometimes attack men on the roads, but only, I think, when driven to it by hunger, when their teeth and strength are too poor to kill game. The Mweru swamp in November is the best place I know of for elephant; I have killed several on the plains there. But the shooting is quite open. There is, as a rule, no chance of cover, and the hunter must depend on his gun. There are swarms of hippo in the swamps, but they are hard to get at. Occasionally, when the water is falling, one finds a place where some dozen hippo have cleared a spot in the grass and taken up their quarters, and one can shoot the lot if one so wishes, as they have no chance to escape. It is rather dangerous work, as the grass one walks over is floating, and going through into the water and deep mud means a bad time, even if one is able to get out again, as sometimes a man is not able to reach the surface on account of the grass. There are large stretches of papyrus, which grows so as to completely cover the largest elephant; and there are innumerable hippo tracks, overgrown with grass, that look all right till one goes over one's head in water. The natives kill some hippo by spearing them through the grass; they can see where they are by the movement of the grass, and, running on the surface, they drive their spears into the hippo's backs.

The Choma river is grown over with grass, and is of no use for a

canoe. There are lots of fish which will take a hook in the open places; these are chiefly what the Americans call "mud-cat," but are fairly good eating. The natives catch lots when the water falls, by building fences and putting down baskets, so that the fish are caught in them as the water drops. They also catch a good many partridge and guinea-fowl in snares; and they trap a good many bush-cat for their skins. The natives, as a whole, are not good hunters or trackers. A native elephant-hunter puts all his trust in the charms that he carries, and these generally fail him.

The natives are a peaceable lot, and go in for agriculture for four months, and sit down and eat for the rest of the year. They are chiefly people who have left Congo territory. This country was raided out by the Arabs, and when the Administration came into it, the only villages to speak of were Namkupa's and Kaputa's; now there are a lot of small villages scattered about, and the country is well populated for Central Africa. Lualika, who occupies the village near where the Choma flows into the swamp, and who gets splendid crops from the rich land on which he lives, was living on the Kipiri in the swamp, and tells of how he was nearly eaten by the mosquitoes, and how hippo used to walk through his village by night, and elephant to look in on him by day. There is no hut tax; but the Administration get what men they want as porters and as workers from the chiefs, who are asked for men in their turn, in accordance with the number of men they have under them. There is now no difficulty in getting men.

When a new man comes into this district, he comes before the official, and if he has any claim to ground, as having lived there in the old days, or his people having done so, he is allowed to return to his old site; or if he is not an old inhabitant, he is put with one of the chiefs. These men are all small headmen, no single man will live by himself. Though the men do a little work themselves, and build the houses, the women do nearly all the work in the fields. The huts are of the usual round style. A circle is marked out, and posts are driven in, at the most 2 inches thick; these are bound together, and reeds bound round the tops, when the posts are cut level. The roof is made of reeds, placed leaning against the sides and meeting in the centre; these are tied together, and it is turned over and placed on the top; it is thatched with grass, and the walls mudded. The roof reaches some 3 feet from the ground, and forms a veranda, part of which is sometimes closed in, and forms an extra room. The walls are about 5 feet 6 inches high. There are generally mud seats inside, and also low ones outside under the veranda. The beds are made by placing poles on four posts driven into the ground, and reeds are tied across these. The men seldom go into their huts in the daytime, and always have a wood fire at night.

In most of the new villages there is no protecting wall round the huts. But the old villages are what are called tembes: they have two mud walls, some 6 feet apart; these are divided into rooms, and have a mud roof all the way round. They have loopholes outside and inside, so that, if the enemy should get inside, they can shoot across the square, and also one side can sweep the roof on the opposite side.

The mail service is carried on by police, of whom a certain number are kept on the station, and who are armed with sniders. They are drilled by the official, and are used for keeping order in the district. All small cases go before the chiefs, but a native can always appeal to the official. Cases between chiefs naturally come before the official, who is treated as the sultani of the country. In the case of an elephant being shot, the chief whose man has shot it sends in the tusks to the official. The Administration takes the ground tusk: this is supposed to be the tusk nearest the ground when the elephant falls, and which by native law belongs to the sultani of the country. The pay for porters is reckoned at about one yard of calico per day. Men from Sumbu or Tanganyika are paid at Choma, and new men taken on to carry the loads to Rhodesia station. Men prefer to take loads rather than to work. The pay for workers is only six yards a month. Workers who cannot go home at night get "posho," or four yards a month for food.

