# PROCEEDINGS

OF

# THE ROYAL GEOGRAPHICAL SOCIETY.

## SESSION 1864-65.

*First Meeting, November 14th*, 1864.

[ISSUED 10TH JANUARY, 1865.]

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

ELECTIONS.—*Captain Wade Browne; Domenick Colnaghi, Esq.; Sir James Duke, Bart.; James Haysman, Esq.; Frederick Symonds, Esq.*

PRINCIPAL ACCESSIONS TO THE LIBRARY since the last Meeting, June 27, 1864.—'Vacation Tourists and Notes of Travel, in 1862 and 1863,' edited by Francis Galton, Esq. Alexander Lehmann's 'Reise nach Buchara und Samarkand in den Jahren 1841 und 1842.' 'Mémoires sur la Chine,' par le Comte d'Escayrac de Lauture. 'Voyage of the *Novara*,' by Dr. Karl Scherzer. (3 vols.) 'Manual of Geology,' by James D. Dana, M.A. 'Dictionary of Geography,' by Alexander Keith Johnson. 'Report upon the Plains and Rivers of Canterbury, New Zealand,' by W. T. Doyne. 'A Mission to the King of Dahome,' by Captain Burton. (2 vols.) Continuations of 'Journals,' 'Transactions,' &c. &c.

ACCESSIONS TO THE MAP-ROOM since the last Meeting, June 27, 1864.—Map of Prussia, on 12 sheets, by the Prussian Government, scale 1 inch to $9\frac{1}{2}$ miles. French Charts, 91 in number. Maps of New Zealand, by the War Office. Maps of Algeria, by the French Depôt de la Guerre, 8 in number, various scales. Topographical Map of France, published on 258 sheets, scale $\frac{1}{80000}$: received 193 sheets. Russian Maps of Asiatic Russia, on 6 sheets, presented by M. A. Hippius. Ordnance Maps—Parishes, Towns, Counties in 6276 sheets; Domesday-Books, in 33 vols.; Area-Books, 341. Admiralty Charts, 27 sheets, up to publication. A Manuscript Map of Captain Speke's routes in Eastern Africa, presented by the Family of Captain Speke, scale 1° to 3 inches. A Manuscript Map of the Dutch Ladies' route in the district of the Bahr el Ghazal, presented by J. A. Tinné, Esq.—Total, 6328 sheets.

The PRESIDENT opened the Session with the following observations:—

Assembled as we now are to commence the thirty-fifth Session of this Society, we begin, as last year, with the consideration of those geographical problems regarding the interior of Africa which are still in process of solution. This is indeed a very natural course; for, whilst our enterprising countrymen well know that, of all distant regions, Africa offers the widest untrodden field for their researches, they also feel that, being the most difficult and hazardous, the greater will be the honour and distinction gained by its successful exploration.

It was this stimulus that urged onward the distinguished explorer Speke, who, on his return last year with his companion, Grant, received, not only at our hands, but at those of the nation, a tribute of approbation never to be forgotten, and which will long serve as an incitement to future travellers. In the interval which has elapsed since the brilliant reception of Speke in this hall, we have had, alas! to lament the loss of that gallant spirit. The catastrophe of his death naturally threw a gloom over the proceedings of our associates at the late Meeting of the British Association at Bath. As the President of the Section of Geography and Ethnology, it fell to my duty to transmit a few words of condolence to his afflicted parents, as coming from the united body of Geographers and Ethnologists; and subsequently I had the melancholy privilege (in conjunction with Grant and Livingstone) of following to the grave the remains of the undaunted traveller who had thus been taken from us in the zenith of his career, at a time when he ardently desired to win new triumphs in the chosen field of his researches.

I am sure, gentlemen, you will desire, as I do, to honour the memory of the man who was the first among Europeans to traverse Equatorial Central Africa from south to north, and who, proceeding from his own lake, Victoria Nyanza, followed its waters to the mouth of the Nile. Imbued with this feeling, I lost no time, after his interment, in taking steps towards the erection of a monument to his memory, by means of subscription; and I am happy to find that already a number of my colleagues have affixed their names to the list which, after the additions it may receive in the days following this meeting, will go forth as our appeal to the public.

At our next anniversary it will be my duty to give you a brief sketch of the life of this devoted explorer; and in the mean time, whilst inviting you to subscribe to his memorial, I may add that our object is simply to obtain a sum sufficient to erect an obelisk similar to that which was reared in honour of Lieutenant Bellot



who perished in the search after Franklin. On this monument the name of John Hanning Speke will stand out as the simplest and best eulogy of his main achievement.

Apart from this sorrowful episode, the proceedings of the Geographers and Ethnologists at the Bath meeting were eminently successful. I may say it with satisfaction, that this Section of the British Association (a section formed on a suggestion of my own in 1847) has now become so attractive, that it is, if possible, more numerously attended than that of Geology, which had hitherto taken the lead in popularity. A generous and healthy rivalry like this, is a sure sign that much is common to the two noble sciences of Geography and Geology, and that the cultivators of the one are effectively throwing light on the researches of the other.

