

other travellers has been the same. Physically they are superior to any of the other Rovuma tribes. They do not wear the pelele or tattoo themselves. They are cleanly in their habits and tend generally towards the adoption of Coast customs. Their houses are large, clean, and unusually well built. In customs, language, and manners, they differ from all the neighbouring tribes with the exception of the Makua, who in some respects resemble the Wahyao, though different in others. Their most promising trait is their eagerness to trade and their love of visiting the coast. Their business capabilities are very high, and they may be said to be to Nyassa what the Wanyamwesi are to Tanganyika and Victoria Nyanza. Unfortunately, however, their country is not blessed with any natural wealth, so that they have to depend entirely upon ivory and slaves, which they gather from the greater part of the Nyassa region. Indeed, this desire to trade has made them the greatest slave producers we now have in the Nyassa and Rovuma districts.

The slaves are chiefly obtained by wars among themselves, or with neighbouring tribes, and an extensive system of kidnapping. Each year every village, great or small, sends its caravan of slaves to the coast, and in the months of July, August, and September, the traffic is still very great. At a rough guess I should say nearly 2000 are every year brought down from the Wahyao alone. Three caravans I met averaged 150 slaves each, and I heard of a number of smaller ones. What, however, impressed me much was the evident absence of the dreadful cruelties usually supposed to accompany these caravans. It is true, however, that the slave stick for the men and refractory women is still a necessity of the trader.

Perhaps few better places could be found than the Rovuma basin for studying the frightful effects of the slave system; tribes scattered to the four winds of heaven, and almost annihilated, remnants of such compelled to live miserable lives on rocks and wretched little islands, continued civil war, the absence of all confidence between the various villages, immense tracts of country laid waste, and other evils of equal magnitude.

There are many colonies of Wahyao all along the Rovuma, and wherever they have settled they have become the chief power of the district.

The Makua are another tribe of considerable importance. They occupy the country between the Lujende and Mozambique, having the Mawia and the Matambwe on the north and the Wahyao on the west. They have always been considered a dangerous and exclusive tribe, but evidently on mistaken grounds. I was everywhere received cordially, and the Rev. Chauncy Maples and A. C. Goldfinch, whose tracks I crossed, marched right through the country from the Rovuma to the Mozambique coast without hindrance or trouble. The Makua do not tattoo themselves so lavishly as the Makonde, though their women wear the pelele.

Their distinguishing characteristic is a horseshoe-shaped mark on the brow, over the bridge of the nose.

The Makua women seem to occupy a very independent position, and advocates of women's rights might take a few hints from them. Thus, each wife has her own hut, with everything she possesses, at her own absolute command. She has her own plantations, and the food she cultivates she may sell or do what she pleases with, and it is only of her own good pleasure if she gives or cooks her husband any of the produce of her plantation. If she is divorced she retains all her property and all her children. It will thus be seen that the husband is here the principal object of pity, occupying, as he does, only the position of father of the family. Next to the Wahyao the Makua occupy the first position in industry, intelligence, and business capacity.

A few words on the Mawia, and I have finished. This tribe is better known as the Mabiha, but I fail to understand why, as it is a term I have never heard among the Rovuma natives, who invariably speak of the Mawia. I therefore adopt the latter as the more correct. They are specially distinguished by the fact that the men as well as the women wear the pelele. They tattoo themselves like the Makonde. They are remarkable for the extreme slenderness of their well-made figures. Their only dress is a single strip of cloth.

They are noted as the most exclusive tribe in East Africa, as even the Arabs have as yet been unable to penetrate beyond the outskirts of the country. Their country is like Makonde, and the demand for rubber and copal is slowly breaking down the barriers which exist, and gradually bringing them into communication with their neighbours. Occasionally a few of the tribe find their way to the coast to trade. On my way to the coast I saw them frequently, and was even able to photograph one of the chiefs.

They are said to live apart from each other, not forming villages. There are few roads, and these hardly passable. They are described as being very treacherous, and difficult to deal with.

*Makua Land, between the Rivers Rovuma and Luli.*

By the Rev. CHAUNCY MAPLES, M.A.

