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OCCASIONAL PAPERS.

TRANSPORT, SUPPLY, AND EQUIPMENT OF THE BRITISH SECTION OF THE COMMISSION FOR THE DELIMITATION OF THE BRITISH AND PORTUGUESE SPHERES OF INFLUENCE IN EAST AFRICA, 1892.

By Major J. J. LEVERSON, R.E.

THE line agreed to by Great Britain and Portugal as the boundary between their respective spheres of influence in East Africa, south of the Zambesi, is laid down in general terms in Article II of the Anglo-Portuguese Convention of the 11th June, 1891.

Starting from the Zambesi, near Zumbo, it runs due south till it meets latitude 16° S., and then follows a westerly direction as far as the point where the River Mazoé is intersected by longitude 33° E. There it turns sharply to the right, and continues generally in a southerly direction to the River Sabi, ascends that river from the point where it strikes it to its junction with the Lundi, and then runs about south-west in a straight line to the north-east corner of the Transvaal, which is situated at the junction of the Rivers Unvubu and Limpopo.

To determine accurately, and mark out on the ground, as much of the above line as time would permit was the object of the operations in the field of the Anglo-Portuguese Delimitation Commission in 1892. Both extremities of the line being situated in parts of the country very difficult of access, and the boundary in the neighbourhood of Massi-Kessi being the portion that pressed most for settlement, it was determined to make that place our headquarters and the starting point of the survey, and to work north and south from it.

The British section of the Commission consisted of myself as Commissioner, Captain S. C. N. Grant and Lieut. C. S. Wilson, R.E., Captain F. E. Lawrence, Rifle Brigade, Surgeon-Captain Rayner, Grenadier Guards, Mr. Saville (interpreter), and five non-commissioned officers of Royal Engineers (trained surveyors). After our arrival in Manica we were joined by the late Captain E. C. Chamley Turner and six troopers of the British South Africa Company's police, bringing up the total number of white men to be provided for, including one servant, to 19. The other servants consisted of a Cape boy, three Zulus from Natal (two of whom deserted on the way up from the coast), three Indians, and a number of locally-engaged natives.

Leaving Southampton on the 19th March, 1892, in the ss. "Moor," of the Union Line, we transhipped at Natal into a coasting steamer, and reached Beira, the port from which we were to proceed inland, on the 22nd April.

There our difficulties commenced, for the steamer on which we had been relying to tow barges containing our baggage and supplies up the Pungwé to Mapanda's, the highest point to which the river is navigable in the dry season, had ventured farther up stream during the inundations, and had been left high and dry when the waters subsided.

No other steamers suitable for our purpose being available, we had to have recourse to sailing-boats. It took several days to collect the seven which were found to be necessary to carry everything which was to be conveyed to Mapanda's. In addition to personal baggage and camp equipment, we had with us a large scientific outfit for the survey operations in connection with the delimitation, 286 cases (each case one man's load) of provisions, spirits, &c. (calculated to be sufficient to last 12 Europeans for from eight to nine months), a large number of bales of goods for barter, and 400 loads of rice. This rice was merely a first instalment of what was required for the supply of the porters. It was subsequently largely augmented by a further consignment from Beira, by purchases at Massi-Kessi and Umtali, and by barter with the natives living along our line of march from Massi-Kessi to the Sabi River.

Having despatched the last of the sailing-boats from Beira on the 26th April, I followed next day with Captain Grant in the cutter of H.M.S. "Raccoon," towed by a small steam launch, by means of which I hoped to be able to render assistance to any of the sailing-boats which might have got stranded on the innumerable and constantly shifting sand-banks in the river. On arrival at Mapanda's, however, on the morning of the 28th, we found that all the boats had reached there without accident.

Owing to reports that native porters were very difficult to get in the country we were about to pass through, and also that those who were obtainable were unreliable, the Portuguese Government had kindly undertaken, at my request, to collect porters for our party in the Inhambane district. At Mapanda's 176 of these joined us. They were in parties varying in numbers from seven to about 35, each under an Induna or headman. Throughout the expedition, even when the Commission was split up into small sections, the porters were kept as far as possible under their own Indunas, who were held responsible for them both on the march and in camp.

In order to be able to identify the porters, each one was given a small tin disc with a number stamped on it, which he usually wore attached to a coloured cord round his neck. The Indunas received larger discs, of which they were very proud.

Up till the 1st May we were engaged in unloading the boats, drying some of the rice which had got wet during a storm on the journey up the river, stacking those stores which were to be left temporarily behind at Mapanda's, and in weighing and arranging in loads suitable

for carrier transport everything that we were to start with on our march up country.

We left Mapanda's on the afternoon of the 1st May, our marching-out strength being 12 Europeans, seven coloured servants, 165¹ porters, seven Indunas, and five riding ponies. Of the loads, 40 consisted of rice for issue to the porters after the three days' rations which each man at starting carried for himself, in addition to his load, had been exhausted. All loads were made up to weigh as nearly as possible 50 lbs. each. As a matter of fact, they varied from about 48 lbs. to 55 lbs.

The cooking-pots for the natives were carried by the Indunas, who did not, as a rule, carry any other loads.

On the evening of the 7th May we reached Mandigo's, about 92 miles from Mapanda's, the average daily march (taking the time occupied on the journey as 6½ days) being 14 miles. This we found was as much as we could get the porters to do; they were still new to the work, the weather was hot, and the dense, tall grass, 6 ft. to 10 ft. high, through which we had to force our way along the greater part of the route impeded progress very considerably.

