EXPEDITION FROM PORT AMELIA TO LAKE NYASSA

COMMANDED BY MAJOR SPILSBURY,
Delegate Administrator of the Nyassa Company.

August, 1900.

THE expedition for Lake Nyassa left Port Amelia on the 13th August, 1900. It consisted of 7 white men, myself in command ; Mr. Nicholls, assistant engineer ; Mr. Allen, secretary ; Lt. Trindade dos Santos in command of escort ; a Portuguese sergeant and corporal, and Abdalla, a Moor, in charge of mules ; 22 black soldiers of the Company's police, armed with Sniders, and about 150 carriers and servants ; 14 mules and 1 colt gun.

As soon as Mwambi, the landing place across the bay, was reached, it was apparent that many of the promised carriers had not arrived, and that the number of loads, when all brought together, was in excess of the carriers provided. This necessitated a delay of two days on the coast whilst every effort was made to obtain fresh carriers ; but the great demand for men for the column, whose march up country was in preparation, had scared most of the available men, and thus prevented all chance of picking up more on the way ; so on the 16th I moved the camp to Nyambabwa, a large village 14 miles inland, and sent the carriers back for the remaining loads left behind. Nyambabwa is situated at the junction of the Namakula and Mahagudi rivers, at an elevation of 60 metres above sea level, in a most fertile and well-cultivated valley : the huts are large and commodious, and the villagers evidently well off. A banyan has a trading store in the village, and I saw plenty of wax and rubber in many of the huts ; millet, maize, ground-nuts, beans, and

cassava are the principal products, and the output could be increased to any extent, should inducement be given to the natives to increase their cultivation. The borussa palm grows wild all over this district, and the coco-palm, wherever it has been planted, thrives. Bananas, cotton, castor oil, papays, melons, mangoes, and cashew are indigenous, and found in nearly all the plantations. The pastoral qualities of the country have scarcely been made use of, probably owing to the numbers of wild beasts which infest the banks of the rivers; I met with one small herd of goats, about 120, on the banks of the Mahagudi, and the owner said he lost very few, though lions and leopards prowled constantly round the stockaded corral in which they were shut up before nightfall. There is no horned cattle in this neighbourhood, although the splendid and well watered pastures should make cattle ranching a valuable industry.

18th August.—We lost our first mule at this place, probably from some poisonous plant which grows in the woods: it produces a swelling of all the glands, also of the head and neck, and the victim dies in 12 hours. Having collected 111 carriers, we moved camp to the Bulu river, a distance of 12 miles, leaving half of our loads at Nyambabwa. The camping ground is close to the river bed, which for some distance forms the road, and is 160 metres above sea level.

19th August.—Moved camp to Mugia, 13 miles, where I proposed waiting for all back loads to be brought up. The chief was very well disposed, and provided a few more carriers. Maize, millet, fowls and eggs were easily procurable. The colt-gun carriage broke down completely at this village; I had already had to straighten the axle at Nyambabwa, but it got badly bent again on the way to Mugia; in endeavouring to straighten it once more it broke off, so we took it to pieces and carried it on mule back, having previously devised a tripod, in case of its services being required.

21st August.—Marched 14 miles to M'kwapi; this is an important village at the foot of a high hill, known as M'kwapi Head; the Nungonia river joins the Mahagudi near here. The natives seemed less well disposed than those we had previously met, possibly because their village lies on one of the routes from

Quissanga to Medo. Thirty carriers bolted in the night, and our transport difficulties were therefore increased.

22nd August.—Marched 10 miles to M'perera, chief Momola's village, 452 metres above sea level. Since leaving Nyambabwa we had come into the granite formation, which continued without a break to the immediate neighbourhood of the Lake: from the coast to Nyambabwa the country is sandstone, and bears all the appearance of a coal basin, although no outcrops are visible. We are now well within the iron district, which improves as we proceed Westward, until near the Lugenda, a succession of vast lodes from 50 to 200 yards in width are met with continually. The ore is extremely pure and easy to smelt: the natives work it up in rough forges, and make excellent knives, hoes, and hatchets.

Chief Momola was anxious to have a Portuguese flag.

24th August.—Moved camp 11 miles to Nyamarira's village at N'koma, 442 metres above sea level.