The women are generally without the hideous ornaments used by some of the tribes, but a few have small brass things through their lips, or through one side of the nose. They have the usual love for beads. They all wear calico, though some have not very much, and they love bright colours. There is not much tattooing.

Before going after elephant, a hunter will go through a certain ceremony, and will be painted with red and white on the chest and face. They will go great distances, to a man who is known for his good hunting charms. They have small grass huts, about a foot high, under which they place the elephant-tusks after a successful hunt. They leave them there for about three days. A successful elephant-hunter is met at his village with great rejoicing. The people are well built on the whole, though as a rule they are not tall. There are a few cases of madness amongst them. There are special men in each village who do iron and wood work; but they are poor hands at these things, on account of the rough life they led when raided out by the Arabs.

They have no cattle, and but few goats. Horses would, I think, do all right if they could be brought up. The crops consist of Indian corn, millet, casava, sweet potatoes, beans, oil seeds, pumpkins, and tobacco. There are made roads near Choma station over to Kaputa, and a branch running towards Lualika, but only going as far as Mr.

Knight's place, which is about 6 miles down the river. There are two whites in the Choma division. The rainy season begins in December with short showers, and the heavy rains are over about the end of March; the grass is burnt in July. The natives are mostly armed with cap guns, and nearly all carry spears. One seldom sees a bow and arrows.

Large tracts of land are now being put under cultivation by the natives. The edges of the swamps can be turned into rich rice-fields, and can produce a huge crop. European potatoes can be grown well too, with a little trouble. The climate, in spite of the large swamps, is not worse than in most parts of Central Africa, and with care whites can live without much discomfort.

II. EXPLORATIONS WEST OF THE LOANGWA RIVER.*

By CYRIL D. HOSTE.

In December, 1895, the late Dr. J. A. Maloney, having constructed his wet season's camp at Mafuta's, some 20 miles north of the Angoni chief Mpeseni,† returned to England. His sudden death preventing his return, I was instructed to proceed and explore the country to the west of the Loangwa river.

On August 17, 1896, having engaged enough carriers from the villages close to us, my companions and I left Chinunda and took the now well-known path to Kambwire; only stopping long enough to obtain additional carriers, we passed on to Chisiri, on the Aruangwa (Loangwa) river. This chief lent us three very small canoes, with which we transported our loads across. The path led us through a Mopani forest, and we crossed the Mpamasi river about 20 miles north of Chisiri. Game was fairly plentiful in this part, the chief antelope being, of course, the impalla; and I noticed the spoor of kudu, roan antelope, water-buck, and wart-hogs. A good troop of elephants had also moved off, quite recently, from that river. After crossing the Mpamasi, the path takes a turn to the north-west, and we reached the villages of Kavimbe and Mnawaria, on the Mnyamasi river. I sent up for the chief, and was rather surprised to find Mnawaria a woman. She has a good deal of authority over her people—in fact, more than one generally sees among the chiefs of these small Wabisa villages. To the west of her village there are some sandstone hills, at the foot of which, on the east side, there is a very strong sulphur spring of boiling water.

After leaving Mnawaria, we again crossed the Mnyamasi river and struck to the south-west, reaching the Mtinondo river, having passed over a track of country strewn with water-worn stones. The country for 10 miles before reaching this river is open, and we had a good view of the Mchinga range, which looks like a wall stretching north and south without a break, except for two very fine water-falls, where the Mnyamasi and Mtinondo seem to drop directly from the Mchinga plateau to the low country of the Aruangwa (Loangwa) valley. As the carriers

* Map, p. 692.

† See Mr. Money's map of British Central Africa. *Geog. Journal*, vol. x. p. 236.

were running short of food, we were not able to get a close view of these falls, but had to make for the nearest village, which was Mpemba, on the Matisi river. From here we moved on to Chitala's village, on the Mpamasi river. Chitala (known to Joseph Thomson as Katra, and to Mr. E. J. Glave as Katara) belongs to the Wabisa tribe, and is, I believe, related to Kambwire, who used to live in this district until he could stand the Awemba raiding-parties no longer, when he moved eastwards, and built his village where it now stands on the Lokusye (Rukusi) river. Chitala told me that his name was Chitala, and not Katara or Katra, but he is sometimes called Chiwesa, and I have frequently heard him called by this name myself.