Referring you to the published Reports for an account of the numerous interesting and original papers which were read before the Geographical Section at Bath, I must here call especial attention to one portion of our proceedings. A recommendation was proposed by our indefatigable associate Mr. Findlay, having for its object the continuation of those researches into the depth of the ocean and the nature of the sea-bottom that attracted so much attention a few years ago. This was considered to promise such decided advantages to science, that I had sincere gratification in obtaining the sanction of the Association at large to the recommendation, and a Committee was nominated (consisting of Admiral Collinson, Mr. Findlay, and myself) for the purpose of requesting Her Majesty's Government to cause the vessels of the Royal navy to be furnished with the apparatus adapted by Dr. Wallich and used by H.M.'s ship *Bulldog*, commanded by Sir L. M'Clintock, in order to pursue these important investigations. It is to be hoped, in the wording of the recommendation, that the exigences of H.M.'s navy and the discipline of the ships may permit these researches to be carried out, at least to some extent, and that the records may be forwarded to the Hydrographic Department, and the specimens to the Geological Museum, where they may be rendered available to the public.

To pass on to the subjects for consideration at this our opening meeting, I have to say that the first memoir to be read is one by Captain Burton, on the highly interesting subject of the drainage of Central Africa, particularly as regards the head-waters of the Nile; and I have no doubt that this energetic and accomplished traveller will so put the case as to arouse in us the strongest desire to see cleared up, by renewed expeditions, this great question which was so ably set forth by Dr. Beke, whose views have since been

supported by the geographer Findlay, as well as by the antiquarian researches of Mr. John Hogg and Mr. Vaux. It is true that one or more of these points may probably be elucidated by the enterprising Baker, direct news from whom we are all now eagerly awaiting; for, according to the accounts gleaned by Petherick from the men belonging to an Arab trader, Baker had recently visited some great lake, probably the Luta Nzigé.

After the last journey of Livingstone towards the northern end of his lake Nyassa, when he came to the conclusion that no large water flowed into it from the north, it has become evident that no problem concerning the internal drainage of Africa can be more deserving of attention than the configuration of the country between the northern end of Nyassa and the southern end of Tanganyika, an interval of about 360 miles. To fill up this void in our maps of Africa, and to settle the great question to be brought before us this evening, I venture to say that (with the exception of Livingstone himself) no one is more competent than his former coadjutor, Dr. Kirk, should he have the opportunity to lead an exploring party in this direction. His union of varied Natural History knowledge, undaunted perseverance, and acclimatised constitution, not to forget his conciliatory manners, eminently fit him for an enterprise which would task the resources of most travellers.

Another communication to be laid before you this evening will be a recent letter from M. Du Chaillu, addressed to myself,—one of several which he has written to his friends in this country on the eve of his departure for the unknown interior of Western Equatorial Africa. I doubt not that this letter will meet with approval, even on the part of those who most criticised the narrative of his former journeys; for it exhibits the honesty and tenacity of purpose, as well as the lofty aims of this courageous explorer. After occupying several months in accumulating large collections of Natural History objects, which he has forwarded to London (including large specimens of the Gorilla in the preserved state for presentation to the British Museum, and a live Gorilla to be offered to the Zoological Society), the solitary explorer has now departed on his errand to reach the central watershed of Africa, where he supposes that the Congo, as well as the western branches of the Nile, take their origin.

Our Assistant-Secretary, Mr. Bates, has performed the useful duty of abridging, for communication to this meeting, a portion of the voluminous notes of the late Richard Thornton, referring to his exploration of the snow-capped mountain of Kilima-ndjaro. Mr. Thornton, in the earliest and last parts of his scientific career, acted



in co-operation with Dr. Livingstone on the Zambesi, and in the interval was the companion of Baron von der Decken in his first remarkable expedition. The results of the labours of this fine young man, so prematurely cut off, must be divided between the Geological and the Geographical Societies; for Richard Thornton possessed just the character which I can best appreciate, namely, that of a man who unites in his own person the power of deciphering the outlines of the surface of the earth with that of explaining the structure of its crust and the changes it has successively undergone.

Before we proceed to the business of the meeting, let me inform you that I have received a letter from our medallist of last session, the Baron Charles von der Decken, written from the Seychelles Islands, on his way to Zanzibar, where, doubtless, Her Majesty's Consul, at the instance of Earl Russell, and our naval officers, by the direction of the Duke of Somerset, will do everything in their power to facilitate his putting together the river-steamers which he takes with him, and by which he hopes to ascend the Jub, or some neighbouring river. To carry his enterprise to a successful conclusion, this self-sacrificing explorer will need the assistance of the Egyptian authorities, as it is his intention, if possible, to cross the watershed which divides the East African rivers from the basin of the Nile, and, possessing only a formal passport of the Pasha, he has applied to me to procure for him a firman of a more influential character. This, I am happy to say, is in a fair way of being arranged, as I have obtained from Sir H. Bulwer, Her Majesty's Ambassador at Constantinople, a promise that he will take such steps as he doubts not will speedily procure the transmission to Zanzibar of a firman, giving to Baron von der Decken the means of obtaining the aid he desires. Thus we may hope that from the east as well as the west side of Africa, successful explorations will soon lay open many portions of the interior of that continent which still remain unknown.