25th August.—Marched 13½ miles, through Namaluma village at the foot of N'gute Hills, to Meia at the foot of Mesa Hill. The country is everywhere fertile, well watered and cultivated in wide belts round all the villages; the intervening woods are fairly open, but the timber is generally disappointing owing to the custom of burning the trees. Fresh troubles with carriers again delayed us, so that we could only progress slowly leaving most of our stores behind until we could send back for them. Of course this double work for the carriers means short marches for the whole party, in addition to the time lost in waiting for back loads.

27th August.—Marched 14 miles to Namanyumbiri, a large straggling village in a fertile valley.

29th August.—Advanced 17 miles to Wamirue, a little W. of the M'dete mountain, lat. 13° 15'; altitude of camp, 645 metres.

30th August.—Arrived at the military post of Medo, 7½ miles' march from Wamirue. The post, which consists of a small stockade and barracks and storehouses for the column, is situated on the left bank of the Montepes river, at the spot where the proposed railway is to cross. It is not a very healthy locality, as the Montepes in the dry weather is reduced to a few pools of

stagnant water, and fever is consequently prevalent. Lt. Martho, in command, suggested moving the post about 2 miles to the S.W., where an elevated site on rocky ground, near to splendid natural spring of pure water, offered every advantage as a healthy location. The spring in question is the headwater of the Damirue river.

1st September.—Leaving nearly half our stores in charge of the garrison of Medo, we marched 15 miles to N'heriha. There was evidently some local disturbance in this neighbourhood, as we passed many villages in flames or recently destroyed. The only explanation we could obtain was to the effect that the natives were upset by our arrival and the recent activity of the soldiers at Fort Medo, and were clearing out to another district.

2nd September.—Moved camp 12 miles to N'jira: we now entered one of the most fertile valleys to be seen anywhere, stretching for upwards of 40 miles in length by 3 to 5 in width. Before the recent advent of our soldiers and the subsequent fighting, this was the headquarters of Mwalia, who owned many villages: for miles we rode through groves of cashews, coco-nuts and mango trees and the millet fields, now grown over with weeds, the traces of huts now destroyed, in fact the general encroachment of rank vegetation over what was, but two years ago, a rich and flourishing garden, were a melancholy tribute to the stern necessities of civilisation, the first conflict between the original black owner and the newly arrived European. This valley averages 650 metres above sea level: its fertility is such that any crops suitable to a tropical or sub-tropical climate can be grown in profusion. Water is abundant, and the climate, especially on the surrounding hills, healthy and agreeable. It is in my opinion suited to men from Southern Europe, and should support a numerous population, as soon as communication with the coast is made easy.

3rd September.—A short march of 10 miles brought us to the second military post, of Mwalia, well situated on sandy plain, surrounded by palms (coco) and other fruit trees.

4th September.—Our next stage was Mwidia, at foot of Karonji Head, at the base of which flows the Montepes. There was more water in this portion of the river than lower down, and the

country was fairly populated now that we had left Mwalia fort behind.

5th September.—We crossed the Montepes river and marched 16 miles into a wilder country lying between the two water sheds of the Montepes and the M'salu: lion tracks were frequent round the camping ground, and large fires had to be kept up all night to secure the mules from wild animals: the spot was known as Namalala.

6th September.—Water was now less frequently met with, and our next stage was 21 miles over wilderness, without a sign of human habitation till we reached the ford over the M'salu river. Although the dry season was at its height, there was plenty of running water in the M'salu, which flows through high rocky banks and shows flood-marks 25 feet above its bed. The banks were mostly hidden by dense foliage, and some of its reaches, fringed with magnificent trees, were picturesque in the extreme. The ford was 492 metres above sea level.

7th September.—We again struck West, nearly at right angles to the river, and soon left its fertile and fairly-populated banks, to cross another wilderness. Fourteen miles brought us to Lumala spring, where we camped. Vast rolling plains covered with thicket, trees, bamboo brakes and jungle were the chief feature of this stretch of country, rising very evenly to 650 metres; the path wound through numberless kopjes of granite, rising abruptly out of the plain, which remained remarkably level even to the very foot of these granite hills. They offer no obstacle to the proposed railway, which winds in and out on a curiously level formation.

