

1. *Extracts of a Letter from Dr. LIVINGSTONE to Dr. KIRK.*

"Near Lake 'Bangweolo,' 8th July, 1868.

... After enumerating things needed, such as cloth, beads, &c., which are to be sent to Ujiji by first opportunity, Dr. Livingstone adds:—"I have had no news from anywhere for two years and upwards. The Arabs have all been overflowing in kindness. I borrow this paper from Mohammed Bogarib, for I am up here without any. I am greatly obliged by the Sultan's letter, and beg you to say so to his highness. I don't know which of his subjects has served me most, where all have shown kindness and goodwill.

"For Captain Fraser and our friends at Zanzibar, I may say I have found what I believe to be the sources of the Nile between 10° and 12° s., or nearly in the position assigned them by Ptolemy.

"It is not one source from a lake, but upwards of twenty of them. Lake Liemba, which possibly is an arm of Tanganyika, has four rivers flowing into it. One I measured, and found it to be 294 feet—say 100 yards—high, and waist deep, and flowing fast in September. No rain had fallen since May 12; elsewhere it almost requires canoes. This has eleven good-sized 'burns' flowing into it. Taking these four rivers as one line of drainage (a fifth from Marungu must be added), then the Chambeze flows from the side into the centre of a great valley, and receives three streams as large as the Isis at Oxford or Avon at Hamilton. The Chambeze enters Bangweolo Lake and receives two streams; then changes its name to Luapula, and flowing north receives two streams about fifty yards broad each. Luapula receives one, and enters Moero Lake to receive five streams, one is eighty yards broad and always requires canoes. On leaving Moero it is called Lualaba, which receives two good-sized streams, and it forms Ulenge, either a lake with many islands or a division with many streams, which are taken up by the Lufira, a large river which, by five branches, drains the west side of the great valley, which probably is that of the Nile. I have still to follow down the Lualaba, and see whether, as the natives assert, it passes Tanganyika to the west, or enters it and finds an exit by the river called Loanda into Lake Chowambe, which I conjecture to be that discovered by Mr. Baker.

"I shall not follow the Lualaba by canoes, as we did the Zambesi from near the Victoria Falls to Kebrabassa; that was insanity, and I am not going to do any more mad things.

"If any letters have come for me, please send them on to Ujiji till further notice. I send to your care a letter to Lord Clarendon, one for Miss Livingstone, and one for Sir Roderick Murchison, and I trust you will forward them safely at your convenience in proper envelopes.

"Yours &c.,
(Signed) "DAVID LIVINGSTONE."

2. *Despatch from Dr. LIVINGSTONE to the Earl of CLARENDON.*

"Near Lake Bangweolo, South Central Africa,
July, 1868.

"MY LORD,
"When I had the honour of writing to you in February, 1867, I had the impression that I was then on the watershed between the Zambesi and either the Congo or the Nile. More extended observation has since convinced me of the essential correctness of that impression; and from what I have seen, together with what I have learned from intelligent natives, I think that I may safely assert that the chief sources of the Nile, arise between 10° and 12° south latitude, or nearly in the position assigned to them by Ptolemy, whose River Rhaptus is probably the Rovuma. Aware that others have been mistaken, and

laying no claim to infallibility, I do not yet speak very positively, particularly of the parts west and north-west of Tanganyika, because these have not yet come under my observation; but if your Lordship will read the following short sketch of my discoveries, you will perceive that the springs of the Nile have hitherto been searched for very much too far to the north. They rise some 400 miles south of the most southerly portion of the Victoria Nyanza, and, indeed, south of all the lakes except Bangweolo.

"Leaving the valley of the Loangwa, which enters the Zambesi at Zumbo, we climbed up what seemed to be a great mountain mass, but it turned out to be only the southern edge of an elevated region, which is from 3000 to 6000 feet above the level of the sea. This upland may roughly be said to cover a space south of Lake Tanganyika, of some 350 miles square. It is generally covered with dense or open forest, has an undulating, sometimes hilly, surface; a rich soil; is well watered by numerous rivulets, and, for Africa, is cold. It slopes towards the north and west, but I have found no part of it under 3000 feet of altitude. The country of Usango, situated east of the space indicated, is also an upland, and affords pasturage to the immense herds of cattle of the Basango, a remarkably light-coloured race, very friendly to strangers. Usango forms the eastern side of a great but still elevated valley. The other or western side is formed by what are called the Kone Mountains, beyond the copper-mines of Katanga. Still further west, and beyond the Kone range or plateau, our old acquaintance the Zambesi, under the name of Jambaji, is said to rise. The southern end of the great valley inclosed between Usango and the Kone range is between 11° and 12° s. It was rarely possible there to see a star, but accidentally awaking one morning between 2 and 3 o'clock, I found one which showed latitude 11° 56' s., and we were then fairly on the upland. Next day we passed two rivulets running north. As we advanced, brooks, evidently perennial, became numerous. Some went eastward to fall into the Loangwa; others went north-west to join the River Chambeze. Misled by a map calling this river in an off-hand manner 'Zambezi, eastern branch,' I took it to be the southern river of that name; but the Chambeze, with all its branches, flows from the eastern side into the centre of the great upland valley mentioned, which is probably the valley of the Nile. It is an interesting river, as helping to form three lakes, and changing its name three times in the 500 or 600 miles of its course. It was first crossed by the Portuguese, who always inquired for ivory and slaves, and heard of nothing else. A person who collected all, even the hearsay geography of the Portuguese, knew so little actually of the country that he put a large river here running 3000 feet up-hill, and called it New Zambesi.

