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LIVINGSTONE AS AN EXPLORER[1]

DAVID LIVINGSTONE, it is scarcely necessary to remind you, was of Highland descent, his grandfather having been a crofter on the little island of Ulva, off the west coast of the larger island, Mull. In appearance he showed clearly that the predominant strain in his ancestry was what we call Iberian for want of a more definite word. That is to say, that he was of that very old racial strain still existing in western Scotland, western Ireland, Wales and Cornwall, which has apparently some kinship in origin with the peoples of the Mediterranean, and especially of Spain and Portugal. Indeed, according to such descriptions as we have of him, and such portraits as illustrate his appearance, he was not unlike a Spaniard, especially in youth and early middle age. His height scarcely reached to 5 feet 7 inches, his hair and moustache, until they were whitened with premature old age, were black, his eyes hazel, his complexion much tanned by the African sun, but at all times inclining to sallow. He possessed a natural dignity of aspect, however, which never failed to make the requisite impressions on Africans and Europeans alike. Bubbling over with sly humor, with world-wide sympathies, and entirely free from any narrowness of outlook, he possessed a very strong measure of self-respect, coupled with a quiet, intense obstinacy of purpose.

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[1] From the address to commemorate the centenary of the birth of Livingstone given before the Royal Geographical Society, London, and the Royal Scottish Geographical Society and printed in the journals of these societies.

Let us briefly consider his achievements as a geographical discover. He directly inspired the search for Lake Ngami, and was the main agent in carrying South African exploration beyond the arid plateaus of Bechuanaland and the Kalahari desert into what is really the Zambezi basin. Oswell and Murray contributed to the cost of his journeys, but he by his influence found the guides and secured the friendship or the neutrality of the native chiefs. He acted as interpreter-in-chief, and, thanks to the mastery he had acquired over the Sechuana language, was able to converse fully and freely with the natives of South-Central Africa. He also picked up a considerable knowledge of other dialects. He served diligently and skilfully as physician and surgeon all who were connected with these journeys. But his own predilections were for botany, zoology and the study of man. It was the impression that native reports of his character had made on Sebituane, the Makololo conqueror of the upper Zambezi, and the resultant protection afforded, which made it so easy for Livingstone and Oswell to reach the Chobe River and the upper Zambezi in 1851.

Between 1852 and 1856, Livingstone traced the main course of the Zambezi from its confluence with the Chobe northwards to near the sources of the Liba, and from this point westwards he was the first scientific geographer to lay down correctly the position of the upper Kasai and Kwango affluents of the Congo.

Livingstone may be quoted as the discoverer of the great Kasai (perhaps the principal among the Congo affluents for volume and for extent of drainage area). At first it would seem probable that the Pombeiros, at the beginning of the nineteenth century, must have crossed the Kasai in order to reach the court of the Mwata Yanvo. But they appear to have deflected their route southwards, after leaving the upper Kwango, so that they pass round the sources of the Kasai, leaving them to the north. Ladislaus Magyar, the Hungarian explorer and trader (who married a negress of Bihé and traveled over Angola between 1849 and 1864), penetrated about 1851 to the upper Kwango and the northwest limits of the Zambezi basin, and may have seen the infant Kasai in 1855, a few months before or after Livingstone passed by. But he did not communicate the information to the world until after Livingstone's journey, and never, I think, specifically mentioned the Kasai, at any rate, before the publication of Livingstone's book. Moreover, he was no trained geographer or taker of observations for fixing points of latitude and longitude. Silva Porto, a Portuguese trader of Bihé, reached the upper Zambezi and South Congoland in the fifties and sixties, but his wanderings resulted in no additions to the map of Africa.

