

**Local Informants and British Explorers:
The Search for the Source of the Nile, 1850-1875**

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(Abstract)

My thesis describes the praxis of geographical exploration in the mid-nineteenth century through the activities of members of the Royal Geographical Society of London (RGS). I focus on the First East African Expedition (1856-1859), which was led by Richard F. Burton. Geographical exploration was intended to provide data that would allow geographers in Britain to construct an accurate description of East Africa, with emphasis on the rivers and lakes that may contribute to the waters of the Nile and ethnographic research. Earlier geographies of the East African interior had relied upon a variety of sources: ancient, Arab, Portuguese, and local informants. In order to replace these sources with precise observation, the RGS provided some prescriptive instructions to explorers based upon the techniques of celestial navigation and surveying available for field research in the 1850s. The instructions emphasized careful, daily recording of data, using instruments as much as possible. However, in the field explorers experienced a diminished ability to control the consistency of their observations due to insufficient finances, politics, disease, and climate. Where unable to directly observe, they relied upon local informants for descriptions of the regional geography. These informants had a great impact upon the geographies produced by the expedition. In order to complete a full description of the praxis of geographical exploration it therefore becomes necessary to consider the expedition in its wider context—as a remote sensing tool for a scientific society and as a contingent of foreigners visiting a region for which they have little information and entered only with local permission. I propose that five steps, or contexts, must be considered during the analysis of expeditions: contact, acquisition, appropriation, reporting, meta-analysis. These steps make lucid the epistemic transformations that must take place as explorers gather data in the field. At each stage the identity of the individuals involved are contingent upon their relationship with each other and the information they desire. The relationship between explorers and local informants was especially critical to the establishment of credibility. Even when fully trusted by explorers, the British geographers who analyzed expedition data and generated maps of the region debated the veracity of local informants. Explorers (and by extension, local informants) found that other researchers, through the meta-analysis of expedition reports, appropriated any ownership of the information produced by expeditions.

*For my parents,
Who are always there,
Especially when I'm not,*

*And for Kirsty,
who put up with me while I was writing.*

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Prandium gratis non est!

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Introduction

The Nile is the longest river in the world and one of the few to cross the equator. Because it rises in central Africa and discharges into the Mediterranean, the river has been known to Europe since antiquity but the southern reaches of the river remained unknown to Western Geography until the late nineteenth century. The first puzzle faced when trying to understand the river was that it flowed out of a desert, unfed by any tributaries for the final fifteen hundred miles of its journey to the Mediterranean. The Nile also contributed to its own mystique in Egypt by flooding every year like clockwork. Speculation on what could cause this phenomena added to the discussion of what lay upstream. In the days of the Pharaohs, the Nile was life-bringing god. For Herodotus, Ptolemy, and other ancient geographers, it was a puzzle that challenged their understanding of the world.¹

Despite closer investigations of the lower Nile after Napoleon invaded Egypt and was subsequently routed by the British (1798-1801). The source of all the water remained unclear on European maps.² The watershed, spanning over four thousand miles in length, was simply too remote, too massive, and too complicated to observe or comprehend easily. By the 1820s, the Nile was known fairly far south, at least until Khartoum, where the river divides in to two major branches, the Blue and White Niles (the Bahr el Azraq and Bahr el Abiad, respectively). The Blue Nile can be traced from there into the Ethiopian Highlands. This branch of the Nile was better known than the other during the eighteenth and early nineteenth centuries due to an established knowledge of Abyssinia in Europe. James Bruce, the famous eighteenth century Scottish explorer announced that he had found the source of

¹ Benjamin Arbel, "Renaissance Geographical Literature and the Nile," in *The Nile: Histories, Cultures, Myths*, ed. Haggai Erlich and Israel Gershoni (Boulder: Lynne Rienner Publishers, Inc., 2000), 105.