(Read at the Evening Meeting, January 16th, 1882.)

Map, p. 128.

NEARLY two years ago I had the honour of reading before the Society a paper on "Masasi and the Rovuma District"; I now desire to give some account of a journey I have since made, for missionary purposes, in the unexplored country lying between Masasi and Mozambique, a wide tract at present almost an uninterrupted blank on our maps. The

journey occupied two months and a half, and was taken in company with the Rev. A. C. Goldfinch and ten of our own Masasi men as porters. With this little band we travelled in safety and comfort over 900 miles of country, and did our best to lay down our route as correctly as was possible with a compass as our only aid to calculations. Our plan in estimating distances was to time by a watch the exact number of hours and fractions of hours we walked each day, counting an average of three miles (English statute) per hour: then, in laying down this distance on the map, we took off one mile in four as an average for the winding of the path, including also the reduction of the statute to the geographical mile: this average we noted only when the path took the same direction throughout the day, and was not affected by long curves round hills and the like, when, of course, a different allowance was made. In the whole distance from the point at which we left the Rovuma to the mouth of the Luli—travelling by a very circuitous route in order to visit the headquarters of the Makua tribe in the land of Meto—we found we had miscalculated some 20 miles. That is to say, when we found ourselves on the coast at Luli, according to our reckoning we were still some 20 miles from it, this error being almost entirely an error of longitude. From these observations it will be seen how far the accompanying map may be taken as approximately correct.

I left Masasi on June 13th, and early on the 15th reached our station at Chilonda or Newala, as it is more usually called. Here I was joined by my colleague Mr. Goldfinch, who set out with me the following day. On reaching the Rovuma we walked along its northern bank for some six-and-twenty miles in a north-easterly direction till we arrived at the Maviti towns of Mkula and Mkombota. These Maviti, it must be borne in mind, are known by many names; they are, in fact, the same people as the Wandonde, the Mazitu, and the Mangone. In my earlier paper I explained fully who they are, and the relation they bear to the Maviti of Lake Nyassa; it is not necessary, therefore, to repeat what has already been said there about them. After staying two days with these people, we forded the Rovuma close to their towns, and on the south side of it came very soon to some miserably built Matambwe villages. The Matambwe people, it may be noticed, are fast becoming extinct; as far as we know, they exist nowhere save in this part of the Rovuma valley, and even here are almost merged in the larger Makonde tribe. They live for the most part upon fish, cultivate no millet or other cereal, but occasionally buy these for salt, which they are diligent in extracting and preparing. A deep sluggish river, called the Mtumbwi, over which we were ferried by one of their party, runs close to their villages. After crossing this stream we began to mount the hills, and entered the village of a Yao named Ntiaka, who lives just above the river Lidede, abounding in fish and crocodiles. At this point we were, I believe, scarcely more than one day's journey from the little

lake Nangadi, noticed by Livingstone in his 'Last Journals,' and laid down on his map. We had hoped to strike a direct S.S.W. course from Ntiaka's, passing through the very middle of the Maviha country to the river Msalu, and thence in the same direction to Meto, for the capital of which we were chiefly bound. This, however, we found impossible. No road existed there, we were told. Besides, the Maviha are said to be so fierce and inhospitable to all other tribes, that no one dares to pass through their country. Very reluctantly, therefore, we were compelled to be content merely to skirt their country and to retrace our steps, gaining only a very little distance to the south, until we had reached again the longitude of Newala, which we had left a week before. We, however, managed to see something of these shy Maviha folk, for at the end of a very long day's walk from Ntiaka's, we marched into one of their towns. It was built in circular fashion, with a population of about sixty souls, and surrounded by a thickly planted "boma," through which on the south side there is a long passage and gateway leading into the interior of the town. The next day we passed in succession upwards of a score of these villages, and from all of them large numbers of people issued to stare at the white strangers as they passed. In the evening we halted on the last spur of the Maviha hills, and slept in the last of their villages. Our course still lay for several days almost due west, and nearly parallel to the Rovuma. We crossed two rivers, the Mparahanka and the Matiu, both of which rise in the Maviha country, between the Msalu and the Rovuma, and then taking a bend round a conspicuous hill named Nambiti, our path deflected to the south-west, and brought us to a group of Makua villages, presided over by a churlish man named Mkonona. He, however, did us one good turn, in that he warned us to leave the road by which our guides were taking us, and pointed out another by which we were able to arrive in Meto in a far shorter time than we should otherwise have done. The chief interest of our journey, too, is due to his advice, for the route he showed us took us to the headquarters of the Maviti, and enabled us to determine pretty accurately the present location of this East African robber band, as well as to obtain an interview with them which we trust will lead to a more peaceable state of affairs in a country that has of late been much disturbed by their raids.