Soon after arriving at his village, Chitala brought me a letter written by Mr. E. J. Glave, of the *Century Magazine*, who passed through in June, 1894. This is a copy of the letter :—

"Katara's, June, 1894.

"*To any Gentleman visiting this Chief.*

"SIR,—He is the most hospitable and friendly chief I have met in this part of the world. He is, as far as I can learn, loyal to the British. He permits no Arab to enter his stockades, and allows his people to sell them no slaves. He can supply guides either across the Mchinga mountains to the Ilala country, or to Kambuidi (Kambwire?), *the* Bisa chief to the south-east from here. He is thoroughly friendly, and most anxious that the British build a fort, somewhere in the country, to protect his neighbouring villages against the Angoni of Mpeseni and Mombera. With a very little assistance from the whites, such men as Katara can hold their own against their enemies. Two hours from here will be found a curious section of country strewn throughout with sections of fossilized timber.

"Between here and the hills you can get sport—eland, kcodoo, water-buck. I went out twice—each time got a beast, first eland, and then water-buck.

"Very truly,

"E. J. GLAVE,

"Special correspondent of the *New York Century Magazine*."

The fossilized timber mentioned by Mr. Glave is scattered over a very large area, and is to be found almost as far south as Chilenga's village. The country at the foot of the Mchinga range is very much cut up with "dongas," and here again we found a great deal of water-worn stones, chiefly a very poor quartz. The range itself is composed almost entirely of granite, and, except for where the granite is protruding, trees cover the whole sides and summit. The timber is chiefly machabel, gusi, mopani, and on the higher country mahobo-hobo; bamboos also grow at the foot of the range along the banks of the Mpamasi river. Chikwanda, the dreaded chief of the southern Awemba, lives on the high plateau, his village being two days to the north-west of Chitala.

After crossing four running streams we reached the Kapamba, which is a fair-sized river. Here we saw a troop of about fifty elephants, but were unable to get a shot. Crossing the Kapamba and Luanda, the next river of any importance is the Mtisasi, where we found the remains of an old village, which the natives say belonged to Chilovi, who was raided and burnt out by the Chikunda from the lower Aruangwa (Loangwa). All that remains of the village is a large grove of bananas. Between the Mtisasi and Chilenga's village we crossed seven streams, all of which contained good cold water.

Chilenga, Chinema, and Mtanda have their villages close together, and their mother, Anatandali, has her village about 4 miles down the Lusuaswe river, which passes through this small colony of Mlala people. These people came down some years ago from the plateau, as they found that the soil was more fertile in the low country.

From Chilenga's we moved up to the top of the mountains. The climb was very severe even for us white men, who carried nothing, but what it must have been for the carriers with their loads it is hard to imagine. They only asked that the drummer might be sent on ahead, so that he could sit on the top of the mountains and beat his drum, and they could then tell how much further they had to climb. The country at the edge of the plateau is a good deal broken up with large valleys and rocky "kopjes," and the formation is granite; but after passing through about 2 miles of rough country, we got a view of rolling bush veldt, which extended as far as we could see. The climate on the plateau is delightful, and, of course, much cooler than the Aruangwa (Loangwa) valley. While up on the Mchinga plateau this time I bagged a very fine old sable antelope bull, the first and last which I saw in Central Africa. It must have been a very good game country before the cattle plague passed over it, as game can find green grass all the year round, and water is very plentiful.

Returning to Chilenga's to meet some of our party who had brought up further supplies, we next moved to Saide's village, on the Aruangwa (Loangwa), crossing the Mtisasi river 5 miles to the east of Anatandali's village. Then we struck south through Kampara, and stopped for the first night at Chombomere, where the Lusuaswe joins the Aruangwa (Loangwa) river. From here we went south-west, passing through two or three small Chikunda villages, and reached Señor Cardoza's place at the junction of the Mpapushi and Aruangwa (Loangwa) rivers. Cardoza, or, as the natives call him, Mzassa, is a black Portuguese.