I crossed the Chambeze in 10° 34' s., and several of its confluent south and north, quite as large as the Isis at Oxford, but running faster, and having hippopotami in them. I mention these animals because in navigating the Zambezi I could always steer the steamer boldly to where they lay, sure of finding not less than 8 feet of water. The Chambeze runs into Lake Bangweolo, and on coming out of it assumes the name Luapula. The Luapula flows down north past the town of Cazembe, and 12 miles below it enters Lake Moero. On leaving Moero at its northern end by a rent in the mountains of Rua, it takes the name Lualaba, and passing on n.n.w., forms Ulenge in the country west of Tanganyika. I have seen it only where it leaves Moero, and where it comes out of the crack in the mountains of Rua, but am quite satisfied that even before it receives the River Sofunso from Marungu, and the Soburi from the Baloba country, it is quite sufficient to form Ulenge, whether that is a lake with many islands, as some assert, or a sort of punjaub—a division into several branches, as is maintained by others. These branches are all gathered up by the Lufira—a large river, which by many confluent drains the western side of the great valley. I have not seen the Lufira, but pointed out west of 11° s., it is there asserted always to

require canoes. This is purely native information. Some intelligent men assert that when the Lufira takes up the water of Ulenge, it flows N.N.W. into Lake Chowambe, which I conjecture to be that discovered by Mr. Baker. Others think that it goes into Lake Tanganyika at Uvira, and still passes northward into Chowambe by a river named Loanda. These are the parts regarding which I suspend my judgment. If I am in error there and live through it, I shall correct myself. My opinion at present is if the large amount of water I have seen going north does not flow past Tanganyika on the west, it must have an exit from the Lake, and in all likelihood by the Loanda.

"Looking back again to the upland, it is well divided into districts, Lobisa, Lobemba, Ubengu, Itawa, Lopere, Kabuire, Marungu, Lunda or Londa, and Rua; the people are known by the initial 'Ba' instead of the initial 'Lo' or 'U' for country. The Arabs soften 'Ba' into 'Wa,' in accordance with their Suaheli dialect; the natives never do. On the northern slope of the upland, and on the 2nd of April, 1867, I discovered Lake Liemba; it lies in a hollow, with precipitous sides 2000 feet down; it is extremely beautiful, sides, top, and bottom being covered with trees and other vegetation. Elephants, buffaloes, and antelopes feed on the steep slopes, while hippopotami, crocodiles, and fish swarm in the waters. Guns being unknown, the elephants, unless sometimes deceived into a pitfall, have it all their own way. It is as perfect a natural paradise as Xenophon could have desired. On two rocky islands men till the land, rear goats, and catch fish; the villages ashore are embowered in the palm-oil palms of the West Coast of Africa. Four considerable streams flow into Liemba, and a number of brooks (*Scotticè*, 'trout burns'), from 12 to 15 feet broad, leap down the steep bright red clay-schist rocks, and form splendid cascades, that made the dullest of my attendants pause and remark with wonder. I measured one of the streams, the Lofu, 50 miles from its confluence, and found it at a ford 294 feet, say 100 yards broad, thigh and waist deep and flowing fast over hardened sandstone flag in September—the last rain had fallen on the 12th of May. Elsewhere the Lofu requires canoes. The Louzua drives a large body of smooth water into Liemba, bearing on its surface duckweed and grassy islands; this body of water was 10 fathoms deep. Another of the four streams is said to be larger than the Lofu, but an over-officious headman prevented my seeing more of it and another than their mouths. The lake is not large, from 18 to 20 miles broad, and from 35 to 40 long; it goes off N.N.W. in a river-like prolongation two miles wide, it is said, to Tanganyika: I would have set it down as an arm of that lake, but that its surface is 2800 feet above the level of the sea, while Speke makes that 1844 feet only. I tried to follow the river-like portion, but was prevented by a war which had broken out between the Chief of Itawa and a party of ivory traders from Zanzibar. I then set off to go 150 miles south, then west, till past the disturbed district, and explore the west of Tanganyika; but on going 80 miles I found the Arab party, showed them a letter from the Sultan of Zanzibar, which I owe to the kind offices of his Excellency Sir Bartle Frere, Governor of Bombay, and was at once supplied with provisions, cloth, and beads; they showed the greatest kindness and anxiety for my safety and success. The heads of the party readily perceived that a continuance of hostilities meant shutting up the ivory market, but the peace-making was a tedious process, requiring 3½ months; I was glad to see the mode of ivory and slave trading of these men, it formed such a perfect contrast to that of the ruffians from Kilwa, and to the ways of the atrocious Portuguese from Tette, who were connived at in their murders by the Governor D'Almeida.