Acting on Mkonona's advice then, we took the path that led us in a due southerly direction, and for five weary days walked on through a most dreary and uninteresting country, meeting but few people and seeing absolutely nothing that calls for remark. On June 30th we crossed a fair-sized river called Mwiriti, on the other side of which we soon came to signs of cultivation, and once more found ourselves amongst Yaos. Passing quickly through their villages, another 30 miles brought us to Nchine's town. This chief, exceedingly pleasant in manner and most hospitable, has made over the government of the district to a

younger relative, who with the authority has also [taken the name which Nchine formerly held—that of Chivaru—and lives where the Chivarus have lived from time immemorial, by the side of a lofty granite rock visible for many miles round, and known as Nikoche. I place his town in latitude 12° 25' S. and longitude 38° 28' E., which I venture to think may be taken as approximately correct. Chivaru has chosen a fine position for his town. At the back of it Nikoche towers majestically, while other tree-clad crags and rocks bound it on all sides without shutting it in or preventing fine views down the slope to the distant "barra" beyond. We marched up to Chivaru's "baraza" on Sunday morning, July 3rd, and found there some 150 people, full grown and stoutly built Makuas, with perhaps a small admixture of the Maviti element, waiting for us, having heard overnight of our arrival at Nchine's.

After spending the morning in preaching to him and his people, and holding our Sunday service, we afterwards climbed one of the neighbouring rocks to get a view over the country. Wherever the eye rested, the character of this desolate-looking region (for Chivaru's town and its immediate neighbourhood is as an oasis in the desert) was the same—one vast waste of stunted dried-up forest, with here and there great boulders of gneiss standing out against the sky in a hundred strange fantastic forms, some bare and others, less precipitous, covered with trees. To the south-west we descried the distant hills of Meto, to the W.N.W. the great hill known as Makanje, while far away to the north and north-east we fancied we could just make out the faint outline of the Maviha hills. Everywhere we noticed the bare, arid, unproductive-looking nature of the ground, as it were a thin crust of earth scarcely covering the solid rock in parts, while here and there only it ran into greater depth, allowing the cultivation of millet and Indian corn.

In this unpromising-looking locality, and with the town of Chivaru at Nikoche as their centre, the wild wandering Maviti are for the present established. Chivaru himself was most anxious that we should parley with these troublesome subjects of his, of whom in truth he seemed to be in mortal dread. He extorted a promise from us to stay with him on purpose to see them, and bade us speak out boldly to them on the subject of their recent extravagances. Ours being a mission of peace, we were of course very happy to accede to his request, and in due time the Maviti made their appearance. As we sallied forth from the house that had been placed at our disposal to meet them, we saw about twenty men of different ages, some of them mere youths, advancing in a seemingly menacing attitude, brandishing their spears and covering their bodies with their great shields. On seeing us they at once began the Maviti war-dance, and went through some of the strangest evolutions I had ever witnessed. They uttered terrific whoops,

leaped in the air, then seized their assegais between their teeth, and anon poised them, making a feint of casting them at us. Then, thrusting their tongues into their cheeks, they yelled hideously, and rushed round us with vehement gesticulations, whooping all the time.

