

with the Chinese maps of the same regions, and they were almost identical, the only difference arising from the bad draughtsmanship of the Chinese.

The PRESIDENT, in moving a vote of thanks to Major Sandeman, said that, able and interesting as the speeches just made had been, it could hardly be considered that they had had a discussion, because only one side had been maintained. The single contention on the other side appeared to be that it was impossible that the basin at the head of the Irawadi could supply such a vast body of water as was found flowing at some distance above Bhamó. He himself had no knowledge of the country and not much on the subject, but he had often considered a similar problem, as a salmon fisher, in shorter rivers. From the sea to Bhamó was 800 miles, and from Bhamó to the source of the river was 400 miles more, or one-third of the whole. He ventured to say that a much smaller proportion than one-third of the course of the Spey supplied by far the greatest quantity of the water that flowed down that stream into the sea. He had constantly seen the Spey rolling up to its extreme banks while all the tributary streams along the lower and longer portion of its course were hardly flowing at all. Either from the melting of the snows or the rain in the mountains, the upper part was full while the streams feeding the lower part of the main river were almost dry. At Bhamó the Irawadi was only 500 feet above the sea. The fall therefore thence must be very gradual; and the sources many thousands of feet higher up. In England the rule was that the rainfall diminished three per cent. for every hundred feet of diminished height. From the central point of the highest ridge the quantity of rain diminished steadily in that proportion towards the east. That of course arose from the fact that the great supplies of rain came from the west, and the clouds breaking on the high lands decreased as they travelled east. Although that reasoning would not exactly apply to the Assam frontier, it did to a certain extent. In mountainous regions a far larger quantity of moisture fell than in low lands. In the case of the Irawadi the high region was about the source of the river, and it did not appear to him to be extraordinarily wonderful that, at 800 or 900 miles from the sea, there should be a great stream fed by a catchment basin of only 300 or 400 miles, if it came from lofty mountains. To set up the argument that the Sanpo and the Irawadi were one and the same stream, in the face of the great body of evidence to the contrary, direct and indirect, that had been offered, was to say the least extremely presumptuous.

The Elephant Experiment in Africa; a brief account of the Belgian Elephant Expedition on the march from Dar-es-Salaam to Mpwapwa.

By L. K. RANKIN, B.A. Cantab., F.R.G.S.

On June 7th, 1879, Mr. F. Falkner Carter, who commanded the Belgian experimental elephant expedition which came to an end with the death of the leader,* called on me at the Universities' Mission Colony at Mbweni, Zanzibar, and asked me if I could accompany him as "second in command." I willingly accepted, and with Bishop Steere's courteous

* For an account of the manner in which Captain Carter met his death at the hands of a war party of natives, accidentally encountered on his return march from Tanganjika, vide "Proceedings," vol. ii. p. 626; The extracts from his diary, published in the same vol., p. 761, contain the only detailed information that has come before the Society regarding this important expedition. We are, therefore, much indebted to Mr. Rankin for submitting his very full and interesting narrative of the early part of the journey, which, for want of space, we are here only able to give in an abridged form.—[Ed.]

consent, the conditions were soon arranged. Before this date the four elephants presented by the Bombay Government to the King of the Belgians had already been landed, not without adventure, at Msesani Bay on the mainland, and thence marched to Dar-es-Salaam, where they awaited our party.

On June 25th, the Belgian International Expedition under M. Popelin having started a few days before, we landed at Dar-es-Salaam. Including Mr. Carter and myself, we were some seventy-five in number.

On July 2nd, all our preparations being completed, the start was made. It was a stirring moment, even to Europeans, when about one o'clock the four elephants moved off, three laden with packs, and the fourth, used by H.R.H. the Prince of Wales when in India, carrying Messrs. Carter and McKenzie, our large Belgian flag flying, and all the black porters, Indian mahouts and coolies, and Arabs tramping off at a swinging pace. I remained behind for an hour to collect the remaining odds and ends, and finally brought up the rear with some *askari* (soldiers) and two pack donkeys, being escorted out of the village by the local magnate or Akeda. I brought the party into our first camp at Ugongo by 9.30, about five hours behind Carter, though the last stragglers were not fetched in till half-past ten; their loads had really been too heavy for them.

On July 4th we left Ugongo (8 miles from Dar-es-Salaam), where we were delayed two days discarding "luxuries" (i. e. in Africa, the least essential "necessaries") and rearranging bales, several of which we had to leave behind, the porters now carrying exactly 60 lbs. apiece.* Our march was a triumphal progress, all the numerous villages emptying themselves to see the strange procession pass. We could see the people, weapons in hand, running along on either side of our path and keeping up with us at a respectful and safe distance in the jungle. Here the scenery, with its low irregular blue hills in the eastern distance, and its near hills and dales, recalled Yorkshire to one's mind. At a "soft" place in the road constructed at the expense of Sir Fowell Buxton and Mr. Mackinnon, on which we had now entered, occurred the first mishap with the elephants, soon to become a frequent incident. The first three elephants crossed it safely, though with increasing difficulty; the fourth sank into the bog up to the root of his tail. All flew to the rescue, the mountain of baggage, including four large "elephant-cases" and the Norton's pump, was swiftly unrigged, and strewn around; and thus relieved, the ponderous brute, with much fatigue and some roaring, extricated himself. One of the donkeys too, sank into the mud up to his girths, and had to be similarly helped out; he looked very crest-fallen after it. We camped at Kisiravi at 2.30; curious crowds watched Carter and myself washing. Here the country was densely

* In Africa the traveller's track is marked by abandoned bales, as it is by horses' car-cases in the Pampas, and by those of camels in the Sahara.

wooded, the blue water-lily (called *yungiyungi* in the native language) was seen; the people carried bows and poisoned arrows, and were quite bushman-like.