Later on, when the men had become more accustomed to the loads, we were able to make somewhat longer daily marches, even in the mountainous portions of the country, and on a few occasions we did as much as 21, and even 22 miles a day.

The 8th May was a day of rest. On the 9th, the whole of the porters, except some few who were footsore, set out under Captain Lawrence to return to Mapanda's, and bring up fresh loads. We had not been able to purchase any food for the natives on the way up, and the 40 bags of rice with which we had started were rapidly diminishing. The daily ration for natives was 2 lbs. either of flour or meal, and a little salt when there was any to be had. In addition to this, they were given meat whenever any game was shot or a sick ox killed, but, except when we were able to distribute it in large quantities, meat was looked upon as an extra, and the rice ration was not reduced. The supply of meat was very irregular, and at times the men were two, and even three, weeks without any. They were not particular as to its quality or state when served out to them, and ate the flesh of an ox which had suffered from lung sickness or the bite of the tsetse fly with as much relish as if it had been that of a healthy one. Whenever they had a superabundance of meat, all that was not required for immediate consumption was made into biltong—flesh cut into long narrow strips and dried in the sun. The natives are fond of salt, but it is not looked upon as a necessary, and they did not complain when they did not get any. Chili peppers, which were frequently found growing wild, were a very favourite condiment, and used to be cooked with the rice. Water was the ordinary drink of the natives, though, whenever it was to be had, they used to get from the villages pombi—a kind of beer brewed from native grain.

¹ Including two spare porters without loads.

On the rations issued to them our porters did really good work, and thrive well, all of them looking much healthier and stronger at the end of the seven months they were with us than when they first joined us. There was very little sickness amongst them, and no death.

It was almost an invariable rule to make two marches every day. Their length was naturally somewhat dependent on the intervals between the places where drinking water was obtainable. The average rate of progress of the caravan when on the move did not at first exceed two miles an hour, including short halts. Later on, when we had got the porters better in hand, and they had grown accustomed to carrying the loads, the average was increased to nearly $2\frac{1}{2}$ miles an hour, and sometimes even that was exceeded.

The hour of starting in the morning varied slightly with the season of the year. In May we used to rise at dawn (about 5.45 A.M.), strike our camp, have coffee, and be on the move about 40 minutes after réveille had sounded. The mid-day halting place was reached usually between 10 A.M. and 11 A.M. We rested there till between 1 and 2 P.M., and then marched till about 5 P.M.

In July, in the mountainous districts of Manica, it was intensely cold (almost freezing) in the early morning, and the porters complained that the cold ground and grass stumps hurt their feet so much that we often waited till the sun was well up (between 8 and 8.30 A.M.) before starting. On these occasions the mid-day halt was reduced to one and a-half or two hours. In September, October, and November, when the weather had again become hot, we used to rise in the dark, so as to be able to start the moment it was sufficiently light to see our way, and reach our resting place by 9 A.M., as by that hour the rays of the sun had become excessively powerful. At this time of year, our departure in the afternoon was generally delayed till about 3 P.M., and we then marched till between 6 and 7 P.M.

On the 25th May, Captain Lawrence and the porters who had returned with him to Mapanda's rejoined us at Shimoya's, a point about 22 miles beyond Mandigo's on the road to Massi-Kessi, to which, in their absence, we had moved with the assistance of an ox-wagon sent from Umtali to meet us.

The experience gained in the preceding year (1891) had been to the effect that Mandigo's was outside the tsetse fly zone, but it has since been ascertained that animals are not safe from its ravages till Shimoya's is reached on the journey up country. Everyone of the 12 oxen employed by the Commission between Mandigo's and Shimoya's died within three weeks.

On starting from Mapanda's we had five riding ponies with us, which we had brought from Natal. Though they were all bathed every day with a so-called anti-fly solution, they began very soon to waste away, and within a very few weeks they all died, or became so emaciated and paralyzed that they had to be shot.

From Shimoya's there is a wagon road to Manica, made in the early part of 1892 under the direction of Mr. Selous, the well-known explorer and hunter. Making a wagon road in a newly opened-up dis-

trict of Africa consists merely in removing enough trees to allow a wagon to pass, corduroying swampy places, and cutting down the banks of the streams at the drifts so as to form ramps not too steep for wheeled traffic. Occasionally, if the stream is deep and narrow, and the banks are steep, a rough wooden bridge is thrown across.

On the afternoon of the 26th May we set out from Shimoya's to continue our journey up country, our baggage and stores being carried as follows:—About 5,000 lbs. in a Cape buck-wagon, 3,000 lbs. in a tent-wagon, and 40 loads by porters.

The remainder of the porters, about 105 in number, 15 having deserted, were at the same time despatched to Mapanda's for further supplies. This time they were sent in charge of their own Indunas, and were not accompanied by any Europeans.

We did not reach Massi-Kessi till the end of the morning march on the 30th May, though the distance from Shimoya's is only 44 miles, the average daily rate for the four days being only 11 miles. This exceedingly slow rate of progress was due entirely to the difficulties and delays in getting the wagons across some of the drifts at which the streams were crossed.

When Captain Lawrence returned to Mapanda's from Mandigo's he had found a good many natives arriving at the former place in search of employment, and, through their headmen, he had arranged for some of them to carry loads for us to Massi-Kessi. The usual agreement was 1*l.* sterling, or, if gold were not available, goods to the value of about 1*l.* 1*s.* to 1*l.* 5*s.* from the traders' stores at Mapanda's, and rice for the journey up for each load delivered at Massi-Kessi. These porters insisted on prepayment, but we found them most trustworthy, and throughout the expedition we never lost a single load.