At length there was a lull in these strange manoeuvres. Chivaru, Nchine, and ourselves sat down in the chairs of honour in the "baraza," while these wild warriors laid down their shields and assegais, and grouped themselves on the grass under a tree a few yards from where we were seated. Our parley then began. Chivaru first was approached by their spokesman, who in somewhat angry tones demanded of him the news of his guests and the reason of our visit. The others, much excited by their war-dance, wherein some of them appeared to us frenzied, applauded, and Chivaru stood up to reply. He spoke in the Donde language, but we gathered that he very carefully told them that our visit was one of peace, that we were Englishmen and not Banians, Arabs, or even Portuguese, and that we had already counselled him and his people to give themselves to the arts of peace. He looked very stately and king-like as he walked in his grand clothes up and down before them, delivering himself all the while in telling periods. When he sat down, I arose, declared the truth of his description of us, and spoke to them for twenty minutes on the subject of our doctrines. Not at all interested in what I said, but merely wishing to know briefly the main purport of our appearance amongst them, they broke into my sermon by a fresh outburst of warlike demonstrations. This I took as a sign that they considered my part was done, and wished others to speak. I noticed all the while, that Chivaru, Nchine, and the other elders were by no means at their ease, and even appeared to be doubtful as to the issue of this strange interview. More words followed from several other speakers, and then, towards sunset, Chivaru called me aside and said the warriors wanted to go away, but that I should have to give them something for their chief, and something for themselves all round, as a kind of "black-mail." Feeling sure that this was no *ruse* on Chivaru's part to get cloth from us, but on the other hand that he really was more or less frightened of these people himself, I gave the cloth, and with some satisfaction saw them depart after shaking hands with them all, and being assured that we were now free to pass through the country unmolested, and that our lives and property would be respected.

The history of these Maviti settlers at Nikoche is as follows:—Four years ago a roving band of Wandonde or Waninde (*alias* Mwangone, *alias* Wangindo, *alias* Maviti, *alias* Mazitu), who had originally been a portion of the East Nyassa Maviti, who in their turn had been associated with the original Maviti, or Zulus, of those parts, having harried the people about Kilwa and the north, passed south, and came to Chivaru to treat with him as to peace or war. The issue was, that they bent their bows backwards, which is the recognised sign of a treaty of peace, and declared

their wish to live in the adjacent country in amity with him and his people. They have not at present actually broken that treaty, but they claim to keep to their marauding habits, driving away or killing all chance strayers into their country, robbing and dispersing Yao caravans, making raids upon the coast districts, and sometimes even stealing flour, fowls, and goats from Chivaru's people. Chivaru seems unable to keep them in order or to restrain them to any very great extent, though the only way to obtain a safe passport in travelling through the country is to appeal to him and meet these Maviti as we did, at his town, and pay for one's footing.

Fifteen miles south-west from Chivaru's we arrived at the river Msalu, called by Makuas Mhalu and at the coast Mosala. I place our crossing in latitude  $12^{\circ} 40'$ , longitude  $38^{\circ} 25'$ . Its width at this spot is 40 yards, and we found it nearly dry when we passed over its level bed of gravelly sand. With its windings the river may be here 200 miles from the mouth, where it runs into the sea not many miles north of Ibo. It is said to take its rise in the mountain ranges near the eastern shore of Nyassa.

Twenty miles from this river we entered a thickly populated district where Makua villages were closely clustered at the base of a granitic range of hills called Nikokwe, whose highest peak I calculated at 4000 feet above the sea-level. In reaching Nikokwe we were said to have entered the land of Meto, and from this range of hills on to Mwaliya's—the Meto capital—we were nearly always passing through villages and fields. It was here that we began to notice the very extensive cultivation of the cashew tree, from whose fruit a very strong spirit called "arripa" is distilled. It is said that when the fruit is in season all the people give themselves up to one long course of intoxication, during which all kinds of deeds of violence are the order of the day.

On July 11th we crossed the Mtepesi (Montepes) river. It was quite dry at this season, the channel deeply cut, and the breadth only about 10 yards.