For the first 41 miles we followed the splendid road already mentioned, that is to Vikeruti. Day after day the same things occurred; similar mishaps with the elephants; sometimes it took an hour or two to extricate them by means of causeways of lopped tree-trunks and boughs; sometimes two would sink into a bog in different places at the same time. The sagacity of the elephants was great; they sounded with their trunks a doubtful spot, and felt it with one foot, while nothing could induce them to cross a place they had decided was "rotten." One male elephant—"Sundar Gáj"—had a very bad temper, and was given to bolting into the jungle. On these occasions the blows and goads of the mahouts, by no means sparingly administered, were powerless to restrain him; heavy spiked iron bracelets and chains had then to be clapped on. Persuasion—applied through the female, whose name I think was Susán Kalli—alone availed. She would fondly rub her head against his, and then "give him a lead" up to the objectionable bog or ford; but even her coaxing failed sometimes, and then we had to "go round." Once it was tried to drag him backwards with a chain round his foot, but he being the stronger, dragged the female.

The damage caused by their passage through rice and corn fields was sometimes considerable, and always necessitated payment to the hornet-cloud of buzzing natives, and occasionally the purchase of the trampled patch. On occasions when an elephant, perhaps two at once in different directions, lay floundering in a bog and all the packs were strewn around, the natives, excited about their crops, would crowd round and cry with menacing crescendo, "Mhongo! mhongo!" i. e. compensation! I have known matters wear a very threatening aspect for a time, e. g. in Uzaramo, in parts of which white men had never been seen before, and where one, a Mr. Mason, had been murdered; but the presence and the resolute, watchful attitude of a number of men with guns protecting the goods, perhaps suggested that fair means might be exhausted before force was tried.

Mr. Carter had in a very large measure the capacity for command, not only of the wills but also of the affections and fears of his subordinates. The result was seen in our camp, which was orderly, quiet, and disciplined, instead of being, as a camp with so many wild spirits might have been, a pandemonium. Yet I must not omit to mention as probably a potent reserve force Dr., now Sir John, Kirk's known interest in the enterprise, as shown in his personal solicitude and address to the men before quitting Zanzibar. Had Mr. Carter lived to write a book, I am sure one of his first thoughts would have been to testify to the value of Dr. Kirk's services to and sympathy with the expedition, and to his great personal kindness and hospitality toward himself. We often spoke

over our camp-fire of our common indebtedness to H.B.M. Consul-General and his lady, who dispense hospitality and sympathy with so much kindness and tact to the many birds of passage who alight at Zanzibar.

My experience of the negro porters is that they are remarkably good fellows at bottom and, though timid, staunch and loyal. But to bring out these qualities, a thorough mutual understanding is required, based upon a clear conception as to who is "master"; that settled, the guiding hand must be light, though "masterful." In this and many other respects they are very much like children—very lovable when well under control, but otherwise very tiresome. Happy-go-lucky is their character to a T. Careless and thoughtless, they will grumble at a long march; yet, aware that dawn will bring another, they will sit awake all night singing and droning their rambling, repetitionary monotones, or telling stories which vie in suggesting new terrors ahead. As a result of this, some of the more timid have by the morning chosen the better part of valour, and discreetly bolted. When a new country is about to be traversed, every Mpagazi (porter) becomes a Cassandra. Several times our camp was burnt about our ears in the night, to the imminent danger of our baggage-pile and powder-kegs, owing to their careless habit of going to sleep with a big fire blazing in the small straw hut.

On July 7th we reached the end of Mackinnon's road, camping two miles beyond Vikeruti at Mr. Engineer Beardall's, who treated us with great kindness, and was of great assistance in supplying a much-needed gift of axes, and in obtaining our men the food which the neighbouring villagers were very reluctant to furnish. We stayed two days here clearing jungle for the passage of the elephants. The thermometer at night stood between 56° and 60°.

After leaving Dohera on July 13th, we saw much cultivation of maize, cassava, millet, peas, mangoes, bananas, and the tobacco-plant. The native men were tall, with hooked but flattened noses, and with Vandike beards; their hair was dressed just like that of the women, who were squat and ill-favoured. The country was fairly open, village and hut-clusters frequent, and the people numerous. Their arms consisted of bows and arrows and spears. We specially remarked that they had no eyes at all for the white men, although they had never seen Europeans before, but only for the elephants. We noticed a highly aromatic plant, with a smell like that of thyme, but much stronger, and with hairy, purple stalks, the native name being *arcazamudi*. I mention the plant as it is reputed a good native cure for pains in the stomach.