² Research on the Nile appeared early in the RGS' publications. For an example see, J. Gardner Wilkinson, "On the Nile, and the Present and Former Levels of Egypt," *Journal of the Royal Geographical Society* 9 (1839).

the Nile during his travels along the Blue Nile from 1768-1773.³ His glory was fleeting, and by the turn of the nineteenth century, the European geographical community began to focus on the White Nile as the main branch, not the Blue Nile. Despite Bruce's work, the questions about the Nile's watercourses remained half-solved well into the nineteenth century.

Today the course of the Nile can be described from its origins. (see Map 1, page 128) A number of rivers, the strongest being the Kagera, contribute to the waters of Lake Victoria (also known as Ukerewe or Nyanza). At the northern end of Lake Victoria the waters flow into the Victoria Nile turning West through the smaller Lake Kyoga and on to Lake Albert. The Semliki River, copiously fed by waters from the Ruwenzori Mountains of Uganda and Congo-Kinshasa, contributes to the Nile via Lake Albert. At the northern point of Lake Albert the White Nile begins its journey north. A few other strong rivers contribute to the Nile, notably the Bahr el Ghazal, Bahr el Zeraf, Sobat, the Blue Nile, and the Atbara, which is the last tributary excluding intermittent arroyos.

However, when considering an atlas, the headwaters of the Nile are revealed to be intertwined with the headwaters of the two other great rivers of Central and Southern Africa: the Zambezi and the Congo. The rainy equatorial region, in which can also be found Lake Tanganyika and Lake Malawi, soaks up the water from the skies and via a web of streams and rivers, drains to one sea and two oceans. In the mid-nineteenth century trying to figure out this puzzle, distinguishing one drainage basin from the other, became an Arthurian quest for knowledge and glory. The maps of Central Africa during this time were essentially a blank, sometimes filled with hypothetical lakes, mountains, and watercourses. The Royal

³ For a comprehensive history of Blue Nile legends in Europe see, Emery Van Donzel, "The Legend of the Blue Nile in Europe," in *The Nile: Histories, Cultures, Myths*, ed. Haggai Erlich and Israel Gershoni (Boulder: Lynne Rienner Publishers, Inc., 2000).

Geographical Society of London (RGS), formed in 1831, made its prime objective during the mid-nineteenth century the mapping of this uncertain region.

This thesis will describe in detail the first major attempt made by the RGS to solve this puzzle, the East African Expedition of 1856-1859. Led by Richard Francis Burton and seconded by John Hanning Speke, the expedition proceeded to Zanzibar in order to travel west to the region where great lakes were rumored to lie. This tactic was new, previous attempts had all taken the more obvious route by following the Nile south; unfortunately the massive swamp of the Sud caused all to lose their way. In connection to this expedition, other explorers, prior to and after Burton's journey will be considered as well as the host of other sources of information available about African geography.

Writing the history of an expedition, and how it contributed to the generation of geographical knowledge requires the analysis of the entire expedition, not only the journey itself but also the preparation before it and the data analysis afterwards. It also requires widening the focus to include all the members of the expedition as well as the members of the supporting scientific society. We are also compelled to investigate the culture and politics of the people who received foreign explorers into their homelands. I have endeavored to do that here.

Explorers drew upon the previous research of historians, geographers and travelers when planning a journey. Burton studied sources from the ancient Mediterranean up to the recent Arab and Portuguese accounts about East Africa before leaving. A few European missionaries who lived on the East African coast contributed the testimony of African travelers to the body of knowledge. The expedition also drew upon the experience of other travelers in order to prepare for the technical goal of the journey—the scientific measurement of a region.

By widening the focus, I will also highlight the contribution of “locals” to the expedition as guides, interpreters, servants, porters, protectors, and most importantly, as informants. I use the term “local” as a way of including the various ethnic groups who were living in the equatorial region of East and Central African at the time. The most important locals are those like the Nyamwezi, who had set up transport economies based on caravan trade between the coast and the interior long before the Arabs took control from the Portuguese.⁴ Other societies held political control over the areas the expedition would visit and provide food, shelter, and information to travelers in exchange for goods. North of Zanzibar, towards Mombasa, there were also Somali and Ethiopian societies who had already been encountered by missionaries and explorers from the West.