The interest which the public and ourselves take in all questions of African exploration will, I am happy to say, be kept alive through the ensuing session by the publication of Dr. Livingstone and Mr. Charles Livingstone's narrative of the expedition to the Zambesi and Lake Nyassa; and also by the issue of a volume by the gallant Capt. Grant, before he returns to military service in India, entitled 'A Walk across Africa,' in which the domestic scenes of the natives of Equatorial Africa will be vividly described.

In concluding, allow me to say that, in discussing any African questions in which theory is involved, I trust our proceedings may be conducted as heretofore with that mutual good feeling which has

always characterized them. Let discussions which assume too disputatious a character be confined to the various periodicals open to such contributions, where the contending parties may find full space to advocate their respective views. Exciting as these topics are, and valuable as they often prove in leading to great discoveries, their real importance must be determined by the testimony of such patient observers as Livingstone and others now happily present in this room, whose well-defined observations are recorded in the volumes of our Society.

Lastly, let me congratulate you on our increasing prosperity, as testified by the cheering fact that, at the present meeting of the Session, no less than thirty-seven candidates desire to be enrolled among the Fellows of the Royal Geographical Society.

Captain R. F. Burton then read the following Paper—

1. *Lake Tanganyika, Ptolemy's Western Lake-Reservoir of the Nile.* By Captain R. F. Burton.

The author commenced by expressing his recognition of the many noble qualities of Captain Speke; his courage, energy, and perseverance. But he could not accept his "settlement" of the Nile. There were five objections to deriving the true Nile from the supposed Victoria Nyanza. 1, the difference in the levels of the upper and lower part of the lake; 2, the Mwerango River rising from hills in the middle of the lake; 3, the road through the lake; 4, the inundation of the southern part of the lake for 13 miles, whilst the low northern shore is never flooded; 5, the swelling of the lake during the dry periods of the Nile, and *vice versâ*. It might, however, be observed that, whilst refusing to accept the present settlement of the great problem, he in nowise proposed to settle the question: this must be left to time. Dr. Livingstone and Dr. Kirk, in their recent exploration of Lake Nyassa, threw remarkable light on the question, inasmuch as they had stated their convictions to be that no great river entered this lake from the north; the drainage of Lake Tanganyika, therefore, could not lie towards Lake Nyassa. Moreover, Dr. Kirk had informed the author that there was no community of species between the shells collected by Captain Burton in Tanganyika and those collected by Dr. Kirk in Nyassa; besides the "salt weed" (*Potamogeton pectinatus*, with *Valisneria spiralis*) found in Nyassa was unknown in Tanganyika. With regard to the effluence of the waters of Tanganyika in the opposite direction, namely, towards the Nile, Captain Burton confessed that what he learned when on the lake in 1858 militated against the supposition of a northern outflow. The information received about



the river connected with the southern end (River Marungu) was, however, quite positive to the effect that it entered the lake. Seeing now the difficulty of imagining a reservoir 250 miles long, situated at a considerable altitude in the zone of constant rains, without efflux, he was inclined to reconsider the question of an outflow to the north. The crescent-shaped "Mountains of the Moon," which appeared in a sketch-map published by Captain Speke ('Blackwood's Magazine,' August and September, 1859), surrounding the northern end of Tanganyika, Captain Burton showed to be a mere invention, and stated that in a later map of Speke's presented to the Society those mountains were no longer depicted. Many years ago Mr. Macqueen received from a native of Unyamwezi the statement, "It is well known by all the people there, that the river which goes through Egypt takes its source from Lake Tanganyika" ('Journal of the Royal Geographical Society,' vol. xv. pp. 371-4); and even Captain Speke, on his return from his first journey, recorded that a respectable Arab trader had informed him that he saw a large river which he was certain flowed out of the northern end of this lake, for "he went so near its outlet that he could see and feel the outward drift of the water" ('Blackwood,' September, 1859). Mr. W. S. W. Vaux has advanced the opinion that the drainage of Tanganyika is to the north, and Mr. John Hogg and Dr. Beke have also written to the same effect; Mr. Hogg pointing out that Tanganyika corresponded to the Zaire, or Zembre Lacus, or Western Lake-reservoir of Ptolemy. As to the level of Lake Tanganyika, given as only 1844 feet above the sea-level, this would be fatal to the supposition of its water falling into Lake Luta Nzigé and the Nile, if there were not great doubts of its correctness. The thermometer used in making the observations by the author and Captain Speke was a most imperfect one, and liable to an error which would make a difference of 1000 feet. The levels of Victoria Nyanza, Luta Nzigé, and the Nile at Gondokoro, as given by Captain Speke and Mr. Petherick, are also equally irreconcileable with the connexion of Victoria Nyanza with the Nile. The principal alterations which the author would introduce into Captain Speke's map were as follows:—1. Draining Lake Tanganyika into the Luta Nzigé. 2. Converting the Nyanza into two, three, or a larger number of lakes. Captain Speke saw only 50 out of the 450 miles' circumference of the lake; the rest was all hearsay, and, according to Speke himself, *Nyanza* meant equally a pond in the palace, a piece of water, whether pond or river, and the Nile itself. He travelled in the conviction that the lake was on his right; but he never verified that conviction. Irungu of Uganda expressed to Speke