We had now, after a gradual ascent all the way from Dar-es-Salaam, reached the edge of the Kingani river valley, which lay, with a sudden drop, 200 feet beneath us. From the village of Chirwalé the eye could travel some eight miles to where the river meandered amid numerous timber-belts in an extensive grassy plain. There

were signs of game, said to be plentiful here. The same night we made the Kingani ford, some 50 miles as the crow flies from Dar-es-Salaam, having covered 78 miles. The bearings of the place, by name Gungu (chief Mtitu), were calculated as lat. $7^{\circ} 2' N.$, long. $38^{\circ} 37' E.$ The river is here about 70 yards wide, very rapid, and makes several bends. Next morning only two canoes were to be had, and these most unstable. We stretched a rope across the river, and ferried the canoes across by it. One canoe upset, its nine occupants, with baggage and guns, falling into the water; but cries of the much-feared *mamba* or crocodile soon brought them to land, the canoe being recovered lower down the stream. I watched the passage of my guns with much anxiety. Their escape of a wetting was very narrow, as indeed was my own, the overladen canoe rolling from side to side, with the water within an inch of the gunwale; twice it was all but over! The elephants swam across, amusing themselves for some time washing and floundering about.

A splendid, likely-looking game country was now traversed, with fine green grass, plenty of trees, and dense cover.

The same day the river Lungerengere, famous for crocodiles, was reached, a very swift stream, at the point of crossing about 12 yards wide, with banks 12 feet deep. Our passage over a very clever but difficult tree-bridge occupied two hours. The elephants forded, an incline being dug for them in each bank. We camped at once at Kidama Chakawéwa. Near the Kingani and Lungerengere there is plenty of bird-life, notably pigeons, parrots, and ducks. We remained a day encamped by the Lungerengere, which Carter and I devoted to the search of game. Going in different directions, we saw giraffe, zebra, and wildebeeste, but got nothing, except a considerable degree of fever, the result of the day's stalking under a burning sun without a drop of water being met with.

On July 17th we first saw the tsetse-fly, in a belt of country infested by it, through which we had been marching since crossing the Kingani. We were now face to face with one of the three problems the expedition had specially to solve, viz. could the Indian elephant, being removed by long captivity and by its artificial treatment from the safeguards of the wild state, resist the attacks of tsetse, or would he, along with the ox, the horse, and the donkey, succumb to them? The problem was solved, and that in the hoped-for manner. The fly swarmed on the elephants till blood trickled down their flanks in a constant stream. For days they endured this; and yet they showed no prolonged signs of tsetse-poisoning—lassitude, melancholy, running at the eyes—either at the prescribed time, viz. eight days, or afterwards, though they seemed pained and distressed during the infliction. The donkeys, on the other hand, sickened more and more after this, and at Mpwapwa were in a dying condition.

We were now near the Lungwa river at Charinzi, where food was

very dear; and at our next camp in the jungle—a halt made for the sake of the elephants, water being reported absent ahead—the water was almost undrinkable, being strongly alkaline, slimy, and very nauseous to the taste. I was unable to get through my cup of tea. Wild pigs were numerous here. The night temperature in the tent was 62° F.

On the 19th we travelled along the foot of a range of fine hills about 2000 feet in height, and densely wooded to the summit. A specially fine conical mountain lay to the left of our course, which was north-west by west. The country was Ruvuma, and the people Wakami. The Bagamoyo road lay three days' march to the north-east.

The next day's march was through a lovely hill country; precipitous ascents and descents alternating with the loveliest valleys glowing with ripe corn, and dotted with frequent knolls, each crowned with a nest of huts and girt with the usual *boma* or palisade. The waves of golden corn rolled right up the hillsides to the summits; and a charming stream flowed through the centre of the valley. This was the most lovely natural garden I have ever seen, with its glowing millet fields filling every hollow and dell and brightening up the slopes of every knoll, with its lines of fresh bright-green banana-trees along the stream banks, the whole enclosed by huge walls of purple tree-clad mountains. I was told the mountains were called Ukangu. South-east by east lay Luhaki, and south-west by west were the hills of Luguru or Ruguru. The nearest village was Makoka, where we camped in a completely enclosed vale of about 1000 yards in length. The next day's march was through a similar series of picturesque valleys, to all appearance the abodes of peace and plenty. The people crowded together among the tall corn to look at us, but rushed away on the least movement of the elephants. So calm and peaceful were these rural vales, shut in by the girdle of hills, that the inhabitants could, I think, forget in time that there was a world beyond them.

Our next camp was Tumundu in the district Kikunguri, chief Aceda Murumu; it was on the line of the lower road to Bagamoyo. The temperature was 89½° F.; height of position between 800 and 900 feet. We had seen much quartz, and the red sand seemed to glitter with gold-dust, but I fancy most of it was mica. I was much struck by the decayed, desolate look of the forest trees, most of the leaves were fallen, and the boughs broke at a touch—the only life they seem to possess was in their thorns, some of which were straight spikes 8 inches long. For the first time we now began to see giant creepers. After passing some conical mountains we came to a tract of forest where every tree was hung, festooned, smothered, shrouded, enlaced, draped with convolvulus; tree was linked to tree in the most extraordinary manner, and the ground carpeted with the plants. We here saw tsatse again. On July 23rd we left Kiroka (Kungwa Valley) where we had encamped near the mparamusi tree mentioned by Cameron according to my informants. We traversed a

great deal of very dense jungle, and our elephants had some extremely stiff climbing, which no other pack animal, I consider, could or would have accomplished. We saw some wild cherry-trees (*kunazi*). On our right—i. e. north-east to north-west—stretched a vast expanse of dead-level tree country, from which stand up three isolated cone-shaped mountains, bearing N.N.E., the middle one standing more apart: to the north is a solitary peak, and to its right in the far distance a short range of high mountains rises from the horizon. We had passed several gullies and torrent beds, and now, after leaving the circular stockaded village Kigambi of the Wakami, we reached a splendid stream fresh from the mountains, pebble-bottomed and clear as crystal; and in the distance a torrent was seen rushing down the mountain—this river was the Ugorori and the camp Muhalleh. The night temperature was 58°.