In the 1850s, the East African coast north of Cabo Delgado was nominally under the Sultanate of Zanzibar, of which the ruling classes were Omani Arabs. The Arabs had colonized inland to the lake region by the 1840s and were the dominant political power of the region. They came seeking to control the trade in slaves and ivory. Also living on the coast were the Swahili, an old, urban society that dominated most of the coast of East Africa until the Portuguese outgunned them in the early sixteenth century. They controlled much of the caravan trade to the interior by the mid-nineteenth century and their language had become a common tongue among the many societies. The Portuguese living from centuries in the Zambezi valley must also be considered “local” to the region. Their power had never been great, but their presence in areas south of Lake Malawi dated from the early sixteenth century. There were also smaller ethnic groups present such as Indian Banyan merchants who did not travel to the interior much but often financed caravan trade and acted as

⁴ Stephen J. Rockel, "a Nation of Porters!: The Nyamwezi and the Labour Market in Nineteenth-Century Tanzania," *Journal of African History* 41 (2000)., T.O. Beidelman, "The Organization and Maintenance of Caravans by the Church Missionary Society in Tanzania in the Nineteenth Century," *International Journal of African Historical Studies* 15, no. 4 (1982).

middlemen in coastal towns. On Zanzibar Island, there was also a small community of European merchants, including Americans, who traded the manufactured goods of their countries for the products of the interior regions—mostly ivory and people.

All of these groups lived in East Africa, some for centuries, others temporarily, but because of racial questions of who is truly “African”, terms like “indigenous”, or the derogatory “native” may exclude certain groups. Because explorers made use of anyone who may possess detailed information about the region, I use “local” to include them all. I do not use this term in order to propose any sort of equality among these people, but rather as a way of distinguishing the foreign explorer from everyone else they met on the road. The scourge of commercial slavery had pushed East and Central Africans into a well of abuse and exploitation. The various ethnic groups of the coast captured people in the interior and eventually took them to the Arabian Peninsula for sale. This was the great disruption of life going on in East Africa at the time of Burton’s expedition.

Though they were not equals, any local could prove to be a valuable source of information about a region’s geography. This thesis will describe how explorers used locals as informants and how that information was acquired and appropriated by Europeans to develop a geographical understanding of Africa. Local information, often referred to as “native testimony”, was not an ideal form of knowledge in an era of growing empiricism. Likewise the accelerating disciplinization of science during this time demanded that researchers in prospective fields of discourse like Geography distinguish between induction from proper evidence and conjecture from hearsay. Burton’s expedition presented its results at exactly the time when the geographers of the RGS were coming to terms with this epistemological discussion. Thus, debates connected with the analysis of the expedition’s findings are also debates about the methods and standards of Geography.

My thesis will follow a four-part structure. Initially, I will discuss the role of the Royal Geographical Society in the geographical community of Britain and Europe. In terms of this discussion I will concentrate on the types of information available about East Africa before 1856, where it came from, and how British geographers analyzed it. The second chapter will focus on the technical methods used during the mid-nineteenth century for geographical research. Here, I want to describe how Burton planned to outfit his expedition and what kind of advice he may have gotten in the planning stages. I will also describe the various instruments available for geographical research and how they were used. This chapter will provide an understanding of what the RGS expected of its explorers.

In the third chapter I will analyze the expedition as it occurred. What did Burton and Speke take with them? Why? How was the caravan organized? What types of observations could they make? These are the questions that will be addressed. This chapter also highlights the role of explorers and informants as instruments of remote sensing who provided observations for homebound geographers. In the final chapter I will focus on the local informants who contributed to the information collected by Burton and Speke and thus influenced the discussions held at the RGS about the expedition's results. In this chapter I will analyze the relationship that developed between explorers and their informants and consider how this relationship affected their observations.