On the 1st June we had already altogether about 450 loads at Massi-Kessi. These were subsequently supplemented by the loads brought up by our own (Inhambane) porters on their third journey from Mapanda's, and by loads brought up by further batches of porters engaged locally by Messrs. Robbert & Co., who had been appointed agents of the Commission at Mapanda's.

The total number of loads taken with us, or subsequently despatched, from Mapanda's was as shown in the table on p. 120.

At Massi-Kessi I was able to enter into contracts with some traders for the supply of a considerable quantity of native meal for issue to the porters in lieu of rice. In order to facilitate the transport arrangements, I was anxious that part of this should be delivered at various points on the route which the Commission was about to take on its journey south to the Sabi, but all the traders with one exception refused to deliver anywhere except at Massi-Kessi or Umtali, and the one who formed the exception, who had agreed to furnish a large quantity at Chimanimani, about 70 miles south of Massi-Kessi, failed utterly to carry out his contract.

The amount of meal or rice required for the daily consumption of the Inhambane porters, guides, and others attached to the Commission after our arrival at Massi-Kessi was about 7 loads.

	Loads.	
	Equipment and stores for Europeans.	Rice and salt for natives.
Taken with us at original start from Mapanda's	123	40
Taken by the Inhambane porters on their second journey	65	70
Taken by the Inhambane porters on their third journey	—	98
Carried by locally engaged porters, May to September	242	264
Total	430	472
	902	

No reliable information being obtainable about the country south of Massi-Kessi, I made a reconnaissance in June, accompanied by Captain Lawrence. On reaching the Chimanimani Pass, we heard that the country further to the south was more thickly inhabited, and it was reported that a considerable quantity of meal could be obtained, though it would probably take some time to collect. It was, therefore, decided that while I returned to Massi-Kessi, Captain Lawrence should remain behind with a few of the porters, with instructions to establish a depôt, and purchase what meal, goats, and poultry he could, in exchange for barter goods.

On the route between Mapanda's and Massi-Kessi, the natives preferred to be paid in gold or silver rupees, but those engaged in the less travelled regions further south had no idea of the value of money, and did not care for it, and would hardly accept payment except in goods. White cotton sheeting (limbo) is the staple article of barter, though in some places coloured cottons were asked for. Blankets also are much prized, and beads and brass wire in small quantities. Empty solid-drawn cartridge cases, which the natives convert into snuff-boxes and wear in their ears, were at one time useful, but the market soon became overstocked with them. Salt was greedily asked for everywhere, except along the Limpopo River, where there are saline earths from which salt is extracted by rough processes. Gunpowder would have commanded a very high price, but this we refused to sell.

The collection of meal at a depôt was a somewhat tedious and slow affair. After establishing our camp, we used to send out to the villages in the vicinity, to let the inhabitants know that we were anxious to purchase meal, &c., and that everything they brought in would be paid for at a fair value. It took some time to prepare the meal, as grain is usually stored in the native granaries underground, and the method of grinding is not very rapid, the

grain being first stamped in a wooden mortar, and then ground by hand between two stones. The meal when ready was invariably brought in by women in baskets or round dishes. They were generally accompanied by their husbands, but in some places as soon as they found that they had nothing to fear from us they used to come alone. The baskets of meal varied from 2 lbs. to 20 lbs., and as they belonged to different owners each had to be brought separately.

Meal purchased, but not required for consumption or issue to our porters at the dépôts, was made up into loads suitable for transport. When empty rice sacks were not available, long cylindrical bags were made out of the bark of trees.

I got back to Massi-Kessi on the 25th June, and immediately commenced to despatch parties of porters with supplies for delivery to Captain Lawrence at Chimanimani. For this purpose, in addition to the Inhambane porters, natives whom we were able to collect in the neighbourhood of Massi-Kessi were employed. The price paid to the latter was 10s. per load from Massi-Kessi to Chimanimani. In the first instance, two Europeans were sent in charge of each party of natives, but when the route became better known they went under their own Indunas. Each head of a party was always given a way bill, showing the number of loads in his charge and their contents.

Having ascertained on the return march to Massi-Kessi that it would be possible to collect a small quantity of meal at Setchagwa's, a point about midway between Massi-Kessi and Chimanimani, a small trading station was established there in charge of two of the British South Africa Company's police. This enabled the parties to deliver their loads intact at Chimanimani, and to leave the bulk of the meal collected there available for operations further to the south. The detail of the working of the system was as follows:—Massi-Kessi to Chimanimani was from 5 to 5½ days' march for porters with loads. On leaving Massi-Kessi each man took with him, in addition to his load, 3 days' supplies for himself. These were probably consumed by the time he reached Setchagwa's. At the latter place he was given a 3 days' further supply, which with about another 3 days' rations, issued at Chimanimani, where one day was allowed for rest, brought him back to Setchagwa's, when he was given enough to carry him on to Massi-Kessi. The Indunas of parties of porters were always obliged to produce last ration certificates before food was issued to them at any dépôts.

During my absence Captain Grant and Lieutenant Wilson had been engaged in survey operations in the neighbourhood of Massi-Kessi. On the 1st July they started to continue their work to the south, taking with them two non-commissioned officers of Royal Engineers. They were accompanied by about 50 porters carrying baggage, equipment, and instruments, as well as about three weeks' rations for the Europeans of the party, and 10 days' rations for the natives. It was arranged that farther supplies for the natives were in the first instance to be obtained from the dépôt at Setchagwa's, and that later on supplies, both for natives and Europeans, would be found

awaiting the party's arrival at Captain Lawrence's camp at Chimanimani.