8th September.—Our next march of 14 miles completed the 65 miles of wilderness from Mwalia fort to the first signs of inhabited region, on this path, Kissanga Head; and a more remarkable village it would be hard to find. Rising out of the plain is a square bluff of 4 grouped kopjes with a saddle uniting them, and on this saddle or elevated plateau, 720 metres above sea-level, is perched the village of Kissanga in a well-watered breezy valley, looking out over perpendicular cliffs to the E. and to the W., like a gigantic warden of the surrounding country. Here we were glad to replenish our stock of country provisions and rest our exhausted carriers and mules: for with full loads,

our recent marches had been long and heavy, and the welcome arrival of Saidi M'tarica with 280 fresh carriers placed our transport upon a new footing. A party was told off to fetch our back loads from Medo fort, and another to go back to the coast for more cloth, the currency of the country, as our stock was running low, owing to the difficulties created by the want of carriers.

10th September.—Moved camp 20 miles to Misoro river, through wilderness and forest.

11th September.—Marched 25 miles to the Msanjisie River, wide, with high banks: no habitations.

12th September.—Marched 24 miles to Macambiri, the beginning of the cultivated zone of the Lugenda valley. The soil throughout is strongly impregnated with iron ore: enormous quartz reefs cut the granite from N.NE. to S.SW., and these in turn are intersected by thick lodes of iron ore: in some places I observed outcrops of crystallised carbonate of lime, very heavy and hard.

13th September.—Marched 18 miles through rich cultivated lands and many villages to the Lugenda river, where we camped opposite M'tarica's kraal and island. We had been led to expect that the vast fruitful valley of the Lugenda would have afforded us all the provisions and fresh stores, which our party, both men and animals, sadly needed; but the occasion of our arrival was unpropitious: small-pox had been rife for some weeks, decimating the population and scaring away many of the inhabitants, and a prolonged drought had left the improvident nigger, who never looks ahead more than three or four months, with no food to tide over till the rains. Our reception by M'tarica was cordial enough, and the old chief willingly entered into an engagement to construct and keep open a road from the Lugenda to Kissanga Head: but although he gave orders for carriers to be provided for the remainder of the journey towards the Lake, his son Saidi was quite unable to collect the men. It was an unknown region we were about to penetrate, and the native has no stomach for strange ventures. We were, therefore, unwillingly detained until our back loads from Medo fort were brought in by the carriers sent back from Kissanga Head.

As half way station from the sea to the lake, the Lugenda

valley offers every advantage: the soil is rich and well watered, irony and alluvial. The river runs through deep banks and carries plenty of water all the year round; it is fed by numerous streams on both banks, most of which had running water even to the end of the dry season. Owing to rocky bars and boulders, navigation, at any rate on this part of the river, is out of the question. The country round is thoroughly open and clear of forest, though fine specimens of wild fig and other trees are dotted about. The cashew is not in favour throughout M'tarica's country on account of its pernicious effect on the natives. Tobacco is cultivated all along the river banks, and if the leaf were carefully dried and prepared would find a ready market in Europe, for its quality is excellent, and some of the native dried leaf is greatly esteemed by those who have tried it. The whole way from M'tarica's kraal to the junction of the Luambala river, the country is of the same fertile nature and capable of supporting a population at least 100 times greater than its present one.

25th September.—After untold difficulties we commenced our march to the Lake with hardly any carriers, hoping to collect them on the way: we camped at Karicombi, $5\frac{1}{2}$ miles to the S.

26th September.—Moved camp to M'tende, $10\frac{1}{2}$ miles; country sparsely inhabited and cultivation limited.

30th September.—After beating up all the neighbouring villages, Saidi collected carriers enough to enable us to make another move. Orders had reached M'tarica for 3,000 carriers to go down to the coast for the column from Ibo, and as the men preferred this part of the country, we found great difficulty in recruiting them for the Lake. We moved the camp to Cheponda, 12 miles, alt. 550 metres, where food was more easily obtained.

3rd October.—Advanced to M'lumbua, chief Muturuko's village, 7 miles: this place contained a really fine hut belonging to Cucuala, the chief's brother, and provisions were plentiful. Just south of this village the M'sangulu river forms the southern boundary of M'tarica's country, and over the border Mataka's country had been harried and ravaged by the recent Portuguese expedition under Snr. Machado, who left a small force in charge of Fort D. Carlos at Napulu, on the banks of Lake Amaramba.