It is, indeed, remarkable what Livingstone's predecessors missed rather than what they found. Dr. Lacerda reached to little Lake Mofwe, an isolated lagoon about 20 miles south of Mweru and a short distance east of the Luapula. Yet apparently neither he nor any member of his expedition, before or after his death, had the curiosity to penetrate northwards one day's journey and discover Lake Mweru, or visit the banks of the Luapula. Going through the Bisa country they heard of a lake—"Lake Chuia," or Shuia, a short distance to the westward, and knew that the Chambezi flowed into it. This was Livingstone's Bangweulu (named, as he tells us, from one of its islands). But the Portuguese of Lacerda's mission, like those of the Monteiro-Gamitto expedition of 1831–32, made no effort to locate Bangwenlu and place it definitely on the map. Lake Nyasa was

heard of (as "Nyanja") by the Portuguese of the eighteenth century and early nineteenth; but it was not till 1846 that its waters—so far as historical records go—were actually seen by a Portuguese (Candido de Costa Cardoso). Gasparo de Bocarro passed near to Lake Nyasa in 1616 on his way to Kilwa and Mombasa, but seems to have crossed Lake Malombe or the upper Shiré only, and not actually to have seen Lake Nyasa.

Returning from Angola to the Chobe River, he discovered the Victoria falls, and followed the Zambezi more or less closely down to its delta, emerging on the seacoast at Quelimane.

On his second Zambezi expedition he revealed to the world Lake Nyasa, Lake Chilwa (miswritten Shirwa), the high mountains of the Shiré region, and the course of the Shiré River, the Luangwa River to the west of Lake Nyasa, most of the northern confluents of the Zambezi in their lower courses, and the Butonga highlands. This second expedition was also the means of effecting a great increase in our knowledge of the Zambezi delta.

On his third great African journey he renewed previous explorations in the direction of the Ruvuma, and traced a good deal of the course of that East African river. He was practically the first European to explore West Nyasaland and the northern Bemba or Awemba country; he discovered the south end of Tanganyika, and made a shrewd guess at its outlet through the Rukuga (which river he styled the Longumba). He first revealed the great Mweru swamp or Chisera. ["Elephants, buffaloes and zebras grazed in large numbers on the long sloping banks of a river or marsh called Chisera." This considerable extent of alternate swamps or shallow water was afterwards rediscovered by Sir Alfred Sharpe.] Livingstone made known to us lakes Mweru and Bangweulu and the connecting Luapula River, and the course of the great Lualaba or upper Congo at Nyangwe. He also recorded the existence of the upper Lualaba or Kamolondo. He was the first European to penetrate as far north as S. lat. 3° 30′ near the Elila River, and describe the Manyuema forests with the large chimpanzis and pygmy elephants found in them. He mentions for the first time the Lomami River, and is the first explorer to hear of the country of Katanga, its mineral wealth and its—as yet—unexplored, inhabited caverns of vast size.

A month to the westward of Kazembe's country lies Katanga, where the people smelt copper ore (malachite) into large ingots shaped like the capital letter I, weighing from fifty to a hundred pounds. The natives draw the copper into wire for armlets and leglets. Gold is also found at Katanga.

Livingstone was the first writer to mention the possible existence of Lake Kivu; of Kavirondo gulf (Victoria Nyanza); and of Lake Naivasha: from Arab information, of course.

He was the first to record the existence of drilled stones in the country to the southwest of Tanganyika, which seemed to be evidence of the existence of a people of ancient Bushmen culture in that direction, and his remarks generally on the Stone Age in Africa, on the possible existence of undiscovered ancient types of mammals and of mammalian fossils, all show an enlightenment in speculative scientific imagination greatly in advance of his times. He was also in all probability the first writer since the Portuguese chroniclers of the sixteenth century to allude to the remarkable ruins of stone-built forts, villages and cities in southeast Africa. He derived his information from natives, and perhaps also from Boer hunters. He also mentions the coins found in excavating the shore of

Zanzibar Island, with Kufic inscriptions, and perhaps dating back to the ninth or tenth century A.D. (Sir John Kirk confirms this statement, and adds that some of these coins were of Harun-ar-rashid's reign, and bore the name of his viziers, Yahya or Fadl.)