Finding that we could not get through to Salisbury, on account of the Mashona rising, I here turned back, and, sending some of the white men home *viâ* Kota Kota, Blantyre, and Chinde, proceeded with the others to Chombomere; then, striking straight across to Chilenga, climbed up to the plateau again, and built our huts for the wet season about 2 miles to the east of the Lusuaswe river. Fresh provisions and calico having arrived from Blantyre, I started off to look at the country about Serenje's village, and make, if possible, round to the south. Crossing the Lusuaswe over a natural bridge, we reached the valley of the Wangala 5 miles further north, and followed that river to its headwaters, which are close to Serenje. Serenje has moved his village since Joseph Thomson passed through, so as to be nearer a large iron-mine which supplies the whole of this country with materials to make assegai-heads, axes, hoes, etc. Striking to the north-north-east, we came to Nansara, on what Joseph Thomson calls Moir's lake, though now it is little more than a swamp, being overgrown with grass and reeds. Nansara told me that the situtunga antelope inhabits this swamp, although of course he did not know it by this name, calling it the n'zoe.

Five miles to the west of Nansara we passed Serenje's old village, on the headwaters of the Molembo river, which, the guide told me, runs into the Luapula. Mchinka's was the next village, lying about 18 miles west of Nansara. Striking to the south-west, we passed through a more open country, which is well watered, and reached Kawamba, having passed Kwamwando about 6 miles to our west. Crossing the Chipendesi, we passed through Mkwessa's and Chikolongo's, and reached Muwundu, or Kawondo, as he is sometimes called. The country changes suddenly at the crossing of the Chizimba river, between Chikolongo and Muwundu,

to a schist formation, whereas all the journey before reaching the Chizimba was through granite, with an occasional iron "bar." The whole district passed through would make a good farming country, and is well adapted to stock-raising, as there is good feed all the year round, plenty of running water, and, as far as I could see, no tsetse fly. The climate is as fine as any that I have ever seen in Africa. The water is good and plentiful. The timber is almost the same as in Mashonaland. The whole country has been covered with it, but the natives have cleared large tracts for their fields.

Muwundu has the largest village of any Mlala chief that I have yet seen, and after he got over his first scare he seemed to be a very good specimen of his tribe. Taking the path to Chaiye, we crossed the Chizimba and Mweshia, besides a few smaller streams, all running to the south through a very rough and broken country. The Mweshia is a very good river, with a tremendous current. Between the Mweshia and Chaiye the path takes one over three high ranges, passing close to Chilefwi mountain, over the top of Miniwanga mountain, and then suddenly drops down to the Kaombe river, on which Chaiye has his village. The difference in temperature on the Kaombe at this point was very noticeable, being a good many degrees hotter than the high veldt.

On inquiring about the country to the west, and where the Lokosashi had its headwaters, I found all native opinions differed, so determined to go west and see for myself. The only thing that they agreed about was that the Lokosashi rose in the Irumi mountains.

Striking west, after traversing a broken country, we reached Katiso hill, which is a bald granite kopje, after rising, according to my aneroid, about 1000 feet since leaving Karulania. Kamela and Lalasia are the next villages, both on the Lokosashi rivers. Passing by the villages of Wemba, Mkwampura, and Chimkwampi, we reached the new village of Chiwali, who seems to be an influential man amongst the Mlala, and is building a very large village. There are a good many open valleys in this district, and plenty of water, the whole country being drained by the Lokosashi and its tributaries. Going north from Chiwali, we passed the old deserted village of Kafura, on the Chimpinda river, and camped for a night at Mtinauli. The next morning we crossed the Lokosashi again running south-east at the drift. Striking east after crossing it, we next came to the Chipandesi, which we crossed by a natural bridge. This bridge is formed by one enormous boulder, under which the river burrows, coming up again 40 yards lower down. Still continuing to the east, we passed Changwi and Chintankwa, and reached Muwundu on April 28. Having rejoined our party, we struck across towards Serenje's to escape the rough broken country immediately to our east. We passed through a splendid district, crossing the Mweshia, Msuema, and Kaombe, and got into our old road near Serenje's iron-mine, reaching our main camp on May 11. On our next journey we struck north, crossing the Kapamba, and, passing through a good piece of country, got on to Joseph Thomson's road, which we followed down the mountains to Chitala. There is a much easier descent from the plateau here than at Chilenga, and the scenery is very fine all along the Mpamasi. From Chitala we took our old road back to Chilenga, and soon after reached the main camp. Our relief having now arrived, we commenced the homeward journey. Walking as far as Cardoza's place we took canoes down to Zumbo, which is close to the junction of the Aruangwa (Loangwa) and Zambesi. From Zumbo to Kachomba took us five days, at which place we had to leave the canoes and walk to Tete (eight days), taking the broad "machila" road to the south of the river. At Tete we engaged a house-boat to take us down the Zambezi, and arrived once more at Chinde, after an absence of over two years.