On the 2nd July I started on a week's reconnaissance to the north, accompanied by Captain Turner, Dr. Rayner, and some of the Portuguese officers belonging to the Commission, leaving Mr. Saville (interpreter) at Massi-Kessi to superintend the further despatch of loads to Chimanimani.

On the 15th July, sufficient supplies for nearly four months' consumption having been sent forward, I again left Massi-Kessi for the south with the headquarters of the Commission. During our absence Corporal Lewis, R.E., remained behind in charge of the reserve stores of the Commission. We reached Captain Lawrence's camp at Chimanimani on the 20th, and on the 21st were joined there by Captain Grant's party.

On the 23rd I proceeded further to the south with Captain Lawrence and Mr. Saville, leaving Captain Turner and Dr. Rayner temporarily at Chimanimani, while Captain Grant and Lieutenant Wilson continued their survey operations.

Having discovered on the right bank of the Lusitu River, about 30 miles from Chimanimani, a site suitable for a dépôt, situated in a district in which considerable supplies were obtainable, word was sent back to Captain Turner to arrange to send on all stores to the Lusitu River, and as soon as this was done to abandon the dépôt at Chimanimani.

Arrangements were likewise made for shifting the dépôt at Selchagwa's to Malanda's, a native village almost exactly midway between Massi-Kessi and the Lusitu.

As far as Malanda's we were eventually able to make use of carts for bringing meal and rice from Massi-Kessi, a road for this purpose being made by the Portuguese and ourselves. After the road had been completed (end of July), ox-carts were able to travel along it at the rate of 10 to 14 miles a day. Beyond Malanda's the country soon became so mountainous that it was necessary to give up all idea of further employment of wheeled transport.

On the 26th July, leaving Captain Lawrence to form the dépôt on the Lusitu, I started on a reconnaissance to the south-west, accompanied by Mr. Saville. On the 30th we reached a group of kraais belonging to the Chief Mapungane, where it was decided to form another dépôt. Next day, leaving Mr. Saville to collect supplies there, I returned to the Lusitu by a more direct route, arriving there on the 2nd August. On the 5th I again left the Lusitu, and reached Mapungane's again on the 8th.

Subsequently reconnaissances were made to the south and south-west, and dépôts were established on the Inyangamba, 37 miles from Mapungane's, and on the right bank of the Sabi, a few miles above its junction with the Lundi (50 miles from the Inyangamba).

By the 7th September the survey operations had been carried down to the Sabi, and a considerable supply of food had been delivered there by our porters. Before retracing our steps to Massi-Kessi, the line of frontier between the Sabi and the Limpopo still remained to

be explored and mapped. The information we were able to obtain about the country between these rivers was of the scantiest; all that we could learn from the natives was that it was covered with thick bush, that water was extremely scarce, that the population was very sparse, and that we should not be able to obtain any supplies, the previous season's harvest having failed altogether on account of a drought.

This was corroborated by Corporal Whittle, who returned to the Sabi on the 6th September, having made a reconnaissance to the Mahunjé River, about 46 miles to the south-east in the direction of our objective point on the Limpopo.

In view of the probable difficulties with respect to supplies and water, it was decided to reduce the party which was to proceed to the Limpopo, to its smallest possible dimensions, and to cut down the baggage and equipment of all kinds. It was eventually arranged that Captain Grant, Mr. Saville, and one of the non-commissioned officers of Royal Engineers were to accompany me; the rest of the Commission being left under the charge of Captain Lawrence, with instructions to finish up the survey work, erect beacons, and gradually withdraw towards Mussi Kessi.

The actual strength of the party which set out from the Sabi on the 10th September was as follows:—Myself, Captain Grant, Mr. Saville, Corporal Johnson, R.E., and one European servant (5 whites), two coloured servants, two Indunas, and 60 porters.

The loads were made up as follows:—

For myself and Captain Grant (baggage, tents, bedding, instruments, despatch-boxes, and rifles)	10 loads.
Mr. Saville, Corporal Johnson, and European servant (baggage, tents, and bedding)	5 "
Two coloured servants (baggage and bedding) ..	1 "
Cooking-pots, water-buckets, and lanterns	2 "
Ammunition	2 "
Barter goods	1 "
Groceries (29 days)	3 "
Spirits and medical comforts	1 "
Tools	1 "
Biscuit (22 days)	4 "
Preserved meat (15 days)	3 "
Rice for Europeans and servants	2 "
	—
	35 "
Rice and meal for porters	25 "
	—
Total	60 "

In addition to his load, each porter carried, on leaving the Sabi, 2½ days' rations of meal or rice for his own consumption.

About 25 loads of meal and rice had been sent forward to the Mahunjé

($2\frac{1}{2}$ days' journey) 2 days before our departure. Out of this the $2\frac{1}{2}$ days' rations eaten on the way there were replaced, and the greater part of the remainder was left in charge of an Induna and a porter, as a reserve for us on the return journey.

We actually, therefore, started from the Mahunjé with about $12\frac{1}{2}$ days' rations for the porters.

On arrival at the Limpopo, by sending a party nearly a day's march into the Transvaal, we succeeded in purchasing five sacks of mealies. With this exception, the whole of the food consumed by the porters (except a little meat and fish), on the march from the Mahunjé to the Limpopo and back, a distance of 270 miles, was taken with us on starting from the Mahunjé.