('Journal,' &c., p. 187) his surprise that the traveller should have come all the way round to Uganda when he could have taken the short and well-known route *viâ* Masai-land and Usoga, which would be straight across the lake as depicted on Speke's maps. 3. Detaching the Bahari-Ngo from the Nyanza waters, which drains the mass of highlands between the equator and 3° s. lat., and sends forth the Asua River, which the author believed, together with Miani and Dr. Peney, to be the trunk-stream of the White Nile. He thought it probable that the white colour of the Upper Nile might be due to glacial water contributed by the Asua, which flowed from the snow-covered mountains to the south-east. The author concluded by expressing his conviction that the "great Nile problem," so far from being "settled," was thrown farther from solution than before. The exploratory labours of years, perhaps of a whole generation, must be lavished before even a rough survey of the southern Nilotic basin can treat the subject with approximate correctness of detail. "Mais les sources du Nil, sont elles decouvertes?" enquires Malte-Brun. "Nous ne le croyons pas." No geographer does, no geographer can, believe in the actual "settlement" of the Nile sources. That the Tanganyika is the Western "top-head," not source, of the Great Nile, and that the Bahari-Ngo, which supplies the Tubiri, is the Eastern, he had little doubt. But the Arcanum Magnum of Old World geography has not yet been solved. It still remains to this generation, as to its forefathers, "Caput quærere Nili"—to close the canon of geographical discovery.

The PRESIDENT, in returning the thanks of the Society to the author of the Paper, said he was sure Captain Burton would bring the subject forward in such a manner as to elicit a lively discussion, which he hoped would now take place. But Captain Burton knew as well as himself that the great question as to the ultimate sources of the most distant lake whence the Nile flowed could never be settled except by further explorations; and Captain Burton would accomplish much in the interests of geography if his paper proved to be the means of inciting other explorers to clear up the question. Geography is a progressive science, and its facts can be established only by actual exploration. He only hoped that Dr. Kirk, or some gentleman like him, might be induced to go to that portion of the globe, and clear up the doubts that still hang over the question of the sources of the Nile, as well as that of the real watershed of Southern Africa. Captain Burton had let fall an expression as to his wish to ascend to the sources of the Niger. It was only justice to that gentleman to state that during the interval between his quitting the Fernando Po Consulate and taking possession of his new appointment in the Brazils, he offered to determine the sources of the Niger by crossing from the west coast of Africa. He mentioned this to show what an energetic traveller Captain Burton was.

DR. LIVINGSTONE wished to say a few words in confirmation of what Captain Burton had said about the region north of Lake Nyassa. He would begin by saying that he was quite correct in his definition of the meaning of the name "Nyanza" or "Nyassa," both meant simply a piece of water. The most frequent name of Lake Nyassa was Nyanza, not Nyassi; but he would



continue to call it Nyassa, as it was the name by which it was generally known in Europe. When he went up the Lake Nyassa last year, he wished to go round to the north end of it, in order to ascertain whether a large river did not flow into that part of the lake. He was, however, prevented from doing so by a colony of Zulus, whom he believed to be very unfriendly, and who had desolated the whole of the country to the north and west of the lake. On that account he went away to the west from Kotakota Bay, hoping that when he had got about one hundred miles from the shores of the lake he would be able to get round to the north. Before he had got that distance, however, he saw so many rivers flowing into the lake in the driest portion of the year, and such abundant evidence of a very humid climate—the trees covered with lichens—that he came to the conclusion that the lake did not at all require a large river to flow into it from the north. From Kotakota he looked to the west, and saw, as it were, a range of high mountains, some ten or fifteen miles off; but when he reached the top he found it to be the edge of a plateau which, according to the boiling-point of water, was 3440 feet above the level of the sea. He then went straight west, nearly 100 miles from the lake, and found, first of all, that certain rivers flowed away back into the lake, and then a great number of shallow valleys exactly the same as he had found in Londa (or Lunda), in the middle of the country. Some of them had rivers flowing away to the south-west; and he was told by the people that they flowed into the Loangwa, which entered the Zambesi at Zumbo. Another river flowed to the N.N.W., called "Moitala," or "Moitawa," and which they said flowed into Lake Bemba, a lake ten days distant, which had not yet been discovered. He met a number of tribes called Babisa, who were great traders, and travelled far and near in search of ivory; these maintained that a river called "Loapola," or "Luapula" flowed out of Lake Bemba to the west. It flowed west, and then formed another lake called "Moéro," or "Moélo." Emerging from that it formed still a third called Mofué: and then passing near to the town of Cazembe, it turns away to the north, and falls into the Tanganyika. That was the statement of those men. He (Dr. Livingstone) wished very much that it had flowed according to his previous ideas, down towards the Zambesi; and he tried some of the men by saying: "It does go that way; it does go to the Zambesi?" The men spoke to each other laughingly and said, "He says the Loapola goes away to the Zambesi. Did you ever hear such nonsense?" He was forced to believe that the river actually did flow away to the north-west, and into Tanganyika. The next question he put was, "What became of the water that flowed into the Tanganyika?" But not one of them could answer it—not one could tell whether the Tanganyika had an outlet or not. That was all he knew about it. He might also say something about the Casai. When going away to Loanda, he crossed a river about the size of the Clyde, at Glasgow, flowing away to the north-east, which seemed to indicate a hollow in that direction; but when he got still further to the north, to the Portuguese at Cassange, he was assured that the river was the main branch of the Congo. He crossed another called the "Coango," or "Quango," which also indicated that the country to the east of it lay low; but whether the Tanganyika had an outlet in that direction, or an outlet away towards the Nile, he did not know, and he did not suppose anybody else did. That was a question to be decided. As he intended to leave England and go to Africa as soon as he had completed the book he had in hand, he might again visit those parts to which he had alluded; but he did not like to promise what he should do, for he always remembered a saying of his father who, he believed, quoted from a much wiser man:—"Let not him that putteth on his armour boast himself as he that putteth it off." He saw no difficulty, however, in the way of reaching that country. There was high land extending all along about 300 miles from the coast; and if they could get on to