NOTE.—The accompanying map is made from compass bearings, and distances measured by the time of marching.

Kambwire's, near the Loangwa river, was taken as a fixed point from which to commence the surveys.

APPROXIMATE HEIGHTS ABOVE SEA-LEVEL BY ANEROID.

	Feet.
Chintankwa	4440
Chizimba	2890
Chiwali	4360
Chaiye	2190
Kamela	3490
Kaombe	5090
Karubuma	1990
Katiso	2990
Mtinauli	4340
Muwundu	4290
Mweshia river (upper crossing)	2990
Mkwampura	4340

HEIGHT BY BOILING-POINT THERMOMETER.*

Kasandwe	4795
Kwakumbi	1818
Mambesa	2173
Sunda	2062
Saide	1931
Lusuaswe river camp	1984
Mzasea	1612

ON SEA-BEACHES AND SANDBANKS.†

By VAUGHAN CORNISH, M.Sc. (Vict. Univ.), F.C.S., F.R.G.S.

§ 11. ON THE CHESIL BEACH, A LOCAL STUDY IN THE GRADING OF BEACH SHINGLE.

The Chesil Bank has long been a sort of prize puzzle among beaches, and space forbids detailed reference in this place to the somewhat extensive series of papers which geologists and engineers have written upon the subject. To put the matter shortly, the chief *crux* has been the circumstance that the pebbles are fine at the west end and coarse at the east end. This has been generally regarded as a peculiarity to be explained by special causes, as, *e.g.*—

(*a*) That the material travels from east to west, and not from west to east,

* Kindly communicated by Dr. J. S. Hyland.

† Paper read at the Royal Geographical Society, March 16, 1898. Continued from p. 543.

A PORTION OF

BRITISH CENTRAL AFRICA,

West of the

LOANGWA RIVER.

From a sketch survey by Cyril D. Hoste.

1897.

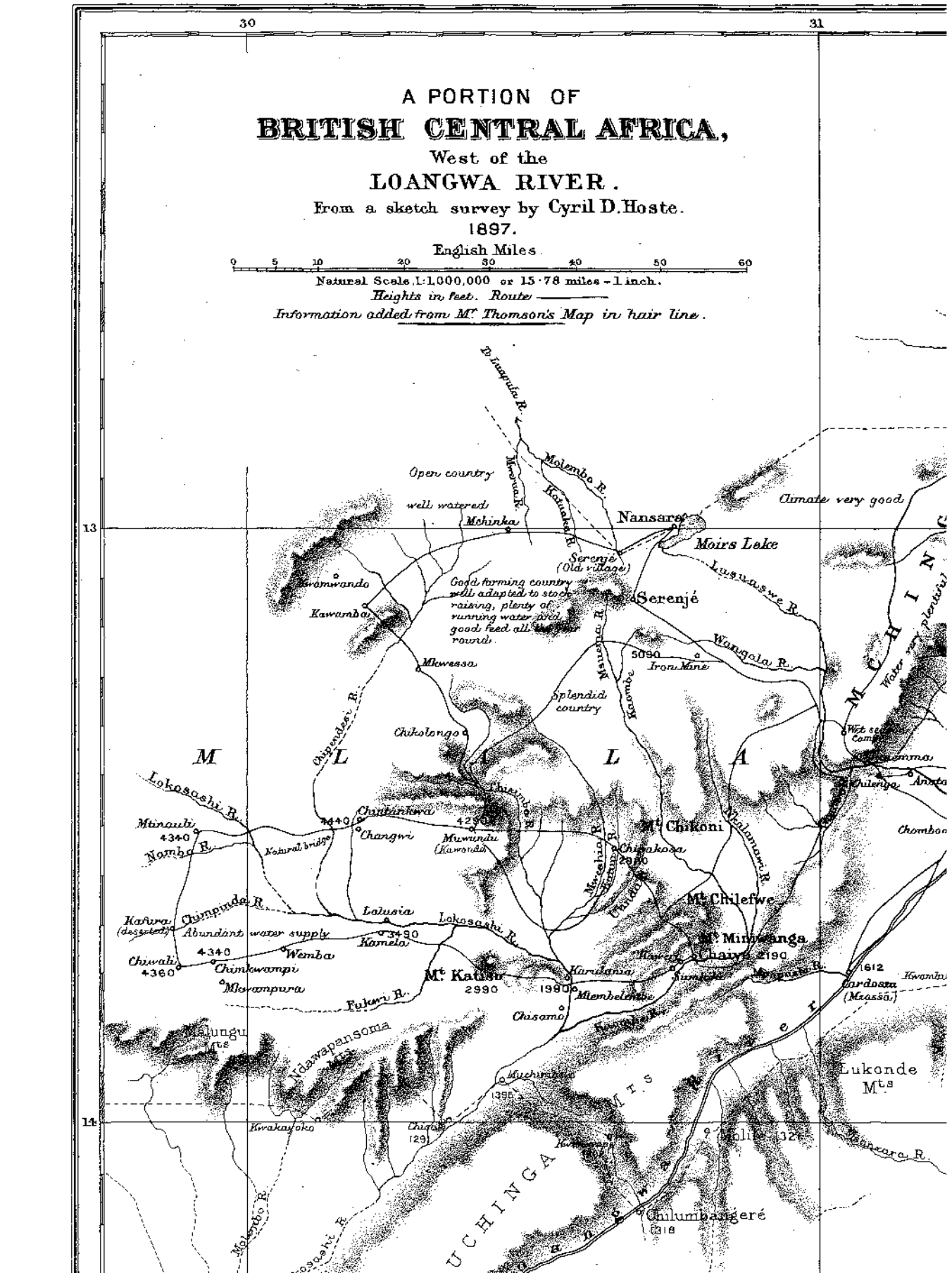
English Miles.