"After peace was made I visited Msama, the Chief of Itawa; and, having left the Arabs, went on to Lake Moero, which I reached on the 8th September, 1867. In the northern part Moero is from 20 to 33 miles broad. Further south it is at least 60 miles wide, and it is 50 miles long. Ranges of tree-

covered mountains flank it on both sides, but at the broad part the western mountains dwindle out of sight. Passing up the eastern side of Moero we came to Cazembe, whose predecessors have been three times visited by Portuguese. His town stands on the north-east bank of the lakelet Mofwe; this is from two to three miles broad and nearly four long. It has several low, reedy islets, and yields plenty of fish—a species of perch. It is not connected with either the Luapula or Moero. I was forty days at Cazembe's, and might then have gone on to Bangweolo, which is larger than either of the other lakes; but the rains had set in, and this lake was reported to be very unhealthy. Not having a grain of any kind of medicine, and, as fever, without treatment, produced very disagreeable symptoms, I thought that it would be unwise to venture where swelled thyroid gland, known among us as Derbyshire-neck, and elephantiasis (scroti) prevail. I then went north for Ujiji, where I have goods, and, I hope, letters: for I have heard nothing from the world for more than two years: but when I got within 13 days of Tanganyika, I was brought to a stand-still by the superabundance of water in the country in front. A native party came through, and described the country as inundated so as often to be thigh and waist deep, with dry sleeping-places difficult to find. This flood lasts till May or June. At last I became so tired of inactivity that I doubled back on my course to Cazembe.

"To give an idea of the inundation which, in a small way, enacts the part of the Nile lower down, I had to cross two rivulets which flow into the north end of Lake Moero; one was 30, the other 40 yards broad, crossed by bridges; one had a quarter, the other half a mile of flood on each side. Moreover, one, the Luao, had covered a plain abreast of Moero, so that the water on a great part reached from the knees to the upper part of the chest. The plain was of black mud, with grass higher than our heads. We had to follow the path which, in places, the feet of passengers had worn into deep ruts. Into these we every now and then plunged and fell, over the ancles in soft mud, while hundreds of bubbles rushed up, and, bursting, emitted a frightful odour. We had four hours of this wading and plunging—the last mile was the worst; and right glad we were to get out of it to the sandy beach of Moero and bathe in the clear tepid waters. In going up the bank of the lake we first of all forded four torrents, thigh-deep; then a river 80 yards wide, with 300 yard sof flood on its west bank, so deep we had to keep to the canoes till within 50 yards of the higher ground; then four brooks, from 5 to 15 yards broad. One of them, the Chungu, possesses a somewhat melancholy interest, as that on which poor Dr. Lacerda died. He was the only Portuguese visitor who had any scientific education, and his latitude of Cazembe's town on the Chungu being 50 miles wrong, probably reveals that his mind was clouded with fever when he last observed, and any one who knows what that implies will look on his error with compassion. The Chungu went high on the chest, and one had to walk on tiptoe to avoid swimming. As I crossed all these brooks at both high and low water, I observed the difference to be from 15 to 18 inches, and from all the perennial streams the flood is a clear water. The state of the rivers and country made me go in the very lightest marching order; took nothing but the most necessary instruments, and no paper except a couple of note-books and the Bible. On unexpectedly finding a party going to the coast, I borrowed a piece of paper from an Arab, and the defects unavoidable in the circumstances you will kindly excuse. Only four of my attendants would come here; the others, on various pretences, absconded. The fact is, they are all tired of this everlasting tramping, and so verily am I. Were it not for an inveterate dislike to give in to difficulties, without doing my utmost to overcome them, I would abscond too. I comfort myself by the hope that by making the country and people better known I am doing good; and by imparting a little knowledge occasionally, I may be working in accordance with the plans of an all-embracing Providence which now forms part of the belief of all the more

intelligent of our race, my efforts may be appreciated in the good time coming yet.

"I was in the habit of sending my observations to the Cape Observatory, where Sir Thomas Maclear, the Astronomer-Royal, and the Assistant-Astronomer, Mr. Mann, bestowed a great deal of gratuitous labour on them in addition to the regular duties of the Observatory. They tested their accuracy in a variety of ways, which those only who are versed in the higher mathematics can understand or appreciate. The late Earl of Ellesmere publicly said of a single sheet of these most carefully-tested geographical positions, that they contained more true geography than many large volumes. While the mass of observations which went to the Royal Observatory at the Cape required much time for calculation, I worked out a number in a rough way, leaving out many minute corrections, such as for the height of the thermometer and barometer, the horizontal parallax and semi-diameter of planets, using but one moon's semi-diameter and horizontal parallax for a set of distances, though of several hours' duration; corrections for the differences of proportional logarithms, &c.; and, with these confessedly imperfect longitudes, made and sent home sketch-maps to give general ideas of the countries explored. They were imperfect, as calculated and made in the confusion of the multitude of matters that crowd on the mind of an explorer, but infinitely better than many of the published maps. Sir Thomas Maclear, for instance, says that short of a trigonometric survey, no river has been laid down so accurately as the Zambesi; and Mr. Mann, after most careful examination of the series of chronometric observations which more than once ran from the sea and Tette up to Lake Nyassa, says that any error in the longitude cannot possibly amount to four minutes.