Before beginning this thesis, it is important to note two points. First, the "Search for the Source of the Nile" was the driving force behind expeditions that collected a vast range of data about a region. Ethnography, meteorology, geology, surveying, and biology all fell under the umbrella of "Geography". Explorers were the collectors of this information. The

expeditions did not only generate maps, many disciplines benefited from their results and they were indeed seen as interdisciplinary ventures in their own time.⁵

Second, the search for the source of any river depends on what you are looking for. At each bifurcation of a river, the criteria employed to choose which way to go upstream are not obvious.⁶ The flow can be measured over a year and the more productive channel elected the “main channel”. Alternatively, the source could be marked as the point furthest from the mouth where the river flows from, ignoring volume of flow. Taking into account social factors we could follow the name of the river as it avoids some tributaries and follows others. In fact, rivers have many sources, each tributary making its contribution of water that has come from groundwater, rain, or melting ice and snow.

In 1859 Colonel W.H. Sykes of the RGS declared in the midst of a debate about the source of the Nile, “Every great river has more than one source.”⁷ He used the fingers of his hand as an analogy: all joining at the wrist to form the arm. An anonymous reviewer in *Blackwood's Edinburgh Magazine* echoed the frustration in 1865 by comparing this discussion with the contemporaneous controversy following Darwin's release of *Origin of Species*:

The “species” can't discuss its “own origin,” without becoming so violently excited as to endanger its peace of mind; and if it is any satisfaction to those who are still maintaining a bitter controversy as to “the source of the Nile” to hear it, we can assure them that they may fight about it for ever, for it is as impossible to discover in a precise form the source of a mighty river as the origin of a race.⁸

⁵ I admit that “interdisciplinary” may be a bit anachronistic here but it helps to describe the variety of empirical activities that explorers engaged themselves in.

⁶ William Desborough Cooley, an important contributor to meetings at the RGS describes these very difficulties in 1854 when he states, “We must know on what grounds was decided the question of superiority between the uniting streams.” William Desborough Cooley, *Claudius Ptolemy and the Nile or an Inquiry into That Geographer's Real Merits and Speculative Errors, His Knowledge of Eastern Africa and the Authenticity of the Mountains of the Moon* (London: John W. Parker and Son, 1854) 4.

⁷ “Meeting, 9 May, 1859,” *Proceedings of the Royal Geographical Society of London* III, 1858-1859: 212.

⁸ “Nile Basins and Nile Explorers,” *Blackwood's Edinburgh Magazine* 97, no. 1 (1865): 100.

Samuel Baker, who explored Lake Albert with his wife Florence in the early 1860s, also followed the sentiment that the goal was unattainable. “I believe,” he said, “that the mighty Nile may have a thousand sources.”⁹

Therefore, I may follow another historian by declaring, “There is no such thing as the source of the Nile and this thesis is about the search for it.”

⁹ Samuel W. Baker, "On the Discovery of the Albert Nyanza," *Journal of the Royal Geographical Society* 36 (1866): 15.

Chapter One: The Royal Geographical Society of London and Geographical Knowledge in Nineteenth-Century Britain

The Royal Geographical Society of London (RGS) was founded in 1830 by a group of individuals interested in expanding geographical knowledge and promoting exploration.

The initial charter of the organization reads, in part:

At a numerous Meeting of the Members of the Raleigh Traveller's Club, and several other Gentlemen, held at *Thatched House*, on Monday the 24th of May, 1830, it was submitted that, among the numerous literary and scientific societies established in the British metropolis, one was still wanting to complete the circle of scientific institutions, whose sole object should be the promotion and diffusion of that most important and entertaining branch of knowledge, Geography.¹⁰

However clear this statement may be, that geographic knowledge is a distinct and necessary part of intellectual inquiry; there still remains the question of what facts constituted geographical knowledge in 1830, and how it was to be gathered. In response to this question, the RGS, I hope to show, played a large role in developing the epistemology of geography during the nineteenth century by declaring some forms of knowledge inadmissible as proper knowledge while carefully prescribing how prospective explorers were to go about collecting new information in the field.