His biblical studies drew him into Egyptology, and one of his incentives to the exploration of the Nile sources was the conviction that Moses when living in Egypt had taken a great interest in Nile exploration. Livingstone half hoped that in discovering the ultimate sources of the Nile he might come across archeological traces of Egyptian influence. He was not pursuing in this direction an absolute chimera.

The physical appearance of so many of the Bantu tribes between Lunda, on the southwest, and Manyuema, Bambare and Buguha, on the northeast, constantly suggested to Livingstone's mind the idea of an immigration of Egyptians into Central Africa. Had he lived to penetrate to the countries north of Tanganyika to see the Hima or Tusi aristocracy on the highlands of equatorial Africa, he would have been still more convinced of the ancient inflow of Egyptian influence into these regions: though it is a theory which it is very unsafe to pursue on the scanty evidence we possess at the present time.

When traveling from Tanganyika to Mweru in 1869, he remarks on the appearance of the chief and people of Itawa.

> Nsama, the chief, was an old man with head and face like those sculptured on the Assyrian monuments. . . . His people were particularly handsome, many of the Itawa men with as beautiful heads as one could find in an assembly of Europeans. Their bodies were well shaped, with small hands and feet—none of the West Coast ugliness—no prognathous jaws or lark heels.

There is another entry in his journal derived from Arab information which bears on this theory of the Hamitic permeation of Negro Africa.

> The royal house of Merere of the Basango [northeast Nyasaland] is said to have been founded by a light-colored [Hamitic?] adventurer, who arrived in the country with six companions of the same race. Their descendants for a long time had straight noses, pale skins and long hairs.

His journeys into southern Congoland threw a very interesting light on a native kingdom made famous by the earlier Portuguese explorations—that of the Kazembe of Lunda, whose capital was between lakes Mweru and Bangweulu.

In the early seventeenth century a great negro empire had arisen in southern Congoland, partly due, no doubt, to the arms and trade goods derived from the Portuguese, but partly also to the after-effects of the Sudanese civilization of Central Congoland under the Bushongo dynasty. This empire of Lunda ruled over all the south of Congoland and a small part of northern Zambezia.

In the early eighteenth century a member of the family of the Lunda emperor, or "Mwata Yanvo," moved to the south of Lake Mweru and founded a feudatory kingdom there. He received the title of Kazembe or "lieutenant."

Kazembe's capital was by the side of a little lake called Mofwe. Livingstone approached it along a path as broad as a carriage road one mile long, the chief's residence being enclosed by a wall of reeds 8 or 9 feet high and 300 yards square. The innermost gateway was decorated by about sixty human skulls, and had a cannon, dressed in gaudy colors, placed under a shed before it. This, no doubt, was a gift from the Portuguese. Kazembe himself had a heavy, uninteresting countenance, without beard or whiskers, somewhat of the Chinese type, his eyes with an outward squint. He smiled but once during the day, yet that was pleasant enough, though

the cropped ears of his courtiers and the human skulls at the gate made Livingstone indisposed to look on him with favor. Kazembe was usually attended by his executioner, who wore a broad Lunda sword under his arm, and a scissor-like instrument at his neck for cropping ears. This was the punishment inflicted on all who incurred the Kazembe's displeasure.

Kazembe sat before his hut on a square seat placed on lion and leopard skins.

He was clothed in white Manchester print and a red baize petticoat so as to look like a crinoline put on wrong side foremost. His arms, legs and head were covered with ornaments, and a cap made of various-colored beads in neat patterns. A crown of yellow feathers surmounted his cap. His head men came forward, shaded by a huge ill-made umbrella and followed by dependents. . . .

This Central African monarch (whose descendant was finally deposed for cruelties by the British government) bore an evil reputation; yet he was a good friend to Livingstone and put no obstacle in his path; though he politely told him that lakes and rivers only consisted of water, and that to ascertain this fact by ocular inspection would not repay him for his fatigues and outlay in trade goods!