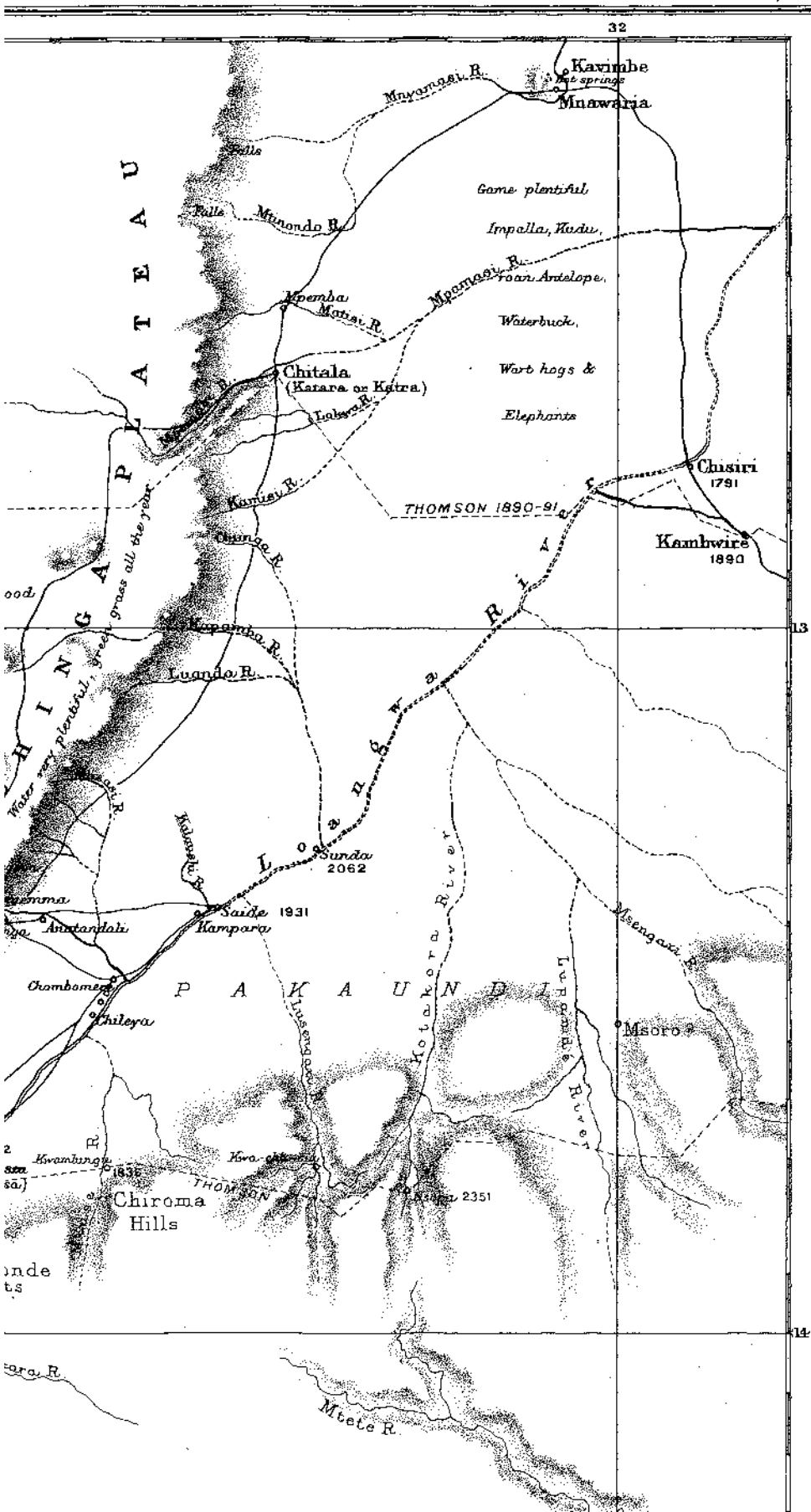
0 5 10 20 30 40 50 60

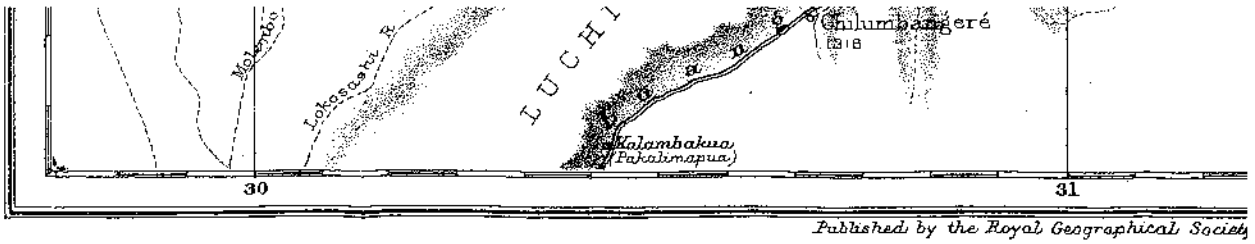
Natural Scale 1:1,000,000 or 15·78 miles = 1 inch.

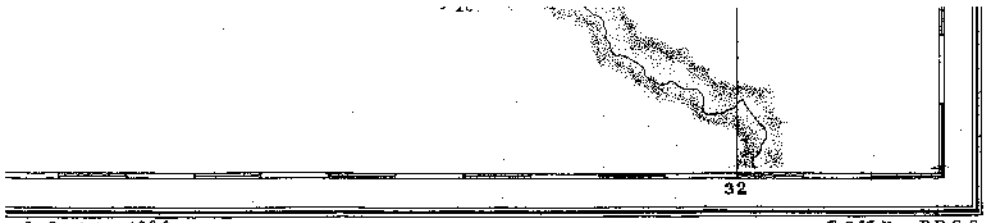
Heights in feet. Route ———

Information added from Mr Thomson's Map in hair line.




32
Kavimbe
Hot springs
Mnawaria
Mnyamasi R.
Falls
Falls
Mbundo R.
Game plentiful,
Impalla, Kudu,
Roan Antelope,
Waterbuck,
Wart hogs &
Elephants
Mpemba
Motasi R.
Mpongasi R.
Chitala
(Katara or Katra)
Lukwa R.
Kamasi R.
THOMSON 1890-91
Chusiri
1791
Kambwire
1890
Chungu R.
Kapemba R.
Lunda R.
Water very plentiful, grass all the year
Luapula R.
Sunda
2062
Saide 1931
Kampara
Chombomeza
Chileya
PAWAUNDI
Kotakota River
Msengasi R.
Msoro
Kwambungu
1835
Chiroma
Hills
2351
Mtete R.
13
14


Molembo
Lokosashi R.
LUCHI
Kalambakua
(Pakalimpua)
30
31
Published by the Royal Geographical Society



cal Society, 1898.

F.S.Weller, F.R.G.S.