Concerning the praxis of Geography in the field, the normative efforts of the RGS will be dealt with in the next chapter. At this point I would like to discuss the types of geographical knowledge available to the British community about Africa *before* the RGS began sending explorers to East Africa. The RGS set itself up as the appropriate referee of geographical information and its bi-weekly meetings would often be focused upon a certain region of the world. The "African Nights" were very popular and became a clearinghouse for the 'Africanists' of Britain; a small, loosely-connected group who were able to claim an informed opinion about African issues.¹¹ Certainly the cartographic history of Africa

¹⁰ "Royal Geographical Society," *Journal of the Royal Geographical Society* 1 (1831): vii.

¹¹ Dorothy Helly estimates that circa 1860 about 150 "Africanists" were active in Great Britain. Dorothy O. Helly, "'Informed' Opinion on Tropical Africa in Great Britain 1860-1890," *African Affairs* 68 (1969).

demonstrates that a large amount of information about the interior of the African continent was being circulated in Europe and Great Britain, and incorporated into a growing body of geographical knowledge.¹² The problem was developing methods to evaluate this information and utilize it to draw maps. Because the information came from a variety of sources, we can imagine that responses to the problem depended upon the nature of the source and the analyst.

Following the discussion of sources, I will attempt to briefly situate the arena of geographical discourse in the first half of the nineteenth century. This proves to be a difficult task as Geography was struggling to define itself during this very period. The decades from 1800 to 1870 witnessed the arrival of new technologies for observation and the introduction of radical new theories in Biology and Geology. Geography was struggling to find its niche in the rapidly dividing arena of scientific discourse, as it struggled with an appalling lack of data about some regions of the world.

When attempting to describe the interior of East Africa based upon information available prior to the first East African Expedition of 1857-59, geographers had access to four types of sources: Classical geographers; Arab geographers dating back to the tenth and eleventh centuries; Portuguese accounts beginning after the voyage of Vasco da Gama in 1498; and accounts from local inhabitants of east Africa. Each one of these sources had specific problems and had to be dealt with differently. These sources were not strictly exclusive of one another as local accounts were typically used second-hand to generate geographies, a practice dating to antiquity. However for the purpose of elucidation I will

¹² Truly comprehensive cartobibliographies dealing with Africa have not been done although these texts do provide extensive information: Jeffrey C. Stone, *A Short History of the Cartography of Africa, Africa Studies* (Lewiston/Queenston/Lampeter: The Edwin Mellen Press, 1995)., Oscar I. Norwich, *Maps of Africa: An Illustrated and Annotated Carto-Bibliography* (Johannesburg: AD. Donker, 1983)., and J.R. Masson, "Geographical Knowledge and Maps of Southern Africa before 1500 A.D.," *Terrae Incognitae* 18 (1986)..

treat them in turn, highlighting their problems and showing how they were used to construct both textual and cartographic geographies of the interior of East Africa.