that high land, they might enjoy pretty fair health, and without much difficulty settle the question as to whether the watershed is in the south or still further to the north. The plant which Captain Burton referred to could not possibly be in the Tanganyika, or else he must have seen it. After every storm in Nyassa it lay along the shore in a thick mass; and the people collected it to burn for salt.

Mr. Galton said he was sure that all who might take part in the discussion would feel themselves embarrassed by the reflection that, although Captain Speke had been amongst them for more than a year and a half, this was the first time his conclusions had been criticised in this room. Those who spoke might feel that they incurred the imputation of want of generosity in criticising poor Speke, for the first time, now that he was no more. But, in fact, his conclusions could not have been questioned before, for this was the first meeting of the Society subsequent to the time when the whole of Captain Speke's data had been in their possession. After Captain Speke's return, his voluminous manuscripts were returned to his hands, that he might therefrom compose his book. The book, as they were aware, appeared after some delay; but that book did not contain those strict, hard geographical facts which were wanted. They, therefore, waited yet further for a paper that it was his duty to send them. That paper was sent, and reached them at the close of last season; and he appealed to Sir Roderick to confirm him in saying that the paper did not contain any new geographical matter, but mainly insisted upon the accuracy of what he had published in his general narrative. They could not, therefore, until then feel sure they had all the facts before them. He thought the theory, so ably propounded by Captain Burton, of the Tanganyika having a northern outlet, had very much to commend it; but he must at the same time state that although, no doubt, the theory had occurred independently to Captain Burton, yet it was promulgated many months since by another eminent geographer, Mr. Findlay, and had been for months past much discussed and much approved of. But it must not be forgotten that this theory involved a reversal of the data that Captain Burton had previously given them. In his paper on the subject of his journey he stated that the Tanganyika was like the Dead Sea; its name "Tanganyika" meant an *anastomosis*—a meeting together of waters;—and that it was a place from which there was no outlet. When Captain Burton returned from that journey he would not hear of the possibility of a river running out of the lake. But *nous avons changé tout cela*. He said this without the slightest disparagement to the ability of Captain Burton, but simply to show how tolerant they ought to be of any mistake into which poor Captain Speke might have fallen, and above all that his admirers might not be tempted to ascribe infallibility to his conclusions. He was very glad that Captain Burton had so prominently brought forward the small value to be attached to the levels taken of the Lake Tanganyika; and he was sure Captain Speke himself would have equally acknowledged it. That elevation was taken with a most miserable instrument, the others having been broken. It was a common thermometer, such as might be purchased for a shilling; and if they considered that, in a thermometer of that kind, a difference of the elevation of the mercury not much greater than the breadth of two pins would correspond to a difference of level of about 500 feet, they would see how utterly absurd it was to build any theory upon small differences of supposed level. He saw nothing whatever in altitude of the Lake Tanganyika, so far as they knew it, that should contradict the possibility of that lake running into the Nile. But as regards the Victoria Nyanza, he did not think Captain Burton's theory was quite so happy. Captain Burton did not believe in the possibility of the lake that Speke saw in his first journey being continuous with that of Uganda, and continuous again with the Ripon Falls; but Captain Burton, who assigned such great weight to all Arab information, in his own earlier paper published