The next day we started in the morning with but six miles between us and the town of the great head of Meto and the Meto Makuas—Mwaliya. We stepped out briskly through very pretty country, where no trees but the mango, the cashew, and the coco-nut palm were allowed to grow, into such an advanced state of cultivation has this most charming district been brought. Our morning's walk took us through a beautiful valley some 8 or 10 miles broad, with a range of hills on either side and a wide expanse of forest beyond, where the hills trend away into the champaign country to the west. The hills lay east and west, and at the end of them is situated the capital of all Meto—Mwaliya's town, with the name of the sultanhip, "Mkaya." When we arrived at the house of Mwaliya, the great man kept us waiting a full hour before he would see us, during which time a salute

was fired off in our honour. To our intense surprise we found Mwaliya himself a mere stripling of nineteen years or so, very drunk, and very much excited at receiving English visitors. He was very voluble in his liquor, and poured out to us in hiccupping accents tales of his power, and twenty times over told us he was "Sultani Mwaliya"—"Mkaya," &c. &c. When he had amused himself in this way for some time, he went to drink again, and then sang childishly to the notes of an old concertina which he feebly fingered. A number of toadies and minions stood by and laughed at his drunken freaks and frolics, and ever and anon repeated his name "Mkaya" to him in a fawning, crying way that disgusted us.

While we were with him a very large slave caravan, numbering 2000 souls in all including leaders and ivory carriers, arrived from Makanjila's, *en route* for Kisanga on the coast. These people we actually met afterwards at Kisanga, where in a most open manner, as if in no sort of fear of Portuguese authority, they were walking about the town and letting the slaves wander about as they willed.

All the houses in Meto are round, being built with walls of a particular kind of grass closely bound together with circular strips of bamboo encircling the house, and tied each about a foot from the other; the grass has a firm, strong stalk, and grows luxuriantly throughout Meto.

We noticed the air here as being very keen and fresh, a fact accounted for by the elevation of the district, which is 2300 feet above the sea-level. The latitude of the Meto capital I have judged at about  $13^{\circ} 25'$ , and the longitude  $37^{\circ} 58'$ .

We were very anxious to pursue our journey from Meto in a direct line to Mozambique, so as to visit the fierce branch of the Makua tribe known as Walomwe, but my ten followers, for whose safety and protection I was responsible, were unwilling to be exposed to the dangers and risks of the road we wished to take, and therefore this route was abandoned. In giving up this route, however, we lost the opportunity of testing the native report of the existence of a snow mountain which is said to lie about half-way between Meto and Mozambique. I do not at present myself doubt the natives' story, for we found it corroborated on all sides; all the Meto people speaking of the mountain Irati in the same terms, and indicating the same spot when I asked as to its whereabouts. What I was told then is this—that  $4\frac{1}{2}$  days (i. e. 130 miles) from Mwaliya's, one comes to the mountain Irati, that in very clear weather its white peak is visible from Mwaliya's to the S.S.E., that in the hot season its top is seen to be "split up" (that is, rifts appear in it), and rivers of melted snow flow down into the valleys below. Characteristically the Makuas add, "Irati goes up so high that when you see the top you see no further—beyond the top, there is a space of a few feet and then there is God—there are no clouds, no sky above it." It

will be for geographers to determine whether this snow mountain really exists in the place where I heard of it as existing. Is it possible that this isolated snow mountain is one in a chain of lofty mountains of which Kenia and Kilimanjaro are at present the only ones known—a chain of isolated peaks which may extend far into Somali-land in the north, but which has but this one link Irati south of the two already known to us? I must, of course, regretfully reiterate that I have not seen Irati.

We had some trouble and incurred some expense in getting out of the greedy hands of our youthful friend Mwaliya; but at the last he was courteous and gave us a guide, who took us to the coast at Luli. This part of our journey, which occupied a fortnight, was almost entirely without interest—one long monotonous path through stunted and parched-up forest in a due easterly direction. Neither do our subsequent visits to Kisanga and Ibo call for any special remark. From Kisanga we walked back to Newala and Masasi, again crossing the Msalu and Rovuma, and passing through some very large Makua settlements. Our route for the remaining part of our journey will be found on the accompanying map, where the line of population is also traced.