On the morning of the 24th, starting at 6.55, we crossed by a fifteen yards wide ford, and thoroughly enjoyed the lovely spectacle of sunrise among the hills. The mountain range on the left of our path was a constant feast to my eyes as we proceeded. As the mists rolled up the lower slopes, its giant proportions revealed themselves in all the contrasts of massive spur and sharp arête; while silvery threads marked the distant course of brawling burn and babbling beck, of roaring torrent and swirling cascade.

The first village of importance was Simbamwenyi (stockaded), 1400 feet above sea-level, according to Cameron, and lying at the base of gorgeous hills. The houses were circular, with dome-shaped roofs ending in an apical pole which supported a Mahomedan crescent. We rather hurried past Simba, whose reputation is not too good, and just beyond it crossed a fine stream running north by east, the Lungerengere, I believe. A fine group of four mparamusi trees attracted our notice, as well as the large quantity of tobacco growing. The inhabitants of Simba—Wazigua—file the teeth to a point. We camped about one hour west of Simba on the Lungerengere, here flowing north-east by east. The people were ugly, with long noses, and looked suspicious and timid. At our camp Carter received a reply from Captain Popelin, of the Belgian International Expedition, to whom he had written from Tumundu on learning his arrival at Mikeseh. The night temperature was 44°.

We left Ugerengere on July 25th. After passing Simbo, a small *tembe*, or stockade, we camped at Mizinga, where the night temperature was 55°. Near this we saw the first fan palm; they became plentiful afterwards, throughout the Mkata plain, a swamp when Cameron passed, but now dry and cracked with the heat. Speke's "umbrella trees" were numerous, and sparse tree-belts were scattered about, with numerous heavy-game tracks. On emerging from a tree-belt, a herd of six giraffes was decried about a mile away, staring at our elephants in amazement; they evidently could not understand the men and loads on their backs.

Carter and I quickly mounted the leader elephant, inspected the giraffes with the field-glass, and with rifles ready set off after them. But after staring some time they made off and were soon lost to view; upon that we gave up the chase.

A tree-belt marked the course of the river Mkata, which we soon reached; here was clearly the true Mkata swamp; the part we travelled over showed no sign of having been a swamp for some time, the presence of grown trees and absence of reeds and marsh-grass suggesting this opinion. Tracks of rhinoceros and elephants were numerous, while the grass was crushed down in every direction by the recent conching of heavy game. Two or three drops of rain were the only local result of very heavy rain-clouds which passed over us. It was lovely park-land, and resembled home-scenery. In the river-bed the water lay in big pools, frequently disappearing under the sand, in particular at the crossing-place. Some natives seen only boasted one gun among the general armament of bows and arrows: they looked on, saying nothing. Millet (*mtama*) strewed the ground, far more being "down" than could possibly be threshed for many a day.

Again the path led to the river, here very strong and rapid; a cleverly-constructed but very narrow and difficult tree-bridge enabled us to cross dry in about two hours. The men were much afraid of crocodiles (*mamba*), with which the stream was said to swarm. A native, on the other side, with whom Carter wished to speak, would not cross until he had sent for and chewed some green-stuff, which done he spat it away and plunged into the water. It shoaled rapidly, at two and a half yards from either bank being much beyond his depth. The elephants forded at a spot 20 yards up stream, and as no man would swim the donkeys over, the female elephant towed them by a rope with her trunk. The ford was near Kukonga, which lies back, hidden, in a bend of the river. The plain here is scrubby. Four giraffes, perfectly dazed, stood about half a mile off looking at us. There was much bird-life here, with quacking of ducks and cooing of pigeons. At Komberinha, half-a-dozen vultures perched near our camp; and we saw a wild African elephant's foot-mark half as large again as those of our animals, though these were over eight feet high. Monkeys were for the first time seen here.

Passing the villages of Kamohina, consisting of about twenty-five round thatched houses, and Kwarigobi and ten other hut clusters, we reached Seyyid Barghash's town of Akeda Ferhan,—where the Arab flag was flying—situated amid a very garden of sugar-cane, millet, Indian-corn, cassava, peas, melons, pumpkins, saffron, castor-oil plant, papaw, cotton, and tamarinds. We passed through and camped at Useghara kwa Ferhan. There are here two pretty streams—the Lunga just before Ferhan, and another on the way to Mvumi—where the courteous Arab governor, Seyyid Ali bin Omar, who rendered such kind assistance to Cameron, and to whom on my return I also was much indebted,

represents the Sultan of Zanzibar. Splendid specimens of *Solanum nigrum* and of tamarinds, also tomatoes (*nyaya*) were noticed, and a broad-bladed grass of styptic fame called *Mwanga mwitu* (i. e. forest rice).

Against a large bloated baobab was propped a striped rod, about three feet long, lying horizontally, with its other end supported on a branch of a shrub ; three hollow globes with a hole in them were spitted on one end from which also projected a feather. This was *dawa* or "medicine," i. e. a protective charm. At Mvumi (Kwam Tupa) were three mparamusi trees.

After passing Miombo and Wangwana Silamu, we camped near Tupa, three hours from Useghara kwa Ferhan.