"My borrowed paper is done, or I should have given a summary of the streams which, flowing into the Chambeze, Luapula, Lualaba, and the lakes, may be called sources. Thirteen, all larger than the Isis at Oxford, or Avon at Hamilton, run into one line of drainage; five into another, and five into a third receptacle—twenty-three in all. Not having seen the Nile in the north, I forbear any comparison of volume. I trust that my labours, though much longer than I intended, may meet with your Lordship's approbation.

"I have, &c.,
(Signed) "DAVID LIVINGSTONE.

"P.S. Always something new from Africa; a large tribe lives in underground houses in Rua. Some excavations are said to be 30 miles long, and have running rills in them—a whole district can stand a siege in them. The 'writings' therein I have been told by some of the people are drawings of animals, and not letters, otherwise I should have gone to see them. People very dark, well made, and outer angle of eyes slanting inwards."

3. *Extracts from a Letter of Dr. LIVINGSTONE to the PRESIDENT.*

"MY DEAR SIR RODERICK,

"Near Lake Bangweolo, 8th July, 1868.

"My letter to Lord Clarendon will explain what I have been doing, and why I can only give you a leaf out of my Note-book. The sources of the Nile are undoubtedly between 10° and 12° s., not one or two, but upwards of twenty of them rise south of all the lakes except Bangweolo. The great valley is exactly like the valleys of the Congo and Zambesi, and you have been seeking the sources too far to the north. I have yet to follow down the three lines of drainage into which the twenty-three sources converge, and do not speak very positively as to whether they flow past Tanganyika to the

west into Chowambe, which I suppose to be Baker's Lake, or into Tanganyika, and through by a river named Loanda into the same lake.

"We are in the same quarter of the world yet. I do not know if Kirk has come to Zanzibar. I hope in a couple of months to be at Ujiji, where I have goods and I hope letters. Want of paper prevents my writing to my friends, A note for Agnes goes by this.

"With love to Lady Murchison, I am ever affectionately yours,
(Signed) "DAVID LIVINGSTONE."

"POSTSCRIPT.—The following is a summary on sources. From 30 to 40 yards broad, and always deep enough to require either canoes or bridges. Chambese, Luapula, Lualaba, and the Lakes receive thirteen sources, each larger than the Isis at Oxford or Avon at Hamilton. Another line of drainage receives five sources. A third receives other five, or twenty-three (23) in all. I do not count small burns from 5 to 10 or 15 yards broad. Lofu has eleven of these, all perennial, nor do I refer to the oozes or sponges, which are the sources of them all.

(Signed) "D. L."

4. *Letter from Dr. LIVINGSTONE to Sir BARTLE FRERE.*

"Near Lake Bangweolo, South Central Africa,
July, 1868.

"When I wrote to you in February, 1867, I had the impression that I was then on the watershed between the Zambesi and either the Congo or the Nile. Further observation now leads me to believe that impression to have been correct; and from what I have myself seen, together with what I have heard from intelligent natives, I think that I can safely assert that the chief sources of the Nile rise between 10° and 12° s. latitude; or nearly in the position assigned to them by Ptolemy, whose River Rhapta is probably the Rovuma. I cannot yet speak positively of the parts w. and N.W. of Tanganyika, because these have not yet come under my observation; but, if you will read the following short sketch of what I have seen, you will see that the springs of the Nile have hitherto been sought for very much too far to the north.

"Leaving the valley of the Loangwa at 12° s., we climbed up what seemed to be a great mass of mountains; but it turned out to be the southern edge of an elevated region, the height of which is from 4000 to 6000 feet above the level of the sea. This upland may be roughly said to cover a space south of Lake Tanganyika of some 350 miles square. It is generally covered with dense forest, has an undulating surface, a rich soil, is well watered with numerous rivulets, and, for Africa, is cold. It slopes towards the north and west, but I have not seen any part of it under 3000 feet of altitude. The country of Usango, situated east of the space indicated, is also an upland, and affords pasturage for the immense herds of cattle of the Basango (Wasango of the Arabs), a very light-coloured race, very friendly with strangers. Usango forms one, the eastern side of the southern end of a great but still elevated valley. The other, or western side, is formed by what are called the Kone Mountains, beyond the copper-mines of Katanga. Still further west, and beyond the Kone Range or plateau, rises our old acquaintance the Zambesi by the name of Jambaji. Referring back to 12° s.—it was rarely possible to obtain even a latitude; but accidentally awaking one morning after we were fairly on the upland, I found a star which showed lat. 11° 56' s., and next day we crossed

two rivulets running north. As we advanced brooks became numerous, some went backwards or sideways into the Loangwa, and with it to join the Zambesi at Zumbé, but the greater number went north or north-west into the River Chambeze. This—misled by a map calling it, in an offhand manner, ‘Zambezi, Eastern branch’—I took to be the river so indicated; but the Chambeze, with all its branches, flows from the side into the centre of the great Nile Valley. It is remarkable as helping to form three lakes, and changing its name three times in the 500 or 600 miles of its course. First of all it is the Chambeze, which I crossed in $10^{\circ} 34' s.$ I crossed several of its confluent, both on its south and north, quite as large as the Isis at Oxford, but running faster, and having hippopotami in them. I mention these animals, because, when navigating the Zambesi, I steered always boldly on to where these beasts lay, sure of never finding less than eight feet of water. The Chambeze flows into Lake Bangweolo, and on coming out of it assumes the name Luapula. Luapula flows down north, past the town of Cazembe, and then enters Lake Moero. On emerging from it the name. Lualaba is taken. In passing on *n.n.w.* it becomes very large, and forms Ulenge in the country west of Tanganyika. I have seen it only where it leaves Moero by a crack in the mountains of Rua, and where it comes out again, and am sure it is sufficient to form Ulenge, whether it is a lake with many islands in it, or a punjaub, if I may use the word, before its waters are all gathered up by the Lufira, a large river, which drains the western side of the great valley and having its sources between 11° and $12^{\circ} s.$ Beyond Ulenge, and Ulenge itself, is purely native information; and some believe that when the Lufira takes it up it flows *n.n.w.* into a large lake named Chowambe, which I conjecture to be that discovered by Mr. Baker: others think that it goes into Tanganyika, and flows thence into Chowambe, by a river named Loanda. I suspend my judgment, but think if the immense amount of water I have seen going north does not flow past Lake Tanganyika on the west, it must have an exit, and in all probability it is by the Loanda.

“Referring again to the upland, I found it divided into districts—Lobisa, Lobemba, Ulungu, Lopere, Kabuire, Lunda, and Rua; the people are known by putting Ba- instead of the initial syllable for country, Lo or U; the Arabs use Wa instead of Ba, as that is Suaheli. On the slope north, and in the Balungu country, I discovered Lake Liemba on 2nd April, 1867. It lies in a hollow, with precipitous sides 2000 feet down. It is extremely beautiful, sides, top, and bottom being richly clothed with trees and other vegetation. Elephants, buffaloes, and antelopes feed on the steep slopes; fish and hippopotami swarm in the waters. Two rocky islands are inhabited by fishermen, who, besides fishing, cultivate the ground and rear goats. The lake is not large, from 18 to 20 miles broad, and from 30 to 40 long. Four good-sized rivers flow into it, and many ‘burns’ (*Scoticè* for brooks), which form pretty cascades as they leap down the bright red clay-schist rocks. It goes away in a river-like prolongation two miles wide, *n.n.w.* it is said, to Tanganyika. Were it not 2800 feet above the sea, I should consider it an arm of that lake, but Speke makes it 1844 feet only. I tried to follow this arm, but was prevented by war. A large party of Arab traders from Zanzibar had been attacked by the Chief of Itawa. I set off to go round about the disturbed district; met the Arabs, and, having showed them Seyd Majid’s letter, was at once supplied with cloth, beads, and provisions. Thanks to your good offices with the Sultan, I have been treated by all the Arabs with the greatest kindness and consideration. The heads of the party readily perceived that a continuance of hostilities meant shutting up the ivory market, so peace was made, but the process required three months and a half. They would not allow me to go into any danger, so I had to remain at a village 4700 feet above the sea, and employ my time in the pig’s employment of taking on fat. When we did move I went someway west with my Arab friends, and I am glad that I saw their mode

of ivory and slave trading. It was such a contrast to that of the ruffians from Kilwa and the Portuguese from Tette. On leaving them we came to Moero on the 8th November, 1867. This in the northern part is from 20 to 33 miles broad. Further south it is at least 60 miles in width, and it is 50 miles long; ranges of tree-covered mountains flank it on both sides. We passed up its eastern shore and visited Cazembe, who has several times been visited by Portuguese. I remained 40 days with Cazembe, and might have come on to Bangweolo; but the rains had set in, and this lake was reported to be very unhealthy. Not having a grain of any kind of medicine, and as fever without treatment produces fits of total insensibility and loss of power over the muscles of the back, I thought it would be unwise to venture. Went north, intending to go to Ujiji for goods and letters, not having heard a word of any kind from anywhere for two years, but I was brought to a standstill at a distance of 13 days from Tanganyika by the superabundance of water in the country in front. A native party came through, and described the waters as often thigh and waist deep and sleeping-places difficult to find. This inundation lasts till May or June. When I became utterly tired of inactivity, I doubled back in my course to Cazembe in April; and that you may understand the nature of the flood that here annually enacts the part of the Nile further down, I may say that two rivulets, each from 30 to 40 yards broad, flow into the north end of Moero. One had a quarter and the other half a mile of flood on each bank, from thigh to waist deep. They were crossed by bridges. Then one of them had flooded a plain abreast of Moero, and we had four hours of plunging in water and black mud. The last mile was the worst, though the rest had many deep ruts, into which, from not seeing them, we plunged and sent up a rush of hundreds of bubbles to the surface, all charged with a frightful odour. Before getting out to the clean sandy beach of Moero the flood-water was high up on the chest. Then we had to wade four brooks thigh-deep, cross a river 80 yards broad with 300 yards of flood on its western bank so deep we had to keep to the canoes till within 50 yards of the higher grounds. Four other brooks had to be forded ere we reached Cazembe. One, the Chungu, was the scene of Dr. Lacerda’s death. He was the only Portuguese of any scientific acquirements, and was 50 miles wrong in latitude alone. Probably fever clouded his mind when he observed, and any one who knows what that implies will readily excuse any mistake he may have made.

“The Chungu went high up on the chest, and one had to walk on tiptoe to avoid swimming. Only four of my attendants would come; the others absconded on various pretexts. The fact is, they are all tired of this everlasting tramping, and so am I. Nothing could be brought but the veriest necessaries,—no paper, only a couple of note-books and the Bible. I have borrowed this and another sheet from an Arab trader; the other is for Lord Clarendon, and they will go by a party proceeding to the coast through Usango. I would go myself, if it were not for an inveterate dislike to give up what I have undertaken without finishing it. I am often distressed in thinking of a son whom I left at the University of Glasgow. He was to be two years there, then spend a year or more in Germany for French and German, before trying the Civil Service examination for India. He will now be in especial need of my counsel and assistance, and here I am at Bangweolo. His elder brother, after being well educated, wandered into the American war, and we know no more of him after an engagement before Richmond. Possibly, Sir Charles Wood, in consideration of my services, might do something to fix this one. I never asked anything for myself. Lord Palmerston sent Mr. Hayward, a Queen’s Counsel, to me before I left home this time, to ask ‘what he could do for me, as he was most anxious to serve me.’ I don’t know how it was, but it never once occurred to me, till I was in here, that he meant anything for myself. I replied that if he could open the Portuguese ports in

East Africa to free trade, this was the greatest boon he could confer. I thought only of my work, and not of myself or children. I feel more at liberty in telling you of my domestic anxiety, and my fears lest Tom should go to the examination unprepared, because you have a family yourself, and will sympathise with me. I shall give Lord Clarendon the same geographical information as I have given you; and as I have not the conscience to ask more paper from my Arab friend, I shall ask Miss Frere to favour me by writing to my daughter a little of the above, and sending it to Mr. Murray, who will know where she is. Agnes is to tell Tom not to go in for examination till he is well prepared, and he may take a year more of education where he may have found the most benefit. I had written you a long letter, which now lies at Kabuire; the foregoing contains the substance of it. Miss Frere must take this into consideration, if annoyed at my asking her to write to a stranger in such a climate as that of India. I regret that the Nile has prevented me from following out my aspirations for the benefit of the people. I sometimes comfort myself by the hope that by making this country and its inhabitants better known, and occasionally imparting a little knowledge, I may be working in accordance with the plans of the all-embracing Providence for the good time coming yet. At other times, I feel as if serving a few insane geographers, who will count me a man and a brother. There is a large tribe of Troglodytes in Rua, with excavations 30 miles in length, and a running rill passing along the entire street. They ascribe these rock-dwellings to the hand of the Deity. The 'writings' in them are drawings of animals; if they had been letters, I must have gone to see them. People very black, strong, and outer angle of eyes upwards. The summary of sources I give Lord Clarendon as flowing into Chambeze—Luapula, Lualaba; and the lakes are thirteen in all, and are larger than the Isis at Oxford and Avon at Hamilton. Five in another line of drainage, and five in a third receptacle, make twenty-three in all: these do not include 'burns.' Lofu has eleven of them, from 5 to 15 yards wide, and perennial. I did get a bit of paper and write to Agnes, so Miss Frere is absolved from the penance. Love to Lady Frere and her family.

(Signed) "DAVID LIVINGSTONE."

5. Letter from Dr. KIRK to C. GONNE, Esq., Secretary to the Government, Bombay.

"SIR, "Zanzibar, 7th September, 1869.

"The chief point of geographical interest in the present letter of Dr. Livingstone is the statement that the sources of the Nile are to be found in the lakes and rivers that drain the great valley in which Cazembe is situated, and lying to the south of Tanganyika, between 10° and 12° of south latitude.

"The town of Cazembe, from which Dr. Livingstone's previous letters (December, 1867) were dated, has been already visited and described by two Portuguese missions. It is situated on the shores of one of a chain of lakes and rivers that flow northwards.

"The Chambeze, having collected by many streams the waters of the northern slope of the damp, elevated plains, flows to join Lake Bangweolo; this, again, is connected with Lake Moero by the Loapula, on whose banks the town of Cazembe is built. Moero is, in its turn, drained by the Lualaba into another lake, named Ulenge, and here exploration ends.

"Natives have told Dr. Livingstone that Ulenge is an island-studded lake, whose waters join the Lufira, a large river coming from the western side of the same great plain, whose eastern slope is drained by the Chambeze. This united stream, some say, enters the Tanganyika, and thence, by the Loanda, into Lake Chowambe; but Dr. Livingstone's informants are not unanimous, and some assert that the Lufira passes to the west of Tanganyika, and so to the

Lake Chowambe, which Dr. Livingstone thinks is the same as the Albert Nyanza of Sir Samuel Baker.

"In fact, the interest of the journey centres in the southern connections of the Albert Nyazza, and Arab traders generally agree in thinking that a water-communication does exist between that and the Tanganyika, but I have not met with any one who professes to have traced out this communication.

"From Arabs who visit Cazembe I learn that the lakes now described by Dr. Livingstone are of considerable size, probably from five to ten days' march in length, and, like Nyassa, Tanganyika, and the Albert Nyanza, overhung by high mountain-slopes, which open out in bays and valleys, or leave great plains, which, during the rainy season, become flooded, so that caravans march for days through water knee-deep, seeking for higher ground on which to pass the night. The country abounds with large game and domestic cattle, while the climate is spoken of as not unhealthy, and is certainly a contrast to the Zanzibar coast, if we may judge from the tanned healthy traders who return.

"I have the honour to be, Sir, your most obedient servant,
(Signed) "JOHN KIRK."

The PRESIDENT further explained, with reference to these letters, that the one to the Earl of Clarendon had only been received since the meeting began. The affectionate letter from Livingstone to the President, consisting of ten or twelve pages of very small writing, was received only just before the meeting, and there was no time to select any details of interest which it might contain. He could not conceive of heroism more perfect than that shown by his illustrious friend in the midst of privations and hunger, here and there having to wade through rivers, and deserted by his attendants. The little paragraph at the end was a very amusing one. Sir Bartle Frere had also received a letter, and would, probably, give the meeting some account of it.*

Sir BARTLE FRERE said his letter went over very much the same ground as that to Lord Clarendon. Dr. Livingstone was under the impression that he (Sir Bartle Frere) was still in India, and had therefore sent him a letter to Bombay in order to diminish the risk of the information being lost. There were also in his communication a few remarks of a private nature relating to some members of his family, but of course it was not intended that they should be made public. In his letter he dwelt rather more fully than in that to Lord Clarendon, upon the feeling which was present in his mind that perhaps in seeking to solve a geographical problem he might be going away from what had been the pursuit of his life, the civilization and welfare of Africa in general. He (Sir Bartle Frere) felt sure that for once in his life Dr. Livingstone was wrong, and that, whatever directions his efforts might take, it was impossible for him to labour for anything but the good of mankind.

Mr. FINDLAY said, when Lake Tanganyika was first discovered, many difficulties were suggested against its flowing into the Nile, but there were also many difficulties attending any other solution of the problem. The theory was that a river ran into the south end and another into the north end, but its waters were perfectly clear and fresh, and there were no marks of any great accession of water. Then in what direction could the outlet be? When Speke and Burton arrived there they were in a wretched condition, the former being blinded and the latter paralysed. They heard that a river ran into it, but from the difficulties of the language they were not at all sure of that. Captain Speke, when he first mapped the neighbourhood down, had the impression that there was an open valley running northward. They had only one observation for level, and that gave the elevation 1844 feet above the sea. That was a very low level to carry it on to the Nile, which was a considerable distance

* A copy of this letter was afterwards communicated by Sir Bartle Frere, and is printed above, No. 4.

away. However, he (Mr. Findlay) was now gratified to find that his own conjectures were likely to be verified. The observations of Sir Samuel Baker, carefully compared with those of Speke, had since proved that 1000 feet must be added to Captain Speke's calculations, making the elevation 2800 feet. Thus it appeared that the two lakes, Tanganyika and Albert Nyanza, were on the same level. There were several difficulties connected with any other solution. On the western side of the lake high mountains were said to extend for a considerable distance. This shut out the idea of its flowing in that direction. On the eastward there was no outlet either. The rocky nature of the country forbade the belief that the Congo afforded an outlet. Then, again, the French had shown that the Ogobai was one of the most gigantic rivers of Africa, and it was possible that the Kija Lake might flow into it. He contended that the chains of mountains in that region were meridional, and that the waters of Africa ran in a northerly direction. In the course of a few months he hoped the great question would be settled. If his opinions should prove to be true, the ivory traders would in all probability prefer the Nile route to the present one to Zanzibar.

Mr. FRANCIS GALTON said it might seem strange that there should be an error of 1000 feet of altitude suspected in the observations of an explorer. Here, in England, levels were made to an inch, but the method of operating in uncivilised countries was quite different from that employed at home. Instead of using a spirit-level, and taking sights, the traveller in Africa had to boil a thermometer, that is, plunge it into boiling water in order to see at what temperature the water was. At the top of a high mountain, such as Mont Blanc, the temperature of boiling water would be insufficient to boil a potato. One degree of temperature corresponds to 500 feet in height; two degrees of temperature would be 1000 feet. The thermometer that Speke used, his others having been broken, was neither more nor less than a bath thermometer, and could not be depended on to a couple of degrees, especially after it had been taken a long journey in Africa and exposed to a dry climate. Even the glass of the best thermometers, after being often put into boiling water, becomes altered in structure, and the instruments change their boiling-point. Consequently, with an untested wooden thermometer, such an error as Speke had made was a very small matter.

Mr. FINDLAY said he had seen a pencil memorandum by Captain Speke to the effect that when he got to the coast again his thermometer boiled at 214° which was two degrees too high. Thus the error was easily accounted for.

The Rev. HORACE WALLER said that the frequent recurrence of the name Zambesi was accounted for by the fact that the word meant the "Washer," and was applied in many instances to rivers liable to high floods. Chambeze was merely a dialectic variation of Zambesi.

Captain SHERARD OSBORN thought it was a matter for congratulation that there was a prospect of Dr. Livingstone being met with and relieved by Sir Samuel Baker. He had always differed from the President in believing that if Livingstone did reach waters flowing north he would follow them down to the Nile and come out at Alexandria, and he still adhered to that opinion. It will be a great day when the two celebrated travellers meet, and the man who has discovered the sources of the Nile southward of the lakes will joyfully hold out his hand to Sir Samuel Baker who traced the Nile up to those lakes.

The PRESIDENT said by this time probably the whole question had been determined, but if the connection between the two lakes was proved he could see no reason for Dr. Livingstone's return by the Nile. The equatorial region had been already traversed, and he could gain no glory by following in the footsteps of Speke, Grant, and Baker. The road to Zanzibar was short, and he would no doubt prefer to return by that route. However this might be, the President was certain that when Livingstone returned home he would receive a more glorious welcome than was ever before given to a British traveller.

Second Meeting, November 22nd, 1869.

SIR RODERICK I. MURCHISON, BART., K.C.B., PRESIDENT, in the Chair.

PRESENTATIONS.—Colonel H. J. Warre, C.B.; F. K. Munton, Esq.

ELECTIONS.—Keith E. Abbott, Esq. (H.M. Consul-General at Odessa); John Buckley, Esq.; Lieutenant W. J. Casberd-Boteler, R.N.; Henry A. Churchill, Esq. (H.M. Consul at Zanzibar); E. B. Eastwick, Esq., F.R.S., M.P.; Captain Henry Fairfax, R.N.; Captain Edward Boyd Fawcett, M.A.; James Gallic, Esq.; Dr. John Harvey, LL.D.; William W. Howard, Esq.; Theophilus Horrex, Esq.; Captain David Hopkins; Alexander Keith Johnston, Jun., Esq.; C. W. Ligar, Esq. (Surveyor-General of Victoria); Alexander Matheson, Esq., M.P.; Albert Müller, Esq.; Colonel Francis Cornwallis Maude, R.A., V.C., &c.; Lieutenant George F. Purdon, R.N.; Iltudus T. Prichard, Esq.; Edward Rae, Esq.; George Russell, Esq., M.A.; William Summerhayes, Esq., M.D.; F. F. Searle, Esq.; George C. Silk, Esq.; Robert Sutherland, Esq.; Charles Waite, Esq., LL.D.; Ebenezer Whytt, Esq.; Captain Charles W. Wilson, R.E.

ACCESSIONS TO LIBRARY FROM THE 8TH TO THE 22ND NOVEMBER, 1869.—'Ueber das Verhältniss der Topographie zur Geologie.' Von J. M. Ziegler. Donor, the author. 'Queensland and her Gold-fields.' By Charles H. Allen. Donor, the author. 'Surveys for the Kansas Pacific Railway.' By General W. J. Palmer. 1869. Donor, the author. 'Trade of the Upper Yangtze:' Report of the Shanghai Chamber of Commerce. Donor, Mr. Consul Swinhoe. 'Hypothetical Phœnician Names of Places on European Coasts,' in MS. By S. M. Drach. Donor, the author. 'Brazil: its Commerce, &c.' By W. Scully. Donor, the author. 'Der Minenbetrieb in Bolivien und der Brasilien, &c.' Also 'Die Deutsche Auswanderer.' Von J. I. Sturtz. Donor, the author. 'Fragmenta Phytographiæ Australiæ.' Contulit F. de Mueller. Melbourne, 1867-8. Donor, the author.

ACCESSIONS TO THE MAP-ROOM SINCE THE LAST MEETING OF NOVEMBER 8TH, 1869.—A Chart of the North Atlantic Ocean, showing the Tracks of the Telegraph Cables between Europe and America. 5 copies. Presented by Captain S. Osborn, C.B., R.N. Switzerland: a Map of Canton of Glarus. A Geological Map of Jerusalem and its Environs, compiled from the Ordnance Survey, under Captain C. W. Wilson, R.E. A Topographical Map of Jerusalem and its Environs. By the same. Map of the Island of Teneriffe. By Messrs. G. Hartung, &c. &c. Map of the City of Guatemala, Central America. By N. F. Y. Donzel. Ordnance sheets, 420 in number.