Livingstone from boyhood had taken a great interest in botany and in the appearance of trees and flowers in the landscape. His observant glance led him to note all the more salient features of the African flora from the Cape to the equatorial forests of Manyuema. His books are full of little word-pictures of the strange, stately or beautiful trees and plants he encounters. He records in his journal the spectacle of the Crinum "lilies" of the Luangwa valley, which in the first rains "flower so profusely that they almost mask the rich, dark, red color of the loamy soil, and form a covering of pure white where the land has been cleared by the hoe." The weird stone- or pebble-like Mesembryanthemums of the Kalahari Desert, and the gouty, leafless geraniums and vividly colored pumpkins and gourds of the same region arrest his attention; the Bauhinia bushes with their golden or bluish tinted, bifid leaves, and the scale insects on them exuding a sweet manna; the noble giraffe-acacia trees, the euphorbias of very diverse modes of growth, the *Strophanthus* creepers whose seeds possess medicinal or violently poisonous qualities, the borassus and hyphæne fan-palms, the wild date, and the "noble raphias," the pandanus and dracænas of the Zambezi delta or of inner Congoland, the innumerable forest trees of northern Zambezia and southern Congoland: all are illustrated in his pages by well-chosen words and sometimes explanatory drawings; and most are correctly named, in contrast with the very unscientific nomenclature of the generality of travelers in his day.

Livingstone notices as he descends the slopes of the mountains towards the Chambezi the abundance of the fig-tree which yields the bark-cloth, so that the natives cared little for the cotton cloths of Europe and India. He also in this region observed green mushrooms, which, on being peeled, revealed a pink fleshy inside (the *Visimba* of the natives). Only one or two of these mushrooms were put into a wooden mortar to flavor other and much larger kinds, the whole being pounded up into a savory mess, which was then cooked and eaten. But in Livingstone's experience this mushroom diet "only produced dreams of the by-gone days, so that the saliva ran from the mouth in these dreams and wetted the pillow." The country on the Chambezi slope of these Muchinga mountains was devoid of game, the game having been killed out by far-reaching and long-continued drives through the hopo fences into pitfalls.

He crossed Tanganyika to resume his

search for the Lualaba in July, 1869. In his journal he recorded the abundance of pandanus screw pines off the west coast of that lake. As he traveled through the Guha and Manyuema countries he entered "the land of gray parrots with red tails" ["to play with gray parrots was the great amusement of the Manyuema people"]. The Manyuema country he describes as "surprisingly beautiful, palms crowning the highest heights of the mountains, and climbers of cable size in great numbers hanging among the gigantic trees." Strange birds and monkeys were everywhere to be seen. The women went innocently naked; and the Adams of this Eden wore nothing but a small piece of bark cloth. Both sexes atoned for their absence of clothing by having their bodies tattoed with full moons, stars, crocodiles, "and devices recalling Egyptian hieroglyphics." Yet although their country—prior to the Arab raids—seemed an earthly paradise, small-pox came every three or four years to Manyuemaland and killed many of the people.

It was in the Manyuema country that he came into contact with the large chimpanzi (*Troglodytes schweinfurthi*) of eastern equatorial Africa, whose range extends from the Welle-Mubangi River and Unyoro to the eastern bend of the upper Congo and the west coast of Tanganyika.

The soko, as he called this large chimpanzi, always tried to bite off the ends of the fingers and toes of the men with whom it fought, not otherwise doing them any harm. It made nests, which Livingstone described as poor contrivances with no architectural skill.

The Manyuema told him, however, that the flesh of the soko was delicious; and Livingstone thinks that through devouring this ape they may have been led into cannibalism. The sokos gave tongue like foxhounds; this was their nearest approach to speech. They also laughed when in play, and in their relations with the natives were quite as often playful as ill-tempered. The lion, which seemingly existed in the Manyuema country in spite of the forest, was said to attack and kill the soko, but never to eat him. The sokos lived in monogamous communities of about ten. Intruders from other camps were beaten off with fists and loud yells. If one tried to seize the female of another, the remainder of the party united to box and bite him. The male often carried his child, relieving the mother occasionally of her burden.

Rhinoceroses were shot in the Manyuema country. He also alludes to the pygmy elephant of Congoland, "a small variety, only 5 feet 8 inches high at the withers, yet with tusks 6 feet 8 inches in length"; and notes the killing of an elephant with three tusks, one of them growing out through the base of the trunk. [The pygmy elephant (*Elephas africanus pumilus*) of the equatorial Kamerun-Congo forests, was only rediscovered in the early part of the twentieth century.]

Livingstone was almost an expert in geology and petrology. He felt the keenest interest in the records of the rocks, and fully realized the importance of paleobotany. When descending the valley of the Central Zambezi in 1856 he discovered fossil remains of *Araucaria,* or of conifers now confined to South America and Australasia; and fully realized what his discovery meant in regard to ancient land connections between South Africa, India and South America. He was much impressed with the probable coal-bearing strata of sandstone throughout the Ruvuma Valley. A great many pieces or blocks of silicified wood appeared on the surface of the soil at the bottom of the slope up the plateaus. He wrote:

This in Africa is a sure indication of the presence of coal beneath.

In the sands of some of the rivers pieces of coal were quite common. He originated the theory of the rift valley of Lake Nyasa.

It looks as though a sudden rent had been made so as to form the lake and tilt all these rocks nearly over [namely, in the direction of Ruvuma].

His observations would seem to show that the level of Lake Nyasa was once about 55 feet above its present high-water mark. It is possible that at this high level its overflow of waters first of all passed into the basin of Lake Chilwa, and then flowed northwards into the Ruvuma system.

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Stanley, by relieving him when he did, gave him at least two more years of life, a certain measure of happiness, and the sweet consolation that he was not forgotten, and that the magnitude of his discoveries was appreciated. In this brief sunset glow of his life he turned his face once more towards Lake Bangweulu in order to trace the course of the Luapula to Mweru, and its junction with the Lualaba, half hoping that he might then travel down the broad stream till he entered the Bahr-al-Ghazal or the Albert Nyanza; but, although he now possessed comforts he had long lacked, and faithful, comparatively disciplined men, his strength gave out under constant exposure to rain, and to soakings in crossing rivers and marshes. Severe hemorrhage set in from the bowels, and he died of exhaustion at Chitambo's village in the swamps near the south shore of Bangweulu on May 1, 1873.

This brief record of his achievements and his sufferings may fitly close with an extract from his last journals, showing that he died a martyr to that form of religion which we call science:

In this journey I have endeavored to follow with unswerving fidelity the line of duty. . . . All the hardship, hunger and toil were met with the full conviction that I was right in persevering to make a complete work of the exploration of the sources of the Nile.

HARRY H. JOHNSTON

LECTURE AND RECITATION METHODS IN UNIVERSITY INSTRUCTION

A REFERENCE to the systems of instruction in Germany, Canada and the United States will most readily bring out the relative value of the lecture and recitation methods in university instruction. In the German and many of the Canadian universities the popular method of giving instruction consists in delivering a series of lectures and following these by a rigid final examination, while in the United States the daily recitation of textbook assignments is much more common than in the former countries. In Canada the term lecturer is frequently applied to a regular member of the faculty, but in the United States it is seldom heard except when applied to a temporary member of the university staff, who has been engaged to give a course of lectures on some special subject, and a college professor is more frequently regarded as a teacher than as a lecturer.

A student, therefore, who has been familiar with the German system or who has spent some time in certain departments of the Canadian universities, and then enters almost any of the American institutions of higher learning, will be impressed by the difference in the methods of instruction in these various countries. He has been familiar with the freedom of the lecture system where he is in a large measure placed on his own responsibility and, as a rule, may attend lectures or not as he chooses. Under this system he is inclined to feel that the professor has no concern regarding his success or failure beyond the duty of providing him with the intellectual substance of the lecture course in the best form and exacting a pound of flesh on the final examination. This notion is, as a rule, due to the lack of intimate contact between the in-