Classical Sources of African Geography

The classical sources are exemplified by: Herodotus (c. 445 B.C.E.), Eratosthenes (276-194 B.C.E.), Strabo (64-21 B.C.E.), Ptolemy (90-168 C.E.), the anonymous *Periplus of the Erythraean Sea* (c.95-130 C.E.), and a few other sporadic accounts found in Classical Greek and Roman literature.¹³ The chief bit of knowledge of interest to my investigation of the history of East African geography is the source of the Nile. When describing the sources of the Nile, these ancient geographers described the interior of Africa according to their knowledge and conjecture. The Nile, due to its unusual northerly flow, cyclical flooding, and the blatant reality that it flowed out of the desert, was the object of secular wonder and religious awe back to the earliest days of the Egyptian kingdoms. Thus, whenever the geography further south along the rivers source was discussed, the source of the Nile was an obvious question. Anecdotal evidence since Herodotus suggests that expeditions were sent upriver to find the sources. With such a wealth of citable accounts, it is no surprise that Classical sources were mentioned by all of the early-nineteenth-century geographers who described the interior of Africa. But these sources, proven glaringly incomplete by the discovery of the New World in 1492 had already been questioned concerning their descriptions of other regions of the world. However, in the case of the East African interior, they were an important part of the truly scanty information available to European geographers. The question of how to deal with them remained to be answered. This problem had actually persisted for quite some time.

¹³ Herodotus, *History*, trans. George Rawlinson (New York: Tudor Publishing Company, 1944).
The Periplus of the Erythraean Sea, trans. G.W.B. Huntingford (London: The Hakluyt Society, 1980).

Ptolemy, chief librarian at Alexandria during the second-century C.E., left a long legacy in geography and astronomy; though he was in many cases a forgotten source for European Medieval Geography. However, we must consider that Ptolemy gained a new lease on Western geography when his text was retranslated into Latin from Byzantine sources in 1406 by Jacobo d'Angelo.¹⁴ The Italian Renaissance was beginning and Ptolemy's *Geographia* would not be the only wonder to appear from the ancient libraries of Constantinople and Mystra.

There is however a paradox in the Renaissance cartography of Africa that is simply not resolved until the 1860s. D'Angelo's translation exerted its authority on the cartographers, and consequently the three main Ptolemaic attributes concerning central African geography are consistently reproduced through the fifteenth and sixteenth centuries: two symmetrical lakes on the same latitude; the Mountains of the Moon associated with the source of the Nile; and the sources of the Nile located south of the equator.¹⁵ The paradox alluded to is described here by Francisc Relaño, a historian of cartography:

The Portuguese exploration along the west coast of Africa and the revival of Ptolemy were contemporaneous events. The Portuguese added to knowledge of the continent from perceptual experience—through what they saw or thought they saw—whereas the Renaissance mapmakers' reading of Ptolemy led them in the opposite direction, back to classical times, as they made the almost obligatory references to the ancient author. Thus fifteenth-century cartographers were faced with two different and often contradictory sources: what the classical authors said and what modern mariners and pilots claimed to have seen.¹⁶

The problem is one of *evidence*. On one hand Ptolemy provided the Renaissance mapmakers with a wealth of knowledge about the world: more than eight thousand co-ordinates for places on the globe and instructions for the use of meridians, parallels, and the mathematical construction of map projections. On the other hand, Portuguese navigators were reporting

¹⁴ Francisc Relaño, "Against Ptolemy: The Significance of the Lopes-Piggafetta Map of Africa," *Imago Mundi* 47 (1995): 49.

¹⁵ *Ibid.*,: 59.

¹⁶ *Ibid.*,: 50.

on their discoveries. The fact that Bartolemeu Dias rounded the Cape in January of 1488 and Vasco da Gama completed his voyage to India via the Cape in 1499, was a critical blow to Ptolemy's authority, who proposed that Africa was connected to a southern landmass.

The response to Portuguese discoveries among the European geographic community was equivocal. The coastline of Africa began to assume a more accurate shape, and by 1507 Martin Waldseemüller's *Universallis Cosmographia* appears to be a decent representation, resembling the modern outline¹⁷. However, the interior of Africa, where new information was not forthcoming remained solidly Ptolemaic. The ancient source's faults in one area did not cast doubt on his other claims. There are a host of possible reasons for this equivocation. From the start, we could assume that the desire to fill the map with *something* led the cartographers to allow different standards of evidence validity depending upon what information was available. The coastline was becoming more and more well-known and therefore ancient sources were not to be used. As for the interior, where Ptolemy provides more information than anyone else, we rely on him and a few Christian missionaries who reported on Abyssinia.¹⁸