Here the dignified and courteous elder brother of Seyyid Ali called on us and had a long palaver, his motley following crowding the entrance of the tent. Only one or two of these Arabs could understand Arabic. After coffee had been handed, the elephants were put through their drill, saluting (salaaming), &c. ; while I made up some medicines for Seyyid Ali, who had been for some time ailing with an obstinate attack of dysentery. On repassing that way I had the satisfaction of receiving the Governor's grateful assurance of the benefit he had derived from my medicine (ipecacuanha and opium). I need hardly say we were the best of friends and parted with mutual regret.

Poor Carter, who was thoroughly alive to all the probable results of the expedition, anticipated that henceforward Arab local chronology would date from "the year of the Elephants."

Seyyid Ali bin Omar is a young, very bright-looking, laughing Arab of about thirty years, with large, eager brown eyes, in manner very courteous and affable, at ease yet dignified, imperial but not imperious, and seemingly much liked and respected by his *entourage*. In the evening he paid us a visit, walking the mile and a half from Mvumi. A less interesting visit was that of the black chief Silamu with a dusky retinue, Carter's "dark séance" as we called it. We tasted their *pombe* or native beer, and thought it very intoxicating ; it was like fallen peaches stewed. The native water-pipes [Kiswahili = *hiko*] were very curious, being made of gourds of various shapes. The smoker swallowed the tobacco-smoke, which caused a violent fit of coughing, and in this paroxysm of coughing the pleasure and luxury seemed wholly to lie. Here Carter and I made another attempt to find and shoot some guinea-fowl, report crediting the country with plenty ; but as usual, we did not succeed in seeing any, and so finally concluded their existence was one of the fictions of the country. On the 30th, after leaving Tupa, we passed a few villages all stockaded, one especially, where we first struck the Mukondokwa river on its left bank, being shrouded in dense leafy bushes, the narrow entry looking out between bananas, whence huddled women timidly peeped. Here the river is 90 to 100 yards broad :

the ford is up to a man's hips. The view north-north-westward and up the river was very charming. The Mukondokwa valley presents a continual ascent, opening out, as Muinyi Useghara is neared, into a broad smiling vale rich in crops—of corn, castor, sugar-cane, rice, semsem, cotton, bananas, pumpkins, *Amaranthus melancholicus* which makes a good salad, and forms trees similar to the copper beach: while the tall reed-grass was in flower. Stockaded villages crowned all the knolls—which were ubiquitous, some twenty-six occurring on this march alone—and many others nestled in the dells. Cattle and large herds of goats were plentiful. We saw the fan palms, mentioned by Cameron, which have a huge bulge or swelling about three-quarters up their trunk; one had fallen. The roofs of the huts here became more conical and less dome-like. The hills, despite their clothing of trees, look very sterile; black and white primitive rocks prevailed. At the last ford before reaching Muinyi the river was very broad and shallow. Muinyi, under the Rubeho mountains, lies on an open plain surrounded by lofty hills. After leaving Muinyi a very noticeable landmark was an mparamusi tree formed by the union of three in one. Between Muinyi and Rumuma—our next camp—i.e. in the upper course of the Mukondokwa, the path crossed the river many times. At one point the path—which Cameron mentions as rather precarious even for porters, leads for some distance along the steep hill-side immediately above the river, whose bank on this side, though not very deep—5 to 10 feet, perhaps—is sheer, and the stream full and strong. The elephants, whose loads spread out on either side of them some five or six feet, though rendered insecure from this cause, safely passed along. But in one place a dry torrent-bed, forming a deep rift across the path, which, in avoiding it, followed an acute angle, compelled us to cut away the steep hillside a little to enable the elephants' packs to clear it. Yet amid their many real trials of strength, difficulties, and occasional danger, as they clambered up and down, over boulders and tree-trunks, across treacherous bogs and shifty, stony torrent-beds, and up hills which made them pause, look round for help, and trumpet with remonstrance—amid all this these noble beasts at all times exhibited unfailing judgment, patience, and willingness. Their pluck under their too great labours compelled an admiring pity for them. I mention these facts to show the splendid qualities of these grandest of "weight-carriers."

The huts about here were mostly round, with dome-shaped roofs; some were oblong. The jewellery worn by the natives was very elaborate; the favourite piece was a neck-plate, consisting of flat rings of brass wire concentrically arranged to form a large flat plate. One which we saw on a small child measured quite eight inches in diameter. Bracelets and anklets, both reaching far up the limb, were common. The men confined their adornments to their ears, which were slit and stretched to a hideous degree, to hold earrings in the form of silver plates of flower

and other patterns as large as a crown-piece, or in that of a brass cylinder looking like a rouleau of coins, or of a small goat's horn like the native cupping-horns. As we passed Kiresho a group of natives with broad faces, high cheek-bones and slanting Mongolian slit eyes, at once caught my attention. Huge cacti and baobabs were numerous, and a small wild aloe which, when the green skin is peeled off, I was told is an ice-cold and healing application for burns. Our porters warned us against a bean-like, hairy, S-shaped (S) seed-pod of a creeper, as having severe stinging powers; it was about four inches long, yellowish brown; they called it *upupu*. Happily the pain yields to two procurable remedies, cowdung and wood-ashes. Here, close to Rumuma, the river rushes over a splendid natural weir. The aneroid registered on August 1st 27⁷/₁₀; and the night temperature outside the tent was 56° F.