The following, which is likely to be of interest as an example of what can be done with carrier transport, is a somewhat detailed account in diary form of our march from the Sabi to the Limpopo, and back to Massi-Kessi.

10th and 11th September.—Left camp on the Sabi at 7.50 A.M., party consisting of five Europeans, two coloured servants, and 62 Indunas and porters. Two Portuguese members of the Commission accompanied us as far as the Limpopo, but as their transport arrangements were made independently of ours, they will not be further referred to.

Crossed the Lundi about 4 miles after starting, and reached a large reedy vley with good water, $1\frac{1}{4}$ miles further on. Halted there during heat of day. Filled water-bottles, buckets, and calabashes. Started again at 3 P.M., and marched till dark ($8\frac{1}{2}$ miles). No water. Dined and rested till 11 P.M., and then continued the march, with small halts, till 5 A.M. ($13\frac{3}{4}$ miles), when we reached a deserted village with two small pools of stinking water. Slept till 7.30 A.M., then continued $6\frac{3}{4}$ miles to a vley of good water, arriving there at 10 A.M., having accomplished 34 miles in the preceding 26 hours. The porters were so tired that it was determined to remain there for the rest of the day.

12th September.—Started at dawn, and after 12 miles reached the Mahunjé, a dry river bed, in which water was obtainable by digging in the sand. Found the bags of rice there which had been sent on from the Sabi two days before our departure. Issued $2\frac{1}{2}$ days' rations to the porters to replace those that had already been consumed. Left an Induna and one native in charge of a reserve of 10 bags of rice, and set out on our march across the totally unknown and unexplored district between the Mahunjé and the Limpopo. Proceeded $5\frac{3}{4}$ miles in the afternoon. Water in pools in the river bed. Total for the day, $17\frac{3}{4}$ miles.

13th September.—Marched 17 miles in the morning before we at length found some water in a reedy vley. Passed some deserted kraals on the way. Continued $1\frac{3}{4}$ miles in the afternoon. Water in pools in the bed of the Babgwadzi river. Total for day, $18\frac{3}{4}$ miles.

14th September.—After $11\frac{1}{2}$ miles, reached the Chefu River. Bed dry, but water obtainable by digging in the sand. Found a few natives living near the river, but they had no grain or meal, and were living

a miserable existence on wild fruits and a small quantity of game. Continued 6 miles in the afternoon through thick bush and sand. No water at camp. Total for day, $17\frac{1}{2}$ miles.

15th September.— $3\frac{1}{2}$ miles brought us to the Seetoala River. Dirty-looking water obtainable by digging in the river bed. Marched $8\frac{1}{2}$ miles more to the Guluzé river. Water obtainable by digging; slightly ferruginous taste. Kraals deserted. Total for day, 12 miles. We did not make any march in the afternoon, hearing that there was no water for a considerable distance.

16th September.— $14\frac{1}{2}$ miles to the Gunganda River. Water by digging. Continued $5\frac{1}{2}$ miles. Camped at a spot where there was no water. Total for day, 20 miles. Guides most unreliable and appear to have no idea of distance. Some say it will take us $1\frac{1}{2}$ days to our objective point on the Limpopo, others that we shall not be there for four days. Great difficulty in arranging our marches. Sometimes, when the guides tell us water is near at hand, it proves to be many miles off, and at others, when they say it is far off, it turns out to be comparatively close at hand.

17th September.— $12\frac{1}{2}$ miles to Mbatane's kraal. Water from "holes." No food supplies obtainable. 9 miles beyond this we reached the Nuanetsi River, a broad dry river bed. Good water by digging. Total for day, $21\frac{1}{2}$ miles.

18th September.—So tired that we did not start until 6.15 A.M. Road through bush and sand. $8\frac{1}{2}$ miles brought us to the Limpopo, a broad running river. Marched $6\frac{1}{2}$ miles up the river in the afternoon. Total for day, 15 miles. A few fowls and eggs obtainable at kraals, but no meal or rice.

19th September.—Continued the march up the Limpopo, and crossed to the right bank at a point just above its junction with the Unvubu, $11\frac{1}{2}$ miles. The natives here, as elsewhere, were living on wild fruits, and anything else they could get. Sent five porters under the Induna on to a place in the Transyaal, where it was reported some mealies were obtainable.

20th September.—Day of rest. The porters returned in the evening, bringing five loads of meal and mealies; all they had been able to obtain.

At the Limpopo we separated from the Portuguese officers who had accompanied us so far. They proceeded direct to Delagoa Bay, while we returned to Massi-Kessi.

21st September.—Commenced the return march, proceeding by a shorter and more direct route to the Sabi. Camped on the bank of the Nuanetsi River. Water in pools in the river bed. Total for day, $17\frac{1}{2}$ miles.

22nd September.—No water till we reached the village of Luatlatla, which had a well with a fair supply. $16\frac{3}{4}$ miles.

23rd September.—Water $2\frac{1}{4}$ miles after starting, and a small vley 14 miles beyond this. Continued $3\frac{1}{2}$ miles beyond vley. No water at camp. Total for day, $19\frac{1}{4}$ miles.

24th September.— $6\frac{1}{4}$ miles to the Bandaré River, in which we found some small pools of water. $5\frac{3}{4}$ miles beyond this, small vley of very

muddy water. Camped at a spot without water. Total for day, $17\frac{1}{4}$ miles. European servant ill; had to be carried in an extemporized masheela.