Considering that Ptolemy underestimated of the size of the globe, and the more thorough knowledge of place-names in Abyssinia due to the Portuguese missionaries, we can begin to see how Abyssinian toponyms are found so far south on Waldseemüller's map. Locations firmly within the Ethiopian highlands fly far south of the equator in the effort to find some "facts" which can be placed firmly within a completely unknown African interior. Thus, the fluid standards of evidence quality present in a Renaissance map will persist

¹⁷ See this Norwich's atlas (footnote #12) for a look at numerous maps of East Africa from this period. Also see the following for a discussion of Renaissance geography, Benjamin Arbel, "Renaissance Geographical Literature and the Nile," in *The Nile: Histories, Cultures, Myths*, ed. Haggai Erlich and Israel Gershoni (Boulder: Lynne Rienner Publishers, Inc., 2000).

¹⁸ Relaño, "Against Ptolemy,"; 52.

throughout the “Age of Discovery” with Ptolemy retaining influence through the sixteenth, seventeenth, and early eighteenth centuries with only a very few exceptions appearing after 1591.¹⁹ Even on the radically empty map of the African interior produced in 1749 by the empiricist cartographer Jean Baptiste Bourguignon d’Anville (1697-1872) there are shadowy hints at interior lakes.²⁰

An important scholar active in the RGS from its founding until the 1870s and a keen critic of Ptolemy was William Desborough Cooley. A lawyer by training, Cooley began to write on travel and exploration for the *Foreign Quarterly Review* and *Athenaeum* in the 1820s.²¹ His first major book was *A History of Maritime and Inland Discovery* published in 1830.²² In 1846 he founded the Hakluyt Society, which continues to this day to publish old travelers’ tales and journals in order to keep the texts alive as sources for the extent of geographical knowledge in previous centuries.²³ By the 1840s the coastline of Africa was almost perfectly known in circumference, but in many areas just a few miles inland was still *terra incognita* to European geography. Cooley endeavored to utilize the available sources in order to piece together the geography of inner Africa and for his efforts he was considered an expert. Sir Roderick Impey Murchison, a prominent geologist and a pillar of the RGS throughout the mid-nineteenth century noted that where most were in the dark about Africa, Cooley had some knowledge.²⁴ Probably his greatest but most ignored work was his 1854 publication of

¹⁹ Ibid.

²⁰ Margarita Bowen, *Empiricism and Geographical Thought: From Francis Bacon to Alexander Von Humboldt* (Cambridge: Cambridge University Press, 1981).

Norwich, *Maps of Africa: An Illustrated and Annotated Carto-Bibliography*.

²¹ Roy C. Bridges, "W. D. Cooley, the RGS and African Geography in the Nineteenth Century," *Geographical Journal* 142 (1976): 28.

²² William Desborough Cooley, *The History of Maritime and Inland Discovery* (London,: Printed for Longman Rees Orme Brown & Green [etc.], 1830).

²³ Bridges, "W. D. Cooley, the RGS and African Geography in the Nineteenth Century,"; 281.

²⁴ Ibid.,; 35.

*Claudius Ptolemy and the Nile.*²⁵ This work exemplifies the type of geography being done from classical sources in the nineteenth century and the rising complaints about the types of information available to work with. He introduces the book characteristically:

In the description of the transitory scenes of life, we may be, and often are, satisfied with verisimilitude; but in every reference to permanent nature, we must have the truth, and geographical statements deficient in recognizable truth, soon become unintelligible, and consequently worthless.²⁶

For Cooley, the ancient sources could be evaluated and used, but with his method they should also be doubted. He challenged the unquestioning awe with which many were interpreting the classical sources by looking at the internal consistency of the ancient texts:

It cannot be doubted that had Ptolemy possessed such information as would have enabled him to trace the Nile from the plains of Sennar directly up to its sources, he would not only have furnished more copious details, but would also, with his usual frankness, have named his authority. But it is evident that he had no such information. His construction of the three branches of the Nile shows that he had received intelligence from Abessinia and the sea coasts; but his sole authority respecting the sources of the Nile as may be collected from his own words, was Marinus of Tyre whose statements he discussed in an ample and perspicuous manner.²⁷

Cooley reminds us that Ptolemy himself did not often operate from direct observation, but relied on travelers' tales and merchants' routes. Ptolemy also made a few key errors in constructing his geography. Most importantly, Ptolemy rejected the circumference of the Earth calculated by Eratosthenes, which was surprisingly close to modern measurements, and opted for a globe about one third smaller. However, by conflating the globe he stretched his known geography to fill the space available and caused key landmarks to be much farther away from Alexandria than they were. Thus descriptions of the Red Sea coast are assumed to be referring to the East African coastline much further south and the locations of Abyssinian cities are placed near to the equator.

The greatest claim that Cooley made concerned Ptolemy's famous "Mountains of the Moon". Ptolemy supposedly claims that, from these mountains, located somewhere near the

²⁵ Cooley, *Claudius Ptolemy and the Nile*.

²⁶ *Ibid.*, 1.

²⁷ *Ibid.*, 55.

equator of East Africa, , flow the first waters of the Nile River. In Ptolemy's geography, soon after leaving these mountains, the rivers are caught up in two very large lakes and from these lakes flow the main tributaries to the Nile. Cooley compared the statements of Ptolemy with the geography of *The Periplus of the Erythraean Sea*, probably constructed from direct observations of a traveler, as well as embarking on a philological analysis of Ptolemy's text. He concludes two points: first, Ptolemy was describing the Red Sea coast and its interior; second, Ptolemy never mentioned the Mountains of the Moon, they are an addition made probably by Arab geographers during the tenth or eleventh centuries.

Strangely, these iconoclastic conclusions, while powerful, were seemingly ignored by many Victorian explorers and by modern travelers as well. Sir Richard Burton and John Hanning Speke both described certain mountains they reported as Ptolemy's "Mountains of the Moon" or "The Lunar Mountains". Likewise, in his recent book and in personal communication with myself, Christopher Ondaatje has referred to the Ruwenzori Mountains of Uganda and Congo-Kinshasa as "Ptolemy's Mountains of the Moon".²⁸ In contrast to the explorers, some of Cooley's peers did see the value of his conclusions. Murchison felt that Cooley had closed the discussion of Ptolemy's interpretation for good when he wrote in 1863 that, "I must do Mr. Cooley justice to say, that he has satisfied the scholars that the Blue Nile was *the* Nile of the ancients...and that the Mountains of the Moon do not belong to the genuine text of Ptolemy."²⁹ In summary, Cooley concluded that Ptolemy's discussion of the Nile was always in reference to the Blue Nile, which flows from Ethiopia. It has been a long-time error to assume that he was describing the Bahr el Abiad, or White Nile.

²⁸ Christopher Ondaatje, letter, 24 November 2000.

Christopher Ondaatje, *Journey to the Source of the Nile* (Toronto: HarperCollins, 1998).

²⁹ Sir Roderick Impey Murchison, "Presidential Address," *Journal of the Royal Geographical Society* 33 (1863): clxxxiv.

Interestingly, many explorers to the region ignored Cooley's text and its supporters because they had been spurred on by the quest for such a romantically named region as "the Mountains of the Moon". Wrapped up in the explorer's inquisitive psyche is a desire to connect oneself with the ancients who sought to answer the same questions. This is seen frequently in the writings of Burton, Speke, and others. Cooley's attempt to analyze classical sources objectively was not attractive to those caught in their ancient glow. The "Mountains of the Moon" were and persist to be associated with the metaphor of Africa as an undiscovered country, similar to the "El Dorado" of the Americas. Thus the location of the "Mountains of the Moon" will remain somewