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, etc., which are to be sent to Ujiji by first opportunity, Dr. Livingstone adds: "I have bad no news from anywhere for two years and upwards. The Arabs have all been overflowing in kindness. I borrow this paper from Mohammed Bogarih, 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 south part of Lake Tanganyika; of some 260 miles square. It is generally covered with dense or open forest, has an undulating, sometimes hilly, poor soil; is well watered by numerous rivulets, and, for Africa, is cold. It slopes towards the south 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 K报社 Mountains, beyond the copper-mines of Katanga. Still further west, and beyond the Zombo range or plateau, our old acquaintance the Zomboi, under the name of Zambezi, is said to rise. The southern end of the great valley inclined between Usango and the Zombo range is between 11° and 12° S. It was rarely possible there to see a sun, but accidently at one o'clock, I found one which stood above the horizon, and we were then fairly on the upland." Next day we passed two rivulets running north. We advanced, however, more slowly, and came to the river, whose name is Usango, and which forms the eastern side of the valley, between the Zomboi and the copper-mines of Katanga.

"I shall not follow the Luana or its branches, as we did the Zambesi from near the Victoria Falls to Kembrua; that was insatiable, 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 etc.,
(David Livingstone.)"

2. Despatch from Dr. Livingstone to the Earl of Clarendon.

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

"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, rise between 10° S. and 12° S. latitude, and the position assigned to them by Ptolomy, whose River Rhaetum is probably the Kremu. Aware of other streams which 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 own observation; but it is hoped, I shall soon be able to afford you a clear sketch of the discoveries I have made."

"Thus far, I have been relatively free from difficulties, except the generosity of the Arab chiefs."

"Leaving the valley of the Zambesi at Ujiji, we have traveled a great mountain range, 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 be said to cover a space south of Lake Tanganyika, of some 260 miles square. It is generally covered with dense or open forest, has an undulating, sometimes hilly, poor soil; is well watered by numerous rivulets, and, for Africa, is cold. It slopes towards the south 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 Komboi Mountains, beyond the copper-mines of Katanga. Still further west, and beyond the Zomboi range or plateau, our old acquaintance the Zomboi, under the name of Zambezi, is said to rise. The southern end of the great valley inclined between Usango and the Zomboi range is between 11° and 12° S. It was rarely possible there to see a sun, but accidently at one o'clock, I found one which stood above the horizon, and we were then fairly on the upland."

"Next day we passed two rivulets running north. We advanced, however, more slowly, and came to the river, whose name is Usango, and which forms the eastern side of the valley, between the Zomboi and the copper-mines of Katanga."

"I shall not follow the Luana or its branches, as we did the Zambesi from near the Victoria Falls to Kembrua; that was insatiable, 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 etc.,
(David Livingstone.)"
require canoes. This is purely native information. Some intelligent men assert that when the Lufira takes up the water of Ulenge, it flows S.S.W. into Lake Chombe, which I conjecture to be that discovered by Mr. Baker. Others think that it goes into Lake Tanganyika at U Bufi, and still others maintain that it flows into Chombe by a river named Lunda. 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 that if the large amount of water I have seen going north does not flow past Tanganyika on the Lunda, it must have an exit from the Lake, and in all likelihood by the Lunda.

"Looking back again to the upland, it is well divided into districts, Lobisa, Lobemba, Ulenge, Itawa, Lopere, Kambwe, Marungu, Lunda, and Loja; the people are known by the initials 'Lo' instead of 'L' for country. The Arabs often say 'Wa' instead of 'Wa', in accordance with their Swahili 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 hippopotamuses, crocodiles, and fish swim in the waters. Guns being unknown, the elephants, unless sometimes deceived into a pitfall, have 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 (Scottice, 'trout burns'), from 12 to 15 feet broad, leap down the steep bright red clay-sediments, and form splendid cascades, that made my attendants pause and remark with wonder. I measured one of the streams, the Lofo, 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 level of the falls on the 12th of May. Eleven hours of the throws—two of the last miles was the worst; and right glad were we 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 forced four torrents, thigh-deep; then a river 80 yards wide, with 300 yard so old flood on its west bank, so deep we had to keep to the canoe till within 50 yards of the carriageway; the flood was so clear a water. The state of the river 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, and asked them if they could spare me some food—both the circumstances and the defects unavoidable in the circumstances you kindly excuse. Only four of my attendants would come to be here; the others, on various pretences, absconded. The fact is, they are all fired of this everlasting tramping, and so very am I. Were it not for an invertebrate dislike to give in to difficulties, without 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 all-embracing Providence which now forms part of the belief of all the more 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 Zambezi, whose predecessors have been three times visited by Portuguese. His present stands on the north-east bank of the lake of Moero; this is from two to three miles broad and nearly four long, marked by fine, greenly 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 Zambezi's, and might 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 swollen thyroid gland, known among us as Dermis-lamph-fell, and supposed to be infectious. I then went north for Ujiji, where I have goods, and, I hope, letters; for I have heard nothing from the south 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 Zambezi.

To give an idea of the inundation which, in a small way, affects the part of the Nile lower down, I had to cross two rivulets which run 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, the Lofo had covered a plain abreast of Moero, so that the water on a great part rested from the knees to the upper part of the chest. The plain was of black mud, with grasses higher than our heads. We had to go on horseback the length of which, in places, the feet of passengers had worn into deep ruts. Into these we every now and then plunged and fell, over the ankles in soft mud, while hundreds of bubbles rushed up, and, bursting, emitted a frightful odour. We had four hours of this travail the last miles was the worst; and right glad were we 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 forced four torrents, thigh-deep; then a river 80 yards wide, with 300 yard so old flood on its west bank, so deep we had to keep to the canoe till within 50 yards of the carriageway; the flood was so clear a water. The state of the river 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, and asked them if they could spare me some food—both the circumstances and the defects unavoidable in the circumstances you kindly excuse. Only four of my attendants would come to be here; the others, on various pretences, absconded. The fact is, they are all fired of this everlasting tramping, and so very am I. Were it not for an invertebrate dislike to give in to difficulties, without 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 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 Ellenmore 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 back to the Lake Nyasa, 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 Chambessa, Luapula, Lualaba, and the lakes, may be called sources. Thirty-one, all larger than the Ias 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 Run. 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 15° 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 Londo 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. Chambessa, Luapula, Lualaba, and the Lakes receive sixteen sources, each larger than the Ias 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. Loft has eleven of these, all perennial, nor do I refer to the oxoos or sponges, which are the sources of them all.

"D. L."

4. Letter from Dr. Livingstone to Sir Bartle Frere.

"My dear Sir Bartle,"

"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 observations now lead me to believe that my impression was 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 Poloemy, whose River Rhapsa 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 300 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 pasture for the immense herds of cattle of the Basongo (Usango 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 is 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 waking one morning after we were fairly on the upland, I found a star which showed lat. 11° 50' S., and next day we crossed..."
two rivulets running north. As we advanced brooks became numerous, some went backwards or sideways into the Luangwa, and with it joined to the Zambesi at Zambesia, but the greater number went north or north-west into the river Chambuzi. This—ruled by a map—has a headwater and main body called Chambuzi, Eastern branch. I took to be the river so indicated; but the Chambuzi, 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. The Chambuzi which I crossed in 10° 34' S. crossed several of its confluentס, 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 observed always boldly on all those large lakes, and am quite sure of never finding less than one foot of water. The Chambuzi flows into Lake Bangwoelo, and on coming out of it assumes the name Luapala. Luapala flows north, past the town of Cazembe, and then enters Lake Moero. On emerging from it the name Luulaba is taken. In passing on N.W. it becomes very large, and forms Ulange in the country west of Tanganyika. I have seen it only where it leaves Moero by a crag in the mountains of Ruha, and where it comes out again, and am sure it is sufficient to form Ulange, whether it is a lake with many islands in it, or a扑jut, if I may use the word, before its waters are all gathered up by the Luufa, a large river, which drains the western side of the great valley and having its sources between 11° and 12° S. Beyond Ulange, and Ulunge itself, is purely native information; and some believe that when the Luufa takes it up, it flows N.W. into a large lake named Chowombo, which I conjecture to be that named by Sir John Gilbert, and by Mr. Baker. Others think that it goes into Tanganyika, and flows thence into Chowombo, by a river named Luunda. 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 Luufa.