Upon the whole, our walk brought to light the fact of the unproductive, lean nature of the soil everywhere, of the scanty population, and of the scarcity of water: the spots of interest on which I have dwelt in this paper were but *oases* in a desert. There is certainly nothing in the general character of this large tract of country to recommend it either to the hunter, the colonist, the trader, or the traveller who travels in order to feast his eye on fine scenery. Bare and uninteresting, monotonous and dreary, is my verdict on "Makua Land between the rivers Rovuma and Luli."

## ITINERARY.

	Bar.	Miles.		Bar.	Miles.
June 13. Masasi .. ..	2700	..	July 6. Nikokwe .. ..	2500	15
Masuguru .. ..	2100	18	7. Kawariya's .. ..	..	15
14. Mkoo .. ..	1980	18	8. Mwenju's .. ..	..	15
15. Kilonda .. ..	2670	13	11. Mkaya .. ..	..	24
16. Forest .. ..	1790	14	12. Mwaliya's .. ..	..	5
17. Rovuma river ..	1400	13	15. Mpupua's .. ..	..	3
18. Mkula's .. ..	1400	20	16. Forest .. ..	..	14
20. Ntiaka's .. ..	1630	12	17. Ditto .. ..	..	5
21. Nchilem .. ..	2600	16	18. River Namanka ..	..	10
22. Mkoba .. ..	..	13	20. River Mkaluma ..	..	12
23. Kaluma .. ..	..	8	21. Forest .. ..	..	14
24. .. ..	..	..	22. Ditto .. ..	..	11
25. Mparahanka ..	2000	16	23. Ditto .. ..	..	20
26. Nambiti .. ..	2100	21	25. Mwigama's .. ..	..	17
27. Mkonona's .. ..	2130	10	27. Forest .. ..	..	18
28. Forest .. ..	..	17	28. River Luli .. ..	..	11
29. Ditto .. ..	..	11½	29. Luli (town) .. ..	..	17
30. River Mwiriti ..	2120	20	30. In the fields .. ..	..	6
July 1. Forest .. ..	2350	15	31. Mkufi .. ..	..	15
2. Nchine's .. ..	2500	15	Aug. 1. Mrebwe .. ..	..	11
3. Chivaru's .. ..	..	5	2. River Mehezi (in	..	16
5. Forest .. ..	..	19	Pomba Bay) .. ..	..	..

	Miles.		Miles.
Aug. 3. In the dhow .. ..	16	Aug. 15. Mchilimba's .. ..	12
4. River Tari .. ..	9	16. Forest .. ..	16
5. Kisanga .. ..	30	17. River Matiu .. ..	20
6. Ibo .. ..	10	18. River Mparahanka ..	15
7. Kisanga .. ..	15	19. Kaluma's .. ..	13
8. Karawa's .. ..	15	20. Rovuma, south .. ..	16
9. Mwojia's .. ..	12	21. Ditto, north .. ..	2
10. Namaru .. ..	18	22. Kilonda .. ..	18
11. Makonde village ..	16½	23. Mkoo .. ..	10
12. Nasombe's .. ..	13	24. Forest .. ..	23
13. Forest .. ..	19	25. Masasi .. ..	11
14. River Msalu .. ..	5		

The PRESIDENT, in introducing the two preceding papers, expressed his regret that the authors were not present, for the Society would have been glad to meet again two gentlemen, Mr. Joseph Thomson and the Rev. Chauncy Maples, who had contributed so much to the extension of geographical knowledge. But that regret was very much mitigated by the fact that the first paper would be read by Sir John Kirk, whose name was well known and honoured by all geographers. He was the friend and companion of Livingstone in one of his most important expeditions, and was known as a gentleman who, in his capacity of H.M. Consul at Zanzibar, had more than any one else promoted exploration in Eastern Africa. There had been no expedition during the last twelve or fourteen years from the Eastern Coast to the interior, the leaders of which had not acknowledged in the warmest terms their gratitude for the services rendered by Sir John Kirk; and every member of the Council of the Society regarded him as a person who could always be depended upon to do his utmost to promote the interests of geographical science in Africa. They had never felt the slightest reluctance in applying to him, and the assistance they had received from him had been perfectly invaluable. Mr. Maples was a member of the Universities Mission on the East Coast. He had on a previous occasion contributed a paper to the Society. Mr. Penney, the Secretary of the Universities Mission, and a personal friend of Mr. Maples, would read his paper that evening.