At Kirasa and Kioro we saw European waggons, and found they had belonged to Mr. Roger Price's party, upon whose "road" we now were. I believe this place marked the limit reached by the bullock-waggons of that party; oxen would ill have been able to drag them further along the so-called road which was scarcely wide enough for even a small cart. For the elephants to pass, we had to widen the road considerably, and to do so cut down large quantities of trees. I can safely say that where our elephant caravan passed through the jungles a thoroughly serviceable 12-foot way, free of trees, marked our track,—and that, all the way to Mpwapwa (Mpamvua). At Rumuma I again saw tsetse fly, an observation which M. Broyon's experience confirms, he having lost some oxen through the fly after bringing them safely all the way to Mpwapwa. Beyond Rumuma the ground was quite white with salt; and traces of heavy game, among them hippopotami spoor, were numerous. There was hardly a leaf on the trees in these dry highlands of Useghara, nothing but dense grey thorn-jungle, covering the sterile rolling hills piled around; away south-west by south was a fine plain. The hills were granitic with much quartz; the sort of country in which one would expect to find gold. I shall not readily forget the thorn-jungles of Useghara! Every tree is a wait-a-bit thorn-tree: I was nearly torn off the elephant once, a thorn having got hooked in my eye-lid, and as the elephant was striding rapidly along, nearly tearing the eye-lid off; I happily unhooked it just in time. The hard, woody spiky point of a yucca-like reed-grass called *miombo* ran into my knee, making me very lame for four or five days; the pain kept me awake all that night. This *miombo* is plentiful as you approach Lake Ugombo, and superabundant on the shores of Lakes Kimagai (Iramba) and Ngiha, of which, I believe, M. Broyon was the discoverer. When beaten, rubbed, and twisted, *miombo* makes splendid rope and cables; we made a very long and stout rope of the grass. The inner bark of the acacia also makes fine strong rope; while excellent material for sun-blinds, &c., is furnished by the stalk of a tall lanceolate-leaved reed-grass, with a flower-head

suggestive of pampas-grass and called *mdete*. Mr. Last gave us much information about the uses of miombo and *mdete*.

In crossing a river to-day a typical accident befell the author of so many of our disasters—the male elephant “Sundar Gáj,” better known as “Old Musty.” In the words of my diary: “I was sitting on the elephant and waiting till the others should have crossed the river and come up, when suddenly urgent shouts from Carter for ‘Jemadar!’ (the head mahout) and ‘Buchiet!’ (the head of the elephant gang) made me slip down from the elephant and run back to the river. There I saw “Musty” rolling helplessly in the stream, his off-legs sunk inextricably in the mud, his pack half under water, and only one side of his head above the surface: his efforts to free himself only made him roll over more, and his head sank under water, only his trunk appearing, a signal of distress. We thought he would have been drowned. The men dashed into the river and unfixed the pack. It took three-quarters of an hour to get his load to the bank, now several hundred pounds heavier than before, by reason of the long immersion. Curiously enough, neither my tin box with books and instruments, nor my cartridge magazine got wet. The cause of the disaster was that this obstinate elephant would follow in the track of the three others up the precipitous and yielding bank; this giving way, he rolled back and down into the stream.”

We camped at Lake Ugombo on the edge of the lake: the natives called the locality Matamombo. The night temperature outside the tent was 41° F. I found it intensely cold with all my clothes on. There was a dense penetrating mist from the lake. The return of morning revealed a beautiful sight, the placid lake reeking with vapour, and the hills and slopes that faced east being grandly lit up and empurpled with the rising sun. Hundreds of water-fowl,—large white cranes, brown and white geese, cormorants winging their heavy and solitary flight; while clouds of ducks whirled and wheeled in their hosts in search of their morning meal among the mud and sedges. Hippopotami grunting amid the reeds were heard, but not seen: however, Carter shot two that were some way out in the lake. The porters, fearing crocodiles, would not, though badly off for food, go into the water after them. Subsequently, at Kimagai, Carter saw thousands of birds,—ducks, geese, cranes, and strange herons, black swans (which Stanley mentions), and a strange eagle, as Carter believed, with wattles, like a turkey. Between Lake Ugombo and our next camp at Simba on the Ugombo river, a high table-land of red sandstone was traversed: a tree-plain stretched away south-west, and there was much scrub and bush affording cover to the swarms of bird-life with which this region teems. We noticed guinea-fowls, quails, cranes, kites, parrots with black, green, and gold plumage, a bird like grouse, and pigeons, of which one sort had lovely gold-green plumage.

On Sunday, August 3rd, we left Ugombo river at 7.20, on our last stage for Mpwapwa. Most of the way led through a dense thorn-jungle, whose impenetrability will be realised when I say that our porters reached Mpwapwa five hours before the elephants, although on the flat where there is not much cutting these animals, with their steady pace of three miles an hour, can easily outwalk the porters. And this despite our strenuous exertions to reach the long-sought goal. The porters got in at 11.30 A.M., we at 5.45 P.M., after a march of 10 hours 25 minutes. The elephants required a road about 12 feet high by 11 feet wide. The path, on our arrival, was only a foot-track along which one had to brush through the thorns; our passage in this part of the caravan route would convert it into a very fine road. The approach to Mpwapwa lay along the broad, sandy bed of the almost dry river, now about four feet wide, close to which on the level we pitched our camp. Our entry was a triumphal one. The elephants, grand in their ponderous strength and docility, strode along in single file; our Belgian flags were flying in the breeze; the dark, yet alien, Indians and the disciplined body of Arab "elephant-men" with axes and billhooks, Carter and I on foot in rear and van respectively, the little band advanced in silence, conscious of having accomplished the first section of our great journey in half the time expected.