I found it divided into distincts—Lobisia, Londeha, Ulungu, Itawa, Lopere, Kaburo, Lunda, and Ruha; the people are known by putting Ruha—instead of the usual syllable for country, Lo or Lo; the Arabe use Wa instead of Ruha, as that is Swahili. On the slope north, and in the African country, I discovered Lake Liuba on 6th Aug., 1869. It lies in a hollow, with precipitous sides 2000 feet deep. It is extremely beautiful, slopes, 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, 200 feet above the sea, have cultivated 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 trees, which form pretty cascades as they leap down the bright red clay-sclerishe rocks. It goes away in a river-like prolongation two miles wide, N.W. It is said to reach Tanganyika. It is not 2600 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 it 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 Arab traders, and showed them my cabinet's letter, 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 continuation of the desert meant starvation, so they stuck up the ivory market, and 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 somewhre west by 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 9th November, 1867. This in the northern part of it from 20 to 30 miles broad. Further south it is at least 60 miles in width, and 80 to 100 miles long; ranges of tree-covered mountains flank it on both sides. We passed up its eastern shore and visited Cazembe, which has several times been visited by capt. T. A. Palmerston, and has two large lakes on it. We now passed on to Tanganikia, and then arrived at the coast. I cannot do justice to the beauty of Tanganikia, which is a vast sheet of water with mountains on all sides, and a forest of trees. We passed up the river, and arrived at the small town of Baguzi, which I reached on the 10th December, and found it in a state of great poverty. I was not able to see the capital, but I was informed that it is a large and flourishing town.
LETTER FROM DR. KIRK. [NOV. 8, 1869.

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 sympathize 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 examination till he is well prepared, and let him 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 names 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 are the rock-dwellings of the hand of the Devil. The 'writing' 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 Chambenze - Luapula, Lualula; and the lakes are thirteen in all, and are larger than the Ila at Oxford and Avon at Hungerford. Fire in another line of drainage, five to ten thousand, make twenty-one 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 pittance. 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 Kazembe is situated, and lying to the south of Tanganyika, between 10° and 12° of south latitude. The town of Kazembe, 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 Chambenze, having collected many streams the waters of the northern slope of the dump, elevated plains, flows to join Lake Bangweelo; this, again, is connected with Lake Mwoyo by the Loapula, on whose banks the town of Kazembe is built. Mwoyo is, in its turn, drained by the Luulaba into another lake, named Uluenge, and here exploration ends.

"Natives have told Dr. Livingstone that Ulonge is a land-studded lake, whose waters join the Lufira, a large river coming from the western side of the same plain, whose eastern slope is drained by the Chambenze. This muddled stream, some say, enters the Tanganyika, and thence, by the Leonda, into Lake Chwemame; but Dr. Livingstone's informants are unambiguous, and some assert that the Lufira passes to the west of Tanganyika, and so to the

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Lake Chwemame, 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 Nyanza, 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 this communication.

"From Arabs who visit Kazembe 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 Nyanza, Tanganyika, and the Albert Nyanza, overlying 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 great contrast to the Zanzibar coast, if we may judge from the tainted 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 more perfect than that shown by his illustrious friend in the midst of privations and hunger, and there having to wade through rivers, and deserted by his attendants. The letter 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 blindfolded and tied, and the latter suffering from the difficulties of the language they were not at all sure of. 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 1644 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.

VOl. IV.
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, since had proved that 1000 feet must be added to Captain Speke's calculations, making the elevation 2900 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 other than the Zambesi. The rocky nature of the country forbade the belief that the Congo afforded an outlet. Then, again, the French had shown that the Ubangi was one of the most gigantic rivers of Africa, and it was possible that the Kila 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 uncivilized 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 Mount Elgon, 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. He could not be depended on 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 Walker 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. Chambasze was merely a dialectical variation of Zambesi.

Captain Sheard 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 the same opinion. It would be a great day when the two celebrated travellers met, and the man who has discovered the source 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 at 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 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.