After the reading of the papers—

The Rev. HORACE WALLER said that one of the greatest factors in the restoration of that part of Africa to something like the state it was in five or six centuries ago, must be the opening up of trade. When Sir John Kirk and himself were on the Zambesi and the Shiré, indiarubber was only used here and there, and then merely to make toys for the children in the villages; but the trade had developed to a most extraordinary extent. Sir John Kirk, with his great knowledge of botany, might be able to give some additional information on that point, and the Meeting would be obliged to him if he would do so.

Sir JOHN KIRK said that the papers which had been read represented the country described as most unpromising, so far as natural capabilities were concerned. One writer spoke of it as similar to an Arctic region newly emerged from beneath a glacier; while the other condemned it as bare and uninteresting, monotonous, and dreary. Still he thought the riches were there. A singular instance of that was to be found in the development of the indiarubber trade. When on the Zambesi he had seen the plant growing abundantly but neglected. After he was appointed to Zanzibar he did his best to encourage the collection of indiarubber. The slave trade, however, at that time made it almost impossible to collect it. It was necessary that people should be sent out into the forests to tap the vines; but that could not be done whilst they were liable to be captured and carried away as slaves. In 1873 the export trade to foreign countries in slaves was completely stopped.

Then the natives began to work the indiarubber, and now it would be found by the returns of the Zanzibar trade that about 200,000*l.* worth of indiarubber was collected annually, recouping the traders and the Sultan for any loss they might have sustained. The last time he was at Makindany he was told that 40,000 frasil (of 35 lbs. each) had been shipped in one season. The slave trade to Arabia and Persia from Zanzibar had been completely stopped; the slaves now brought to the coast were only taken to the islands of Zanzibar and Pemba, or used on the coast where there was at present a great demand for labour. The Rovuma was near the boundary line, and the slave-traders could play fast and loose between the territories of Zanzibar and Portugal.

Mr. F. GALTON said that since the beginning of the present year there had been two very remarkable contributions to the mapping of those regions. The first was the publication of the first part of the long-promised map by Mr. Ravenstein, issued under the authority of the Science Committee of the Council of the Society. On that map was inscribed every fact that travellers in those parts had recorded. It was a wonderful illustration of Mr. Ravenstein's industry, and would be most useful to all African geographers. The other work to which he alluded was the relief map of Eastern Equatorial Africa exhibited at the present meeting, by Colonel Grant. It was calculated to give quite a new idea of the country, even to those who were well accustomed to the ordinary maps of the region.

Colonel GRANT, in explanation of his model, said that about a year and a half ago he thought sufficient material had been acquired to produce a map of Africa in relief, and Mr. Bates recommended him to go to Professor Etheridge, of the School of Mines, Jermyn Street, who said he knew of only one person who would be likely to produce such a map properly, namely, Mr. Jordan. He (Colonel Grant) collected all the information he could from the library and other sources, and placed them before Mr. Jordan, who while recognising the insufficiency of the data, set about the work, and produced the beautiful model now before the Meeting. He (Colonel Grant) wished the model to be constructed of some material which would be light and not liable to crack—this was effected by Mr. Jordan placing alternate layers of blotting-paper and glue upon a model of clay, and the result was now to be seen by the Meeting. The snowy peaks of Eastern Africa rising to a height of 19,000 feet, the highest waters of the Nile, the Congo, and the Zambesi, and the crags overhanging the Albert, Tanganyika, and Nyassa lakes, could be traced here in a manner which could not possibly be shown upon an ordinary map.\*

\* Mr. Jordan sent to Colonel Grant the following explanation of his mode of constructing the model:—

"The extent of country modelled represents an area of 1,448,380 square miles, or nearly twelve times the area of the British Islands. It is comprised between the parallels 5° N. and 15° S. lat., and between the meridians 26° and 41° E. long., including, on the east, the shore of the Indian Ocean, showing the islands of Zanzibar, Pemba, and Monfia; on the west it includes the town of Nyangwe, with Gondokoro on the extreme north, and reaching southwards as far as the south end of Nyassa and Lake Shirwa.