5th October.—Marched 15 miles to N'gombo: two brothers of Mataka, N'gombo and Cheramanda, came in professing their submission and desire for peace: we crossed the Lugenda at a ford below the village.

6th October.—Marched 16 miles up to the left bank of the Lugenda to Mululuka, at its confluence with the Luambala. The country on the left bank is high, 560 metres to 600 metres consisting of rolling plains and ridges thickly wooded, very sparsely inhabited or cultivated, intersected by a few streams, mostly rocky torrents, running into the Lugenda: at Mululuka the Lugenda narrows to about 150 yards, and is easily bridged on good rock foundation just above the Luambala. This latter river carries plenty of water even in the dry season: it runs through very steep banks.

7th October.—Struck due W. and marched 17 miles to Marira N'gombe: keeping well away from the banks of the Luambala; the country is singularly flat and even in its steady rise towards the high lands of Nyassa: camp was 750 metres above sea level. Hardly a village was seen and no clearings or signs of cultivation.

8th October.—Marched 21 miles through a fine game country of alternating forest and grass plains: signs of elephant, koodoo, buffalo, antelope and zebra are apparent on all sides. We met with many new clearings apparently a year old, being got ready for this season, but saw no huts or villages: camped on Marirunga, alt. 800 metres.

9th October.—Marched 18 miles, steadily rising to the village of Nitamui, chief Katoori, at an altitude of 1,025 metres. Rubber is collected all over this district and traded down to the Lake: ivory is also held in very large quantities, but is at present conveyed to the coast through German territory, as the natives aver that no restrictions are placed on the purchase of arms and ammunition in German territory, and they reserve all ivory for this special purpose. No doubt enormous quantities are hoarded and buried all over this district, up to the Rovuma, but until the Company is in a position to establish posts on the Rovuma and stop the irregular trade now going on, all the profits of this commerce are taken by our neighbours.

10th October.—Marched 6 miles to Pandiuli, chief Katoori's

residence on the Luambala. We are now well up in the mountains, 861 metres above sea level, and the nights are delightfully cool: provisions are abundant, and the chief made us welcome. Like all other African chiefs he was drunk on M'pombe every day, and had no great authority over his people. But his country is exceedingly fertile: these highlands are well adapted to coffee: cotton, castor oil, papays, bananas, tobacco, beans, onions, tomatoes, limes, maize, millet, ground and pistachio nuts, melons and custard apples are grown in profusion.

12th October.—Moved camp 13 miles to Lulezi, S.E. of the main peak M'ntonia: camp 1,019 metres above sea level.

13th October.—Marched 17 miles to Quesimba: our guides had brought us too far N., and we got into very hilly and broken ground which might have been avoided, but the scenery is very grand, and the valleys all round Quesimba very fertile and well cultivated.

14th October.—Marched 20 miles to Kipanga, crossing the divide at Booti Hill, 1,310 metres; a succession of high ridges had to be crossed before reaching the plateau of 735 metres where we camped.

15th October.—Marched 26 miles to Fort Maguire in British Central Africa. The Anglo-Portuguese boundary has now been delimited between Lakes Nyassa and Chiuta and beacons set up. We had expected to find telegraphic communication and supplies of every sort at Fort Maguire, but to our disappointment, we found a few Sikh soldiers who could not speak English, no telegraph and no provisions, so I had to send our men across the boundary again with what food I could collect, and continue our journey with a small party to Fort Johnston.

We arrived there on the 27th October, and having obtained through the telegraph funds from England and leave to carry out my proposal to establish a temporary post on the Lake shore, with the military escort which had accompanied me, I set about collecting the necessary stores and supplies. Col. Manning, Acting Commissioner of B.C.A., very kindly allowed me the use of the gunboat *Pioneer*, Capt. Roades, to carry me back to the site of the new post, and on the 13th November we arrived at Zirambo Bay, where the rest of our party were anxiously awaiting our return.

I selected a spot for the fort and settlement, long. $34^{\circ} 50'$ lat. $13^{\circ} 22'$ —which I named "Port Arroyo," after one of our Directors now Portuguese Minister for Foreign Affairs : and made all arrangements, financial and otherwise, for Lt. Trindade dos Santos, 1 sergeant, and 1 corporal (Portuguese), and 20 black soldiers to garrison the post for three months, when they could be relieved by the column from the coast.