25th September.— $4\frac{1}{2}$ miles to the Chefu River. Small pool of fairly good water. 15 miles more to the Babgwadze River. Pools of water. Servant still ill and unable to walk. Total for day, $19\frac{1}{2}$ miles.

26th September.— $10\frac{3}{4}$ miles brought us back to the Mahunjé, where we found the Induna and porter we had left in charge of the reserve rice, and four other porters whom we had sent back lame two days after leaving there. Started again in the afternoon, taking all stores with us. Servant still had to be carried. Marched $9\frac{1}{4}$ miles. No water at camp. Total for day, 20 miles.

27th September.—Marched $2\frac{1}{2}$ miles to vley, where we filled up all water-bottles, calabashes, buckets, &c., and then continued $6\frac{3}{4}$ miles to Intonjwasimba's. Kraal still deserted. One of the pools was quite dry, the other still contained a small quantity of muddy stinking water. Marched $8\frac{3}{4}$ miles in afternoon. No water at camp. Total for day, $18\frac{1}{4}$ miles.

28th September.—No water till we reached the large vley near the Lundi River— $13\frac{1}{2}$ miles. Reached depôt on the Sabi River in the evening. Found Corporal Whittle, B.S.A. Co.'s Police, and Lance-corporal Wilkins, R.E., in charge of stores of food both for Europeans and natives of my party. Total for day, $18\frac{3}{4}$ miles. The journey to the Limpopo and back, $315\frac{1}{2}$ miles, had taken 19 days, including $1\frac{1}{2}$ days' rest on the Limpopo.

29th September.—Day of rest.

30th September.—Started again in the morning, taking on every one and all stores. Between the Sabi and Massi-Kessi, streams of good water were always met with at short intervals. No further reference to water supply will, therefore, be made in this diary. Camped at Garajwa's kraal. Total for day, $18\frac{1}{4}$ miles.

1st October.—Reached the Mlongesi River— $16\frac{1}{4}$ miles. Fine rain fell during the morning.

2nd October.—At Musigoboya's kraal ($9\frac{1}{4}$ miles) found an Induna and two of our porters in charge of 15 loads of meal, which had been collected by Captain Lawrence, and left there for us. Continued in the afternoon to the camp on the Nyamgamba, at which Captain Turner had died and been buried during our absence. Total for day, $14\frac{3}{4}$ miles.

3rd October.—Fine rain fell in the afternoon and evening. Marched by a new route $14\frac{1}{4}$ miles.

4th October.—Heavy mist during greater part of day. Corporal Johnson down with fever and bilious attack; had to be carried. Marched $14\frac{1}{4}$ miles. Camped on the Umswilisi River.

5th October.—Continued the march and crossed the Busi river. Total for day, $17\frac{3}{4}$ miles.

6th October.—Corporal Johnson still ill and had to be carried. Camped near Mafussi's. Total for day, $17\frac{3}{4}$ miles.

7th October.—Country very mountainous. Reached the Lusitu River in the afternoon ($16\frac{1}{4}$ miles), where we found Trooper Jones, of the

B.S.A. Co.'s Police, and a coloured servant in charge of a quantity of stores, left for us by Captain Lawrence.

8th October.—Day of rest. Corporal Whittle taken violently ill in the early morning—dysentery and fever. Showery during day, rain at night.

9th October.—Corporal Whittle too ill to be moved. Sent off native messengers for Dr. Rayner, who was with Captain Lawrence, and was believed to be encamped somewhere near Chimanimani.

It being imperative that I should reach Massi-Kessi as soon as possible, it was decided that Captain Grant, Corporal Wilkins, and Trooper Jones should remain on the Lusitu to look after Corporal Whittle, while I continued the march, accompanied by Mr. Saville, Corporal Johnson, my white servant, and 34 porters.

Started in the afternoon, and found that the Lusitu had risen very considerably, being 3 ft. deep at the drift. After crossing the river, there is a very steep ascent of over 2,000 ft. Total for day, $6\frac{1}{2}$ miles.

10th October.—Very heavy mist in early morning. Marched $18\frac{1}{2}$ miles.

11th October.—Crossed the Chimanimani Pass, 5,150 feet, and met Dr. Rayner on the other side of it. He had received my message, and was on his way back to the Lusitu. The attack of fever from which Corporal Whittle was suffering proved to be a very serious one, but he eventually pulled through. Reached Malanda's kraal ($19\frac{1}{2}$ miles) in afternoon. Heavy storm of thunder and rain before we reached there. Found Captain Lawrence there, and also a depôt of stores in charge of two of the B.S.A. Co.'s Police.

Lieutenant Wilson and Corporal Davis, R.E., were away surveying along the watershed between the basins of the Busi and the Sabi.

12th October.—Steady downpour all day. Remained in camp.

13th October.—Rained till 10 A.M. Very misty. Started at 1 P.M. Captain Lawrence accompanying us. Camped on the Manwingi River, 11 miles. Rain at night.

14th October.—Some showers. Marched $22\frac{3}{4}$ miles.

15th October.—Reached Massi-Kessi at 5.30 P.M.—21 miles.

The distances marched, from our departure from the Sabi on the 10th September to our arrival at Massi-Kessi on the 15th October, were—from the Sabi to the Limpopo, $168\frac{1}{2}$ miles; from the Limpopo to Massi-Kessi, 376 miles; total, $544\frac{1}{4}$ miles. The time occupied was 36 days, but this included $1\frac{1}{2}$ days' rest on the Limpopo, 1 day on the Sabi, and $1\frac{1}{2}$ days on the Lusitu, and $1\frac{1}{2}$ days' detention by rain at Malanda's, thus reducing the marching days to $30\frac{1}{2}$. The average distance marched each day for the whole 36 days was, therefore, $15\cdot12$ miles, and for each marching day $17\cdot8\frac{1}{4}$ miles.