by the Geographical Society, gave an account of the country from the information received by himself, and spoke of that lake as entirely continuous. He (Mr. Galton) did not say that Captain Burton stated in so many words that it was continuous, but he implied it throughout. He (Mr. Galton) would take that opportunity of giving his tribute of admiration to the wonderful accuracy with which Captain Burton's information was then gathered, as tested by the facts subsequently confirmed by Captain Speke himself. They would read in Captain Burton's paper a complete and just foreshadowing of Captain Speke's journey, at least as far as Uganda. Captain Burton spoke of a road through the lake, as he (Mr. Galton) understood it, on the assertion of Irundu, that there was a shorter and direct road to the coast leading from Uganda through the Masai country, which, if he understood Captain Burton's argument aright, meant that that road must have passed through the bed of the lake. But if they looked on the map, they would see that a line drawn straight from the head of the Nyanza to the mouth of the Pangani River would pass through the Masai country and cut off a very considerable bend; and he presumed it was that to which the African potentate alluded. In regard to the Asua, Captain Speke saw the confluence of this stream with the Nile; and whatever may have been his failings in picking up information, Captain Speke certainly was a most careful mapper; and he (Mr. Galton) could not help thinking that the greatest weight ought to be attached to his distinct assertion that the Asua was a small stream compared to the river into which it flowed, and which Speke called the Nile. Miani took a contrary view; but Miani's account of the Nile was so vague (he not being a professed geographer), that it was exceedingly difficult to collate with certainty his description with that of Captain Speke. He did not, therefore, think Miani's statement of sufficient weight to overcome that of Captain Speke. He was a little astounded by the remark of Captain Burton that the colour of the "White Nile," might be due to the glacial water brought down by the Asua. It was in the knowledge of them all that the Nile below the Asua was of exceedingly small dimensions—a mere nothing compared with what it was at Khartúm. The place where the Nile became a large river was far south of its confluence with the Asua. Whatever might be brought down by the Asua, it was absolutely inconsiderable compared with the whole body of the water at Khartúm. Besides that, it would run through flats where its turbidity would be lost. The river Po received glacial tributaries; but the Po could never be considered, at its embouchure into the sea, to have anything of the character of a glacial river. All that he (Mr. Galton) had said amounted virtually to this—that he believed the northern flow of the Tanganyika into the Nile was certainly possible; and at the same time he believed that the Victoria Nyanza was a considerable lake. He had heard nothing to weaken that belief. He did not say it was of immense breadth, as shown upon Speke's map, but still he believed that it supplied the main part of the river which reached Gondokoro. If any part of the Nile did rise from the Tanganyika, its sources would reach much farther south than Captain Speke had imagined; and he therefore agreed with Captain Burton, that the Nile was not yet "settled."

The President then read a letter from Captain Grant, received that afternoon. It referred to the subject of the evening, and stated the belief of the writer that Captain Speke's account of his journey was entirely accurate. He was a careful surveyor, and took great pains in ascertaining all the main geographical points of the expedition. The writer explained that Speke's "Mountains of the Moon," as they appeared on his earlier published maps, were merely an exaggeration of the engraver, originating not with him, but in some foreign map made in Germany.

Dr. Murie said Captain Burton had given five reasons why the Lake Nyanza cannot be the source of the Nile. He had been unable to catch all these reasons in detail; but to those which he had heard he would reply. The first reason

assigned was the difference of level between the northern and southern portion of the lake. Because there is an overflow at the southern portion, the inference is drawn that the lake does not run northward. Another reason was, that the lake and the Nile do not rise and fall in unison. Could these things be explained? He thought they could. First, with reference to the question of levels, it was possible the lake might overflow its banks at the southern portion, while at the same time it might flow to the northward. The difference of apparent rise might be accounted for, if at the northern portion the sides of the lake were steep or formed a gorge, where there could be no overflow, while in other parts, where the shores are flatter, there would be more likelihood to flood when heavy rains occur. With regard to the other point, the river being high when the lake is low, that was also capable of explanation. Mr. Galton was the first to determine that Lake Nyanza did not rise and fall very much. The equinoctial rains fall over a vast extent of country; and as they move northward, the lake, being situated at their equatorial limit, would be the first to sink; the river would decrease more gradually, because the rains in that part of the country would continue falling till a later period. The Nile, therefore, would still be high after the lake had begun to fall. It seemed to him that there was much more truth in what Captain Speke said than what he himself seemed to be aware of. Captain Speke claimed to have found the head-waters of the Nile. He did not say Captain Speke had completed Nile discovery—very far from it; but from what he had himself seen, as far as Gondokoro and the region east and west, he was inclined to think that Captain Speke had at least reached very near the head-waters. He also differed from Captain Burton in supposing that the Lake Tanganyika drained northwards, entering Lake Luta Nzigé, and then passing into the Nile. He believed it was possible that the Tanganyika had not an outflow towards Lake Luta Nzigé. It was known, through Dr. Barth, that there was a river flowing towards the west. Dr. Barth, in his journey to the sources of the Niger, was told that a large river, further south, flowed from the east towards the west; and when Consul Petherick was in the region eastward of that point, his men having travelled ten or fifteen days southward, also heard of a river flowing to the west. Where then was this body of water derived from? Might it not be the drainage of Tanganyika quite as probably as that this lake drains towards the Luta Nzigé? This, moreover, would be the proper quarter to look for the sources of the large rivers which flow to the west coast near the equator. Until further explorations it could not be concluded that what Captain Speke said had been disproved: we should at least wait until the Tanganyika was found to enter the Nile, before concluding that he was in error.