I decided to return, with Messrs. Nicolls and Allen, to the coast *viâ* the Shire and Zambesi, leaving the carriers under Saidi M'tarica and the mules, now reduced to 6, under Abdallah, to return overland. My reasons for so doing were, first the approach of rain which had commenced in this region, and, secondly, the poor condition of the mules, which could certainly not survive the return journey under loads. I felt also that the season was too advanced to allow of a return by another route, and nothing was to be learned by going back again over the same ground.

We reached Port Amelia on the 17th December, having left Fort Johnston on the 19th November.

GENERAL CONCLUSIONS AS TO THE DEVELOPMENT OF THE COUNTRY.

THE general impression I formed of the country throughout our journey was distinctly favourable, but it must be clearly understood that the favourable features are mere capabilities of the country, not actual realities, for in its present condition it barely produces sufficient for the requirements of its native population, and only here and there a small surplus for export. The native is extremely lazy, and only cultivates sufficient land for his own requirements, not even keeping a reserve in hand against drought or bad seasons. Near the coast contact with the Banyans has already created in his mind the want of imported cloth and other goods, and here his productive energies are more and more stimulated every year ; but before we can hope to infuse the same wants amongst the countless inhabitants of the interior, roads must be opened up and communication established, and traders, white men for choice, or Banyans, where no other means are obtainable, must be encouraged to penetrate into the most inaccessible regions.

MINERALS.

It must be remembered that this Expedition was not fitted out for geological or mineralogical investigation. It had been preceded through the first half of its course by an expert investigation, sent out by the Breittmayer Group, under the Company's auspices, and it was therefore considered unnecessary to delay and hamper it by a search for minerals. At the same time a careful examination of the formation was made, day by day, and all the principal features were carefully noted.

The first 15 miles from the coast is a bed of sandstone, which reappears inland at the lower end of the Lugenda and, so I am informed, at the N. end of Lake Nyassa and on its N.W. shores, this is the coal-bearing stratum, samples of which were shown me by the natives brought from our northern territory. I think all these indications go to prove the existence of a coal-belt from the N. of Madagascar to the interior of Africa, a little to the N. of the 13 parallel of Lat. as it crosses our eastern coast and running W.N.W. The depth of the coal measures can only be ascertained by boring, and hitherto, although I have the necessary plant, I have had no personnel to entrust with its erection and working. The matter, however, is now becoming urgent, and provision should be made for carrying out the work as soon as the rainy season is over.

Iron.—As soon as the first 15 miles from the coast are traversed, the whole formation varies, and granite and gneiss run uninterruptedly right away to the mountains on the 15° Lat. The main feature of the country is the eruptive formation of huge conical or dome-like masses of rock rising straight out of the plain, without, as a rule, spurs or broken ground at their base. Doubtless the plain has been levelled by denudation, the heavy and rapid fall of water not as a rule scoring it into gullies and ravines, but sweeping it into gently rolling plains, the ridges of which are more or less defined, as the spaces between the hills are more or less contracted.

The eruptions or kopjes generally run a definite course, mostly N.E. to S.W., and are intersected on their major axis by veins of quartz. The quartz is very compact and no doubt mineralised at a certain depth. Near the surface it carries

numberless lodes of iron ore, some of which I measured and found 150 feet wide, others I saw still wider, and near the Lugenda the whole country may be said to be a mass of iron.

Emery.—I was struck by the prevalence of corundum or emery right through our territory; the crystals when examined under the microscope are perfect minute specimens of sapphires, rubies, and garnets. I heard from the missionaries on Lake Nyassa that some of their members had brought in fine specimens of gems from the Rovuma district, but refused to state the exact location, on conscientious grounds.

Limestone.—Near Medo and again on the Luambala, I met intersecting veins of very compact and heavy carbonate of lime of a larger grain or crystal than white marble, the facets averaging $\frac{1}{16}$ th of an inch. Many of the river beds are all quartz to a considerable depth.

Prospecting.—We should do our best to encourage the individual prospector; a large expedition is too costly to devote sufficient time to a thorough investigation.

AGRICULTURE.