Rest and reorganisation were necessary after the laborious march in order to prepare for perhaps yet sterner work. Especially necessary was this the case with regard to the elephants, who were very thin, and to the porters, after their thirty-three days of almost forced marching. We meant to take twelve days' rest; but owing to the non-arrival of the Belgian International Expedition under Captain Popelin and Dr. Van der Heuven, and of our goods from Zanzibar; and also to the grave illness of the Belgians with whom we were to join forces in passing through Ugogo,—a month of chafing and impatience was wasted there. During this time we received exceeding kindness and attention at the hands of Mr. J. F. Last, of the Church Missionary Society, who almost maintained our expedition during its stay. At Mpwapwa our first task was to draw up the "Report" for the King of the Belgians, of which unfortunately I have no copy; but I remember it contained the words—"The elephant experiment has now been proved a complete success," an assertion which Carter justified on the three counts of (1) Their immunity against tsetse after twenty-three days' exposure to that insect; (2) their maintenance during one month mostly upon the uncultivated food of the country, and therefore at little cost; (3) their ability to march over all styles of ground, soft, stony, sandy, boggy; to conquer all eccentricities of topography—hill and dale, river and jungle—while labouring under double their due weight of baggage, some 1500 instead of 700 lbs.; and this in a style that no other beast of burden could hope to emulate. At this distance of time, and notwithstanding

the subsequent death of three elephants and the discontinuance of the experiment, I see no reason to withdraw a word of Carter's claim to success.

"A great deal of my time was occupied in making out the "Statement of Account." I here give a *résumé* of it, as showing how small was the cost of the expedition on the march, and how notably trifling the elephants' share thereof, viz. some 25½ rupees.

**COST OF THE ROYAL BELGIAN ELEPHANT EXPEDITION FOR ONE MONTH, i. e. FROM JULY 21
TO AUGUST 3; ON THE MARCH FROM DAR-ES-SALAAM TO MPWAPWA.**

This = 57*l.* odd; which gives for a year's cost at same rate 685*l.*

Our "CLOTH" expenditure, which is converted into money in the above account, stood thus:—On leaving Dar-es-Salaam we had of

		Doti.
Amerikani, 13 bales, each of 6 pieces, each piece of $7\frac{1}{2}$ doti	535
Satiné, 18 bales, each of 7 pieces, of 9 doti each	<u>1134</u>
Total	1719

On our arrival at Mpwapwa we had expended 431 doti, leaving only 1288 doti.

Carter and I had always said "our troubles will begin at Mpwapwa." Our fears were realised, though not from the source we had anticipated, at least as regards the most serious trouble—the death of our finest weight-carrying elephant. Our brilliant Report had been despatched between the 5th and 10th. On the 11th, Carter went to Lake Kimagai with two elephants to get miombo grass for rope-making, and to see the lake and shoot. At sundown on the 12th the elephants Sundar Gáj and Nadir Baksh returned laden with miombo, both seemingly well. On the 13th, about 5.30 A.M., my servant awoke me with awe in his face, and in a ghostly whisper said—"Bwana! (Master!) the big elephant is lying on the ground; the Hindi don't know what to do, they think he is dead!" It was too true. Seen standing at 3 o'clock that morning by the Indians, now, at half-past five, his mighty carcase lay motionless on the earth. Sundar Gáj, our giant-comrade in many labours, was dead! After a few moments' sad and silent contemplation of his lifeless bulk, I began the work of inquiry. In the subdued circle of solemn faces around me, it was to the Indians I turned for their opinion. I saw no signs of a violent death, no external sign of the cause; he had fallen without a struggle, for the soil was not disturbed. Around him

were the leaf-boughs of a tree which the Indians said had been their food since Dar-es-Salaam. A message, in which I proposed a post-mortem examination, despatched at once to Lake Kimagai, brought an answer that Carter would return about 4 p.m., and had ordered the removal of the tusks, the amputation of the feet—it being necessary to send all these to Bombay—and the excavation of a grave. The first two tasks I personally performed; our porters could scarcely be compelled even to lend their knives. The grave was not ready even at 10 p.m. Early next morning I set about the dissection, which proved no easy task. The whole business took me two days, and poisoned my finger into the bargain. The heart weighed 31 lbs. and was some 16 inches long; I did not consider it diseased. The opinion I formed then and still retain was that Sundar Gáj was a victim of too-herculean labours and of an insufficiency of food. This opinion—which reflects upon the Indians infinitely more than upon Carter, who, as being ignorant of elephants' habits, left to them the treatment, and referred to them for guidance in the case of these animals—receives support from the following considerations:—(1) that a second elephant died soon afterwards; (2) that they had been stall-fed in India, on white bread, &c., the fat of the land in short, and then after only a short gradual reduction at Dar-es-Salaam, had had to forage for themselves, very little corn and rice being bought for them; (3) that whereas, according to Sanderson, 700 lbs.—I speak from memory—is the limit-weight an elephant should carry on flat ground for a prolonged time, these bore at first 1200, then 1500 and at one time 1700 lbs.; while they daily climbed the most tremendous hills, which no mule I think could have climbed under a proportionate burden; (4) that fat and round at starting, their backbones stood up six or seven inches from their flanks at Mpwapwa, so much flesh had they lost.