Throughout the whole march, both Europeans and natives were on foot, and native porters were the only means of transport for our supplies, baggage, &c. There were no roads but tortuous Kaffir paths; part of the country traversed was bush and sand, while other portions were very mountainous, and the whole of it was situated within the tropics. More than 250 miles of our route were quite

untravelling, and we had been able to obtain only the scantiest information about this portion of it beforehand. 17 to 18 miles a-day may not seem much to persons only accustomed to the well-made roads of civilized countries, but, owing to the great heat and the badness of the tracks, this was as much as either Europeans or porters could manage, and on arrival at camp in the evening everyone was thoroughly tired out.

By the 23rd October everyone had been withdrawn from the country south of Massi-Kessi.

On the following day the greater part of the Commission started in a northerly direction, and proceeded through an excessively mountainous district to the main watershed between the basins of the Pungwé and the Zambesi. Our movements were much impeded by rain, and the mountain tops were so constantly covered with mist that survey operations were only carried on with extreme difficulty.

I got back to Massi-Kessi on the 11th November, having made a *détour* in order to visit Umtasa's kraal, and found that Captain Grant and Sergeant Clarke, who had separated from us a few days after leaving Massi-Kessi in order to complete some survey work, had already arrived.

On the following day (12th November) Lieutenant Wilson, Dr Rayner, and Mr. Saville reached Massi-Kessi direct from the Zambesi-Pungwé watershed, where I had left them owing to Mr. Saville being laid up with a very serious attack of fever. They had been delayed on the banks of the Pungwé, which had risen in consequence of the rains, and had had to wait to cross it till the waters had subsided.

On the 14th November Captain Lawrence left Massi-Kessi with about half the British section of the Commission, and on the following day I followed with Captain Grant and the remainder. We reached Mapanda's on the 23rd, covering the 157 miles between it and Massi-Kessi in $8\frac{1}{2}$ days, or an average of 18.47 miles per day. There was a good deal of rain during this period, but as it fell generally at night it did not interfere very much with our progress.

From Mapanda's we went down the river by boat to Fontesvilla, which had sprung into existence during our absence, and is the starting point of the railway now in course of construction to Shimoya's; and proceeded from there by steamer to Beira.

The detachment of the British South Africa Company's police attached to the Commission brought their own supplies with them from Umtali. The whole of the food, except fresh meat, required for the rest of the Europeans, belonging to the British section of the Commission was taken out from England, and was calculated to be sufficient to last 12 persons for between 8 and 9 months.

Everything was supplied by the Army and Navy Co-operative Society, packed in cases suitable for carrier transport; and the Commission is much indebted to Major McCrea, the managing director, for the great trouble which he personally took in the matter.

For simplification and convenience of issue the various articles of food were grouped in four categories, viz., groceries, breadstuffs, meat,

luxuries. When a party was ordered away there was no weighing and measuring out of rations. The officer in command had merely to demand one or more cases of each category according to the strength of the party and the time it was likely to be absent.

The following details concerning the cases and their contents may possibly be of use to persons fitting out expeditions similar to the one on which we were engaged:—

Groceries—

70 cases, each containing—

Tea, 2 lbs. in $\frac{1}{2}$ -lb. soldered tins.

Coffee, 2 lbs. in 1-lb. soldered tins.

Cocoa, Van Houten's, 1 lb. in $\frac{1}{4}$ -lb. tins.

Loaf sugar, 4 lbs. in a soldered tin.

Salt, 1 lb.

Pepper, $\frac{1}{4}$ lb.

Lard, 1 lb. in a soldered tin.

Arrowroot, $\frac{1}{2}$ lb. in a soldered tin.

Brand's essence of beef, two 4-oz. tins.

Condensed milk, 2 tins.

Solidified soups, 12 squares in a soldered tin.

Marmalade, four 1-lb. tins.

Curry powder, two $\frac{1}{4}$ -lb. tins.

Potted meats, four $\frac{1}{4}$ -lb. tins.

Baking powder, one $\frac{1}{4}$ -lb. tin.

Carbolic soap, 3 pieces

Bromo paper, 1 packet

Ozokerit candles, 3 lbs.

Compressed vegetables, 2 lbs. in a soldered tin.

Tin-opening knives, 2.

Dubbin, 1 tin.

} packed in waterproof paper.

The size of the cases was $28\frac{1}{2}$ in. long by 13 in. broad, and 8 in. deep. Each weighed, when full, exactly 50 lbs. Ten of them were secured by locks and keys, and were used as expense stores. The lids of the remainder, for the sake of economy, were only screwed down. Whenever it became necessary to open one of the latter its contents were at once transferred to one of those with lock and key, which had already been emptied.

The arrowroot and essence of beef were looked upon as medical comforts, and were reserved for the use of the sick.

Each case was supposed to contain about 42 rations. The tea and coffee were rather more than actually required, but the excess came in handy for issue to the coloured servants (Indians and Cape boys). The sugar ration ($1\frac{1}{2}$ oz.) was rather small, but the weight of the cases having to be kept down, it was found inexpedient to put more than 4 lbs. in each. The ration was, however, usually increased by the issue of some brown sugar, three loads of which were bought after our arrival in South Africa. The quantities of preserved milk and marmalade were also small, but these were not reckoned as

absolute necessities, and except on special occasions when the transport had to be reduced to a minimum could always be supplemented from the luxury boxes.

Breadstuffs.—44 cases, each containing 40 lbs. flour in 4 soldered tins of 10 lbs. each. The size of the cases was $22\frac{1}{2}$ in. $\times$ $18\frac{1}{2}$ in. $\times$ $9\frac{1}{2}$ in., and their weight when full about 55 lbs.

63 cases of best cabin biscuits, each case containing 2 tins of 14 lbs. each. The size of the cases was $21\frac{1}{2}$ in. $\times$ 15 in. $\times$ 13 in., and their weight when full about 46 lbs.

The normal daily ration was 1 lb. flour, or 1 lb. biscuit. It was found, however, in practice that while the full ration of biscuit was rarely consumed, 1 lb. of flour provided rather short commons, and towards the end of the expedition the flour ration was raised to $1\frac{1}{4}$ lbs.

It is of the utmost necessity that all tins should be securely soldered as a protection against wet and damp. The tins for the flour were specially made for us by the Army and Navy Co-operative Society, and answered their purpose admirably, but the biscuits were in the original tins supplied by the biscuit manufacturers, and in some few instances got damaged by wet, and became mouldy and uneatable owing to the soldering having given way in places. Our experience teaches that it would be a wise precaution to have all tins, not specially made for the expedition on which they are to be taken, carefully examined and resoldered, if necessary, before being packed.

Meat.—51 cases each containing 32 lbs. preserved meat in 16—2-lb. tins. The size of the cases was $19\frac{1}{2}$ in. $\times$ 11 in. $\times$ $10\frac{1}{2}$ in., their weight when full about 50 lbs.

The meat was of various kinds. That which was liked best was the roast beef. The daily ration when issued was 1 lb. for each person.

The total amount taken with us was only calculated for rather more than half the period the expedition was expected to last. For the rest of the time we counted on getting fresh meat or game.

Luxuries.—32 cases containing preserved fish and vegetables, sausages, sardines, butter, condensed milk, jams, mustard, &c.

These articles did not form part of the regular ration, but were issued in small quantities as extras. Those which were most appreciated were the jams and milk, and during the cold weather the butter, but tins of the last mentioned were found to be quite liquid if opened during the hot season, and could not be used except for cooking purposes.

The supplies taken with us included also 3—4-gallon kegs of lime-juice weighing about 56 lbs. each. On the days when issued the ration was $\frac{1}{24}$ th of an ordinary quart bottle for each person.

Tea, coffee, or cocoa were drunk at all meals. A ration of whisky or brandy consisting of $\frac{1}{12}$ th of a bottle was, however, served out before going to bed every second night during part of the expedition, and every night at other times. We took no wine or beer with us except a small quantity of champagne intended for use in case of sickness.

In the way of dress and camp equipment, except tents which were provided at Government expense, the officers attached to the Commission were allowed to provide pretty well what they liked, the only limitations being as regards quantity and suitability for carrier transport.

The outfit of the five non-commissioned officers of Royal Engineers was specially prepared at the Army Clothing Depot, Pinlco. As it proved most serviceable and satisfactory, and may possibly serve as a useful guide in the future, a detailed account of it is given below.

The articles issued to each man were as follows, viz. :—

Sea Kit—

- 1 blue serge frock.
- 1 pair blue serge trousers.
- 1 worsted cap.
- 6 pieces soap.
- 1 clothes-bag.
- 1 housewife.

Special Kit—

- 2 brown serge Khakee frocks with four front pockets.
- 2 pairs Bedford cord knickerbocker breeches.
- 2 pairs brown canvas leggings (Abyssinian pattern).
- 1 white waterproof tropical coat.
- 1 blue woollen jersey.
- 2 white flannel pyjama sleeping suits.
- 3 flannel cholera belts.
- 1 white havresack.
- 1 waterproof cavalry kit-bag.
- 2 infantry mess tins.
- 4 pairs cotton drawers.
- 4 blue-grey flannel shirts.
- 2 white tropical shirts.
- 4 pairs worsted socks.
- 1 white helmet (10th Hussars pattern).
- 1 puggaree.
- 3 pairs foreign service ankle-boots.

The cost of the above (sea-kit and special kit), including badges of rank and ornaments, amounted to an average of 10*l.* 8*s.* per man.

In addition to the articles above enumerated, each man took with him 1 pair regimental trousers, 1 red frock, 1 great coat, 1 forage cap, and such underclothing and boots as he happened to be in possession of.

In the way of equipment each man was supplied with 2 ordinary soldier's water-bottles (1 for use and 1 in reserve) 2 blankets, 1 waterproof ground sheet, 1 pocket filter, brown leather belt and pouches, a Martini-Henry Artillery carbine, and a Webley revolver, the last

mentioned for use when surveying, and the carbine could not be carried.

The tents used by the Commission were supplied by Benjamin Edgington, Limited, and were made of green rot-proof canvas, which proved to be most durable, and very impervious to rain.

The pattern found most convenient was the so-called "Suakin" tent, a double roof ridge-tent 6 ft. 9 in. square at base, 6 ft. 6 in. high in the centre, and 2 ft. 6 in. at the sides, with an outer roof or fly projecting all round, and jointed hard-wood poles and ridge piece. This tent complete with mallets, pegs, and bags formed two convenient sized loads of about 40 lbs. each when dry.

Full details regarding the instruments and other special equipment taken out for the survey work of the commission have already been published in an article by Captain Grant, in vol. xix (1893) of the Professional Papers of the Corps of Royal Engineers.