From this point of view this country is most promising; soil and climate combine in making it a most favoured land. The grass on a clearing will grow in a few months to a height of 15 feet, coarse, it is true; but the soil which can produce year after year a straw $\frac{1}{2}$ inch thick and 24 feet high, contains the elements of a wheat and cereal production, under proper cultivation, of a most prolific character. I am having the matter practically tested this year, but should my views be erroneous, the production of millet, Indian corn and, in some parts, rice, is an established fact, and the demand along the coast for these commodities is practically unlimited.

Cattle.—Cattle ranching offers a great future to the coming settler with a small capital. Although the pastures are superb and water to be obtained anywhere, the natives, owing to a feeling of insecurity, have hardly anywhere gone in for this very lucrative industry. A few goats, fowls and Muscovy ducks seem the limit of their ambition at present. Wherever an enterprising chief has devoted himself to cattle raising, the herds were in splendid condition, and I found on reaching the

Lake that a very considerable trade had been carried on in our district, and hundreds of cattle taken out of the country where they were bought for £1 to £2 a head, and disposed of at Fort Johnston at £6 to £7. One trader told me he had taken out 600, and many others have exceeded this figure, until the country has been practically denuded. I believe about 300 to 400 are still left. I published in the *B. C. A. Gazette* a notice prohibiting this trade. The introduction of a good herd of Queensland cattle should be a very remunerative undertaking; they are much heavier and more valuable than the diminutive Madagascar or Indian breeds exclusively found here, and coming from a similar climate and country, should adapt themselves easily to their new habitat.

Sheep.—Sheep of the ordinary South African type thrive well in the country, and as the Merino has acclimatized himself on the Zambesi, there is no reason why it should not do equally well here.

Goats.—Goats thrive everywhere; they cost nothing to feed, and only require protection at night from leopards and other animals. When young they provide the chief fresh food of the European, and are very nearly equal to the usual mutton of hot countries.

Fowls.—These are to be met with in every native village, but as soon as a European community springs up the demand is very soon in excess of the production, and here again there is a great opening for the settler.

Vegetables.—Market gardening has hardly been touched anywhere on the coast, and the want of vegetables is one of the greatest trials to the European. The scarcity is due to the fact that the native does not take any interest in any plants not required for his own use, and that the white man either will not, or cannot, dig and garden, but this difficulty could easily be overcome by the introduction of Chinese gardeners. Nearly every European vegetable can be easily raised here during the rainy season, and by a judicious irrigation, all the year round. These remarks apply in a lesser degree to fruits, many of which grow almost wild, but would, of course, be greatly improved by cultivation and selection.

TIMBER.

Considering the countless millions of trees to be met with everywhere, it seems strange that so few are of any use for industrial purposes beyond fuel, but so it is. Here and there a fine forest of big trees is to be met with on the hill sides; along the banks of the rivers magnificent trees mark their courses, and along the sea shore the thick fringe of red mangrove provides a practically unlimited supply of building timber. But throughout the miles of forest which cover the interior, the majority of the trees are stunted, contorted undersized abortions, ant-eaten and hollow, and utterly useless for anything but burning. This is greatly due to the universal practice of burning the grass and undergrowth, whereby the trees are scorched and their growth checked.

In certain localities the *Macruse* or African mahogany grows to a fair size and yields a valuable and handsome wood. Sandal wood is just now being exported on trial, and some specimens are fairly good. Ebony is abundant, but very gnarled and small, though doubtless an expert selector could obtain very large quantities of merchantable wood.

Gum.—Vast quantities of gums of many varieties are to be found everywhere, they exude from nearly every tree, and can be collected very cheaply by native labour.

Rubber.—Nearly all over the country rubber-producing vines and trees are to be found, and the natives bring it in in small quantities, but their system of collecting is faulty, and generally fatal to the trees. I am confident that nothing but systematic plantation and control of the tapping of the vines will place this industry on a proper footing. I would recommend any intending rubber grower to select a forest where the *Landolphia* vine grows naturally, clear away the undergrowth and jungle, leaving the standing trees for shade and support, and then plant the vine against each tree. In four years he would have an inexhaustible collecting ground, and during the period of waiting he could collect enough from the wild vines in the neighbourhood to cover his expenses of living and his outlay.

Wax.—This is another industry which the native, whose present methods are of the crudest, could easily be trained to

work on systematic lines. The vast amount of wild flowers can support an unlimited number of bees, and proper hives would allow of the honey being utilized as well as the wax.

Castor Oil.—This plant grows all over the country, it is found in every village, in many places as a tree 30 or 40 feet high. The production of beans is enormous, and yet, except for native medicine, no use is made of it. I would not recommend the shipment of the bean owing to cost of freight, but if rough crushing mills, such as the peasants of Spain and Italy use for olives, were erected in suitable districts, a valuable oil trade would result; this applies equally to ground nuts, gergelin, copra and many other seeds.

Cotton.—In every village the cotton bush is grown and worked up by the natives into thread; it is a prolific plant and yields an excellent long staple cotton. It grows well as a hedge round the plantations of beans or yams.

Maise.—This is one of the staple productions of the country, the young mealie is eaten either cooked or raw, and the ripe grain is chiefly sold to the Banyans; it will grow anywhere on alluvial soil, and yields magnificent ears of corn. The young plant makes excellent fodder for fattening cattle.

Millet.—This is the real mainstay of the country, and its cultivation is most extensively carried on; the stalks grow to a height of from 18 to 25 feet, the soil requires but little preparation beyond clearing of trees, brushwood, or the previous year's stalks, the burning of which suffices to manure the ground.

Manioc.—The cultivation of the cassava or manioc is even more simple. After the ground has been hoed, a stick from a manioc plant is stuck in the ground, and beyond clearing away the weeds no further attention is required until the roots are dug up and eaten raw or cooked.

Coffee.—Fully one-third of the territory is suitable for coffee lands, but I would warn any intending planter from limiting his cultivation to this single produce. The crops are liable to so many risks from labour difficulty, weather, insects, etc., etc., that the result is more in the nature of a speculation than a reasonable certainty, and, in my opinion, coffee growing should only be carried out as an adjunct to general farming much as the hop gardens are grown at home. There is another variety of small

grain coffee growing wild in the low country near the coast, the fragrance and exquisite flavour of which cause it to be highly prized and eagerly bought up in the country.

Tobacco.—This is another product which only requires the introduction of a systematic method of drying to develop into a very remunerative industry. The plant grows and thrives in the river banks and bottoms, and even when dried on the ground in the sun, in the native manner, and made up into twists, it has a fine aroma and smokes well. There is no doubt that with proper treatment and fermentation, the quality would be vastly improved. In its present condition it is quite good enough to be worked up in Europe and exported to Hamburg for this purpose. Its price in the country is 2*d.* a pound.

IRRIGATION.

The rainfall of the country is nearly 40 ins., mostly falling in four months, during which time the rivers and gullies are full of water, which, however, rapidly drains off to the sea, owing to the average fall of 1 in 600 from the Lake plateau to the coast.

I noticed numberless gullies where, with a very simple dam, large reservoirs could be made, and the water stored for use in the dry weather, and in all the river beds, water, if not on the surface, is obtainable at 2 or 3 feet depth, and can be raised by "norias" to the surface. For sheep and cattle, except on the rivers, which all carry water, this storage is imperative, but even for ordinary agriculture it is of the highest importance, as the productive power of the soil is trebled.

TRANSPORT.

The whole question of opening up the territories depends upon the facilities for bringing produce down to the coast from the interior. The lowest actual cost of man-loads works out, in the interior, at about 1*s.* per ton per mile, but nearer the coast, where wages are doubled, the cost is 2*s.*, and this is, of course, prohibitive on produce which is bulky. So far there has been no attempt made to reduce this cost by substituting wheel traffic, owing to the complete absence of anything approaching

a road. The native paths merely wind in and out through the trees, with only here and there, where the vegetation is too thick, a narrow passage, wide enough for one man to pass through, cut artificially. A main road from one end to the other is an absolute necessity, whether to open up trade or merely to explore, and I am taking energetic measures to get this road open in the least possible time; from the coast inwards, fifty miles are now open, and twenty-five will be ready in two months. From the Lake to the Lugenda, at Mululuka the road is already commenced, and it is to be opened in three months under contract, and a third section of about eighty miles, from M'tarica to Kissanga Head, is being constructed by that chief, under European supervision. I have great hopes of completing the whole route before the end of 1901.

TELEGRAPH.

The telegraph wire will follow this road as fast as it is opened, and provide rapid communication with the interior. But there is no doubt that the main work to be looked forward to, the only factor which will really open up Nyassaland, is the projected

RAILWAY.

For this reason I devoted nearly the whole of my attention throughout the whole journey to this momentous question. I am satisfied that the portion of the survey executed by Mr. Wheatley up to the Lugenda is conscientiously and reliably worked out, and that there are but few difficulties on the way. The section from M'tarica to Mululuka is fairly shown on the map, no difficulties of an engineering nature occur. From Mululuka, where it crosses the Lugenda, I was surprised to note how gradual and easy the ascent to the mountains of Nyassa could be made by keeping a little to the south of the line as shown on the map and on the high plateau, well away from the Luambala river. The ground is naturally level, but denudation increases as it slopes to the river bed, and the banks, which are soft, are scored and cut into gullies as the slope down to the "thalweg" increases. This broken ground is all avoided by keeping on the higher level. The divide will be crossed near

Namitu, at about 4,000 feet elevation, and from here to the Lake shore, about 1,600 feet, an easy drop can be engineered through the valley, running down naturally on the western slope. I did not have time to actually survey this descent, but I saw enough to convince myself that there was an easy road to follow and no very heavy work required to make it practicable. In my opinion the cost of the line on a 3 feet 6 inch gauge should certainly not exceed £4,000 a mile; bridges and culverts are rather numerous, it is true, but stone is everywhere abundant, and all the foundations are firm and within easy reach: I saw no dangerous or shifting ground on any part of the line. There are no abrupt changes of level from one plateau to another; indeed the rise is so gradual that it is only by the aneroid that one becomes aware of its existence. There are no high ranges or ridges to cross, with the exception of the approach to the lake, and that is practically the terminus of the line. In order to provide it with an immediate traffic a branch line to the Itule coalfields is of the highest importance, since this will both provide the line with a cheap fuel for haulage, and yield an immediate article of transport and sale at each end. The steamers on Lake Nyassa at present burn wood, but most of the timber near the shore has been cleared out, and as the distance from the forest to the shore increases, so the cost goes up. Coal at a reasonable figure would find a ready market. Great strides are being made in opening up the trade of Central Africa; steamers are being put on Lake Tanganyika, wealthy companies are providing transport facilities and pushing their trade westward in Northern Rhodesia and the Congo, and the only natural outlet of the traffic so created is the south end of Lake Nyassa. Even in the event of the Cape to Cairo line being constructed it will be one huge feeder the more for our line, for only goods of the highest value and most reduced bulk, such as ivory and gold, can stand the cost of railway transport from the Lakes to either terminus, and consequently all the traffic of the centre will forcibly be tapped and taken by the shortest route to the sea. The present route by the Zambesi and Shire rivers is not only expensive, but it cannot cope with the existing imports. The merchant who has to wait a month to get his goods from Chinde to Fort Johnston (the usual delay

averages three months, and many heavy goods have been delayed upwards of a year) and pay a prohibitive rate of transport, besides suffering all the loss and damages which invariably follow many trans-shipments, cannot get the interest on his goods without demanding so excessive a price that his sales are limited to the absolute necessities of the purchaser. The universal opinion of the traders whom I consulted on the Lake was to the effect that, with a through rate not exceeding £10 per ton, say 5*d.* per ton per mile, not a single ton would ever go by the river route. As far as I could ascertain, the actual traffic of the combined transport companies from Chinde to Fort Johnston amounts to 7,000 tons per annum. Assuming the cost of the Railway at £2,000,000, the existing traffic would provide, for goods only, a gross earning of 5*d.* per ton per mile. Now, the working expenses should not exceed 2*d.* per mile, and we may therefore assume a reasonable profit of, say, £40,000 out of the gross £70,000. Add to this a moderate estimate of £10,000 nett profit on the passenger traffic—I have no figures to go upon in this calculation, but merely base it upon the number per week which travelled up and down during the time I was on the river, and which I average at 10 per diem—the cost of the actual journey is £12 10*s.* per head. These two items alone will therefore show a nett profit of £50,000, sufficient to pay 2½ per cent. upon the cost of the Railway without taking into consideration the local traffic within the territory, or the probable increase of through traffic from the Lakes which must follow on the energetic development of these regions under British supervision. There is no other route from the Lakes to the sea as short or as adapted to easy construction as our projected line, and the harbour of Port Amelia affords advantages of security and deep water not to be met with on any other part of the coast.