It is very important if the elephant experiment is not to be discredited and voted a failure, that the truth should be known. But for this far greater stake, I should have shrunk from publishing my opinion of the cause of death, as indirectly it fixes some responsibility for the calamity on my late chief. As he told me himself, he was instructed to take twenty spare porters lest one of the elephants should fall ill. In his laudable desire to get off quickly—the supply of native porters being exhausted—and have as compact and swift marching a caravan as possible, he did not adopt this plan. When, therefore, we found that the porters were too heavily laden, extra loads were piled on the elephants, themselves already overladen—and this, notwithstanding the numerous goods we left behind at Dar-es-Salaam. This neglected precaution was the “fount and source of the evils” which detained the expedition so long at Mpwapwa, and, I cannot but think, contributed, in the extra work it gave them, to the death of the two elephants. That sad occurrence, so soon after the despatch of the report claiming

"proof of a complete success," unless accounted for on the above hypothesis of rude packs and unnecessary privations, under both of which the noble beasts laboured, and to which they most assuredly succumbed; exposure to which would be avoided by subsequent expeditions, and might have been avoided in this instance by a little more knowledge, patience, and less fear of expense; unless thus accounted for, the fatality would be held to refute our claim to success even by the royal patron of the experiment. With the public of course, it has, I presume, always been regarded as a failure since the death of the elephants and the crowning loss of its chief. Yet it was not a failure; as an experiment it was proved possible and, may I not add, presumably profitable? It failed only as a sustained effort, and this from want of knowledge and experience partially, but from misadventure finally. The dearly bought experience would remove these risks another time. I have not the shadow of a doubt that there is yet a great future in Africa for the elephant, especially when the stage of capturing and taming the native species has been reached.

Difficulties of the problem which must be surmounted are: (1) the assumed, but by no means *proved* inability of Indians to stand the climate, and (2) their reluctance to part with the inherited lore or craft by which they control their elephants. We had a gang of Zanzibar Arabs, speaking Hindostani, specially told off to assist the Indians and learn their craft with a view to replacing them at the expiration of their one year's stipulated service; but they were as ignorant of this craft after a month as at the start, and we saw then that they would remain so. To meet these difficulties, Africans should be sent to the Bombay stables there to learn the elephant-lore. Our Indians were a great care and responsibility to us. They were always sick, always whining and complaining; often we gave them our own dinner of fowl, "galeeney," pigeons or what not; they had early been allotted our store of rice. Often our porters went empty when the Indians fared well; most days I had to doctor seven or eight of them. They took no care of themselves. With the exception of one, Luxuman, and an old man, Wazir Khan, I think they were an ill-plucked, feeble set. One of them died after I quitted the expedition; while seven of them were sent home from Mpwapwa. This left Carter with only five of the original thirteen. These must have been too few for the work, only two, I fancy, being mahouts.

Up to Mpwapwa we lost only eight men by desertion, and those fled from the anticipated terrors of Uzaramo, in the portion of which between the end of Mackinnon's road and Mikesch no white man had been before: the reputed witches, demons, and wild animals of that country proved too much for them. We were very lucky, when one remembers that Stanley lost fifty-seven on his first journey by a shorter route to Mpwapwa; while Cameron's porters deserted in batches every day.

Nor had we any deaths. Our troubles came in a cluster at and after Mpwapwa. There one of the donkeys died, on August 30th. On stepping forth from my tent one morning, I saw the poor beast just outside, his neck over the medicine-chest. In his dire need he had crawled from his own quarters all the way to my tent. I could do nothing for him; the tsetse had done their work.

I visited Dr. Mullens' grave, with its piled mound of heavy stones and strong timber palisade, proof against molestation from wild beasts.

It was winter at Mpwapwa, the night temperature 60° F. in the open air, that of the day in tent 90°-100° F.; it was very cold at night, and comparatively cool by day (yet I could not remain in the tent for the heat), a strong wind always blowing, it was not a bit like one's idea of Africa. Yet though fever was warded off, feverishness was ever present. Until August 30th, neither Carter nor I had any illness worth mentioning, but both had been hearty and hard. My healthiness I attribute largely to the long habit of total abstinence, to dry-rubbing with a towel, changing promptly damp garments, the wearing of net veats, and having a bath only in the middle of the day or before sundown in the shade of the tent; and lastly to taking plenty of quinine.

The healthiest drink in Africa is the water in which rice has been boiled. A nightly potation of this, with as little drink as endurable during working hours, is a sound precaution against intestinal complaints. *Mawélé* (*mwere*) and millet (*mtama*), especially the red sort, are too heating for Europeans. Maize (*muhindi*) loaves made with pombé beer are excellent.

GEOGRAPHICAL NOTES.

The Survivors of the 'Jeannette' Expedition.—A detailed report from Engineer Melville, of the *Jeannette* Expedition, the first received, reached Washington on the 20th of March, and was published in the *New York Herald* of the 22nd of the month. Together with its enclosures, consisting chiefly of copies of the records left by Commander Long at the different halting-places examined by Mr. Melville in the Lena delta, in the course of his ineffectual search for the lost party, it gives much additional information regarding the proceedings of the survivors, from the time of the wreck of the vessel down to the 7th of January. We select the following from amongst the records deposited on his way by Commander De Long, as the most interesting and important:—

"Arctic exploring steamer *Jeannette*, at a hut on the
Lena delta; believed to be near Tcholhogojie,
Thursday, 22nd September, 1881.

"The *Jeannette* was crushed and sunk by the ice on the 12th of June, 1881, in lat. 77° 15' N., long. 155° E., after having drifted twenty-two months in the tremendous pack-ice of this ocean. The entire thirty-