Mr. J. Ball said the chief testimony they had to the non-connection between Tanganyika and Nyassa was the belief of Dr. Livingstone, the man who was best able to form a belief; and, as far as it went, it was excellent testimony. The other reason assigned was, that two species of plant were said to exist in Nyassa, and not in Tanganyika. No naturalist would attach the slightest importance to that negative evidence; and he merely rose to state his belief that it ought to be excluded from the discussion. *Valisneria spiralis* is found in several places in the basin of the Po, whilst absent in many others. What the physical conditions are which induce its presence in one place and its absence in others we did not know; but nothing is more probable than that conditions may exist over such a wide area as to exclude a plant from one part of a river-basin and admit of its presence in others. What is true of plants is true also of molluscs.

Captain Burton, in reply, said he perfectly agreed with Dr. Livingstone about the Southern *influent* of the Tanganyika Lake. The Portuguese, who visited the capital of the Cazembe before the opening of this century, and have kept up their knowledge of the country, always make the river an *influent*.



The German maps, grounded upon the travels of Dr. de Lacerda and Majors Monteiro and Gamitto, make it an *influent*. In fact, the "effluent theory" was cobbled up in England for the purpose of explaining a geographical difficulty. But *fas est ab hoste doceri*. If he had not alluded to Mr. Findlay his memory had been sadly at fault: the Tanganyika Lake owes much to that eminent and energetic geographer. Mr. Galton was correct in asserting that he (Captain Burton), on return, had contended for the Lake being, like the Chad, a still lake, and had now drained it into the Nile. But it is well known that Mr. Galton drained the Tanganyika into the Nyassa, which also is not the case. It is true that in previous writings on the subject he (Captain Burton) had always made, from Arab information, the Lake continuous; but the Arabs are traders and travellers, not geographers, and they care little for lakes. Arabs were generally reliable, as the 'Lake Regions of Central Africa' may prove; their habit of prayer enables them *s'orienter*, which Africans very rarely do. The Wa-Masai are one of several tribes lying between Mombas and the true Nyanza, namely, that visited by Captain Speke during the first expedition. They are not a large tribe, being joined by the Wa-Kuafi, and bounded north by the Gallas. The short cut described by natives to Captain Speke was clearly through the Lake. It would have been as round-about a march round or through the Bahari-Ngo water as round the southern end of the Lake. The confluence of the Asua with another river did not prove the latter to be the Nile. It might be, as Mr. Macqueen suggests, a stream from the Jebel Kuku. The natives directly told Captain Speke that he left the river which he had before struck. The Asua has been described by Captain Speke as an unimportant branch, but Mr. Consul Petherick is said to have measured it, and to have found its volume equal to that of the other affluent. Since the days of Werne we are told by explorers from Egypt that the Nile then becomes a rocky stream, rising from the hills to the *south-east*. Captain Speke conjectured it to spring from a lake to the *south*. M. Miani appears deserving of credit as regards the celebrated tree; for after carefully reading Captain Speke's account ('Journal,' &c.), one cannot understand where he places it. In his map it is west of the Nile. M. Miani distinctly declares it is on the east side of the larger river. With respect to the theory of glacier water producing the whiteness of the true Bahr-el-Abyaz, he (Captain Burton) merely suggested its pointing in that direction; and Mr. Tyndall, an eminent glacialist, had called attention to the subject in 1857. With regard to the letter from Captain Grant which had been read, his reply to that traveller's testimony to Captain Speke's accuracy of statement was that he had much to learn in that line. Captain Speke was no linguist, and he could not collect authentic details from Arabs or from Africans. The Nyanza has not been examined, except mentally, by Captains Speke and Grant. Captain Grant was mistaken in supposing that no flora were gathered by the first expedition; a few specimens from the lower levels were sent to Sir William Hooker, and the boxes containing the others were either damaged or lost. Finally, Captain Grant has taken upon himself to state that Captain Speke's Lunar Mountains were a mere exaggeration of the engraver, and that Captain Speke himself used to laugh at them. Such assertions compromise. Captain Grant had only to visit Mr. Findlay, or the map-room of the Royal Geographical Society, and inspect Captain Speke's original sketches. He would see upon them the "Mountains of the Moon," at the north end of Tanganyika, as well developed as in the printed maps. In reply to Dr. Murie, the speaker gave him full credit for having invented the "sort of backwater" to the Nile called the Luta Nzigé. It was a triumph of intellect to make the Nile on its route to Egypt turn towards the Cape of Good Hope and fill up some 160 miles' length of lake. Dr. Murie had explained the flooding of the Nyanza's southern shore, and the non-flooding of the northern, by the supposition that the latter has a gorge, and that the Lake ("Victoria

Nyanza") cannot help it. But this is surely a new theory about lakes. He (Captain Burton) was perfectly aware that the rivers about the Gondokoro Plain had more to do with the annual inundations than the melted snows; but it was a sad mistake to conceive that rain falls all round the lake in very great quantities. The plateau on the east, and Unyamwezi to the south, have light rains, often droughts. The fact is, because the rains are continuous about Gondokoro, where Dr. Murie was, he would extend them all around the supposed "Victoria Nyanza:" which is distinctly not the case. The northern and southern hemispheres, so far from flooding "in unison," act upon the rule of contrary, as those who have been in both well know. Finally, with respect to the river which Dr. Murie made, from native information, to flow westward from the Tanganyika, and with respect to draining the Congo River from that, he must be allowed to differ from Dr. Murie *toto cælo*. Dr. Barth never was where Dr. Murie placed him, and is the last man to admit that either the Congo or Niger derive their waters from the Tanganyika drainage. In conclusion, with regard to the dissimilarity of specific forms in fauna or flora arguing want of continuity in the lakes discovered, the speaker would refer Mr. Ball to Dr. Kirk, a man of science, who attaches some importance to the phenomenon.

The PRESIDENT congratulated the Society upon the tone of the discussion: it had been carried on in a fair and temperate spirit. He did not think that anything which had fallen from the author of the paper ought to derogate from the appeal made to them to subscribe to a monument for Captain Speke. Whatever may have been the shortcomings of that courageous traveller—whether Captain Burton was in the right and Captain Speke was in the wrong, as to the ultimate sources of the Nile,—Captain Speke, he repeated, was the first European who, with Captain Grant, had traversed Equatorial Africa from south to north; the first to discover the Lake Victoria Nyanza, and the first to follow its waters down to the mouth of the Nile. These feats well merited a memorial. As to the great question at issue, nothing but further explorations by such men as Livingstone, Kirk, or Burton, could decide it.

Mr. MARKHAM then read the following extracts from a letter of Mons. P. B. Du Chaillu to Sir Roderick I. Murchison:—

"Fernand Vaz River, Aug. 20th 1864.

"My scientific instruments and watches reached me at the end of last month. I cannot express to you how happy I felt when this long-expected box came into my hands. I promised, in my last, to tell you what I intended to do. Now, do not laugh at me as a visionary when I say that I propose to strike out for the interior, and follow out the line of the equator (or thereabouts), as far as possible, until I meet some of the rivers falling into the Nile, and then come down the great stream until I reach the Mediterranean. I do not wish in the least to detract from the labours of Captains Speke and Grant, but I think there are other rivers or lakes far to the west of those they saw, and which fall into the Nile. In fact, I believe there is no proper source of the Nile, but that a certain number of rivers and lakes, rising somewhere near the equator, form what we call the Nile. Before leaving England I thought I would only try to reach seven or eight hundred miles inland, and there establish myself for a while amongst the "Sapadi;" but I have now come to the conclusion that, if no obstacles prevent me from going further, I will push forward, and then be guided according to circumstances. It is a great undertaking, and I am perfectly aware of the dangers attending such an expedition. I know that perhaps I may never come back, or may not have bodily strength to accomplish what my heart desires; it may be my fate to die a poor, lonely traveller, but I will try my best, and see no disgrace if I fail. I know, and you know also, that I have no other aim than that of enlarging our knowledge of this unknown part of Africa. I shall be obliged to take about 100 men with me, and shall start in a few days. I have sent to the British Museum some specimens of natural history, among which are seven skeletons of the gorilla and six skins preserved in salt. There are also a very curious ant-eater, probably a new species, and two skeletons of the chimpanzee. Among the live stock I have embarked a live gorilla. A few days before the departure of the vessel I had three of these animals alive; one of them, an adult female, caught after being wounded: it was a fearful sight to see the large animal, bound hand and foot, screaming with rage. Captain Holder, of the *Cambria* of Bristol, saw the three alive, and I have, besides, taken photographs of two of them."



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2. *Journey to Kilima-ndjaro.* By the late RICHARD THORNTON, Esq.

THIS was a condensed account, from the voluminous MS. Journals of the late Mr. Richard Thornton, of the journey to Kilima-ndjaro, in which he accompanied the Baron von der Decken, as his scientific companion. The party left Mombas on the 29th of June, 1861, and proceeded first to the elevated country from which Mounts Killibassi and Kadiaro rear their peaks. This district is inhabited by the Wa-teita, a fierce tribe, who showed great hostility to the party, the fighting men assembling to the number of 200, and threatening the lives of the Baron and his two white companions. One of the principal objects of their stay at this point was, however, accomplished, namely, the determination of the altitude of Mount Kadiaro, which proved to be 4130 feet—a much lower elevation than that assigned to it by the missionary traveller Rebmann, which was 6000 feet. On leaving this district they diverged from the direct route and marched S.W. to the Paré Mountains, and thence, proceeding northerly towards Kilima-ndjaro, skirted the eastern shores of Lake Jipé, a sheet of water 20 miles in length, and in its wider parts, 3½ miles broad. The first attempt to ascend the snowy peaks was from Kilema, on the south-eastern slopes, whence