"The horizontal scale of the model is 25 miles to 1 inch = 1:1,584,000, and the vertical scale = 1:60,000 or 5000 feet to 1 inch. This exaggeration, which is equal to about twenty-six times the horizontal scale, was found necessary in order to show, although in a small degree, the differences of level of the great lakes, which form the principal features on its surface.

"Before commencing the construction of the model, it was necessary to prepare a suitable map of the district to the required scale. On this map was drawn a series of contour lines at intervals of 1000 feet of vertical height—a work of much labour, owing to the scarcity of information for such a purpose.

"The next step was to transfer these contours, at their proper elevations, to some

The **PRESIDENT**, in proposing a vote of thanks to the authors of the papers, said that although the expeditions described had not embraced so wide a tract as those of Livingstone, Cameron, or Serpa Pinto, they had the special advantage of directing closer attention to the geographical details of a smaller area. In the longer journeys it was difficult to dwell minutely on the actual condition of the natives, or the character of the country so rapidly traversed; but when attention was fixed on a small area, it was easy to enlarge upon both those matters. With respect to Mr. Thomson, many present would remember his first appearance before the Society. Under the circumstances in which he was called upon to take charge of the expedition

plastic material which could be moulded to represent the natural undulations of the country. This was done by means of an apparatus devised by my father, Mr. Thos. B. Jordan, much on the same principle as his patent wood-carving machinery. It consisted of a wooden frame or box lined with sheet zinc, of the size and depth of model, and filled with potters' clay. The map was placed on the same table by the side of it, with an iron rail between them which was considerably longer than the map. This formed the guide on which a large T-square rolled over both map and clay in a north and south direction, while the blade of the square, which crossed from east to west, was so constructed as to receive and guide a second slide furnished with two tracing points capable of moving in a vertical plane; these points were distant from each other by the width of the map. By this arrangement two motions were secured on lines east and west and north and south, so that the tracer could be placed on any point of the map, while the other point or cutter would be over a corresponding point of the clay. The vertical scale of the model was engraved on the stem of the cutter in order that its point might be fixed at any required elevation above the sea-level of model. It will be seen that this apparatus enabled us to copy accurately the contours of the map at their proper elevations in the plastic clay, and from this to model the undulations of the country to agree with the best data at our disposal.

"Having thus arrived at the form of the surface in the clay, a hard mould was formed from it by taking a cast in plaster of Paris. In this mould the model was produced by covering its surface with repeated layers of paper and glue, forming together a hard and permanent copy of the original clay model, in thickness about one-tenth of an inch.

"As soon as this paper cast was sufficiently dry, its surface was coloured in oil to represent, in a general way, the natural tints of the country; the rivers and other features were then indicated, the names of places, &c., added, and the lines of latitude and longitude drawn at every degree. It was a matter of some difficulty to draw these lines correctly, and necessitated the construction of a special apparatus which was made by setting up two columns of wrought-iron tubing from floor to ceiling of my study and fixed at a convenient distance from the wall, against which the model was placed, resting on the floor. A horizontal shelf or table was made to slide up and down these columns, to which it could be clamped at any required point; this shelf served as a guide on which to move the scribing gauge holding the drawing pen, so as to admit of drawing the lines over the undulating surface of the model without risk of departing from the true line. The lines were drawn in gold paint, which showed more distinctly than any colour over the various tints of the surface.

"The model is mounted in a plain oak frame, the top surface of which represents the sea-level. The size of the model is 4 feet 7½ inches × 3 feet 5½ inches.

"It is not pretended that this model gives more than a general idea of the principal features of the country, as far as information is available. If, however, a plaster of Paris cast were prepared from the original mould, it would form a groundwork which might be altered and added to, as fresh explorations are made; it would then become a more accurate and instructive representation of the country.

"JAMES B. JORDAN.

"Lieut.-Col. JAS. A. GRANT, C.B.

"STAINES, December 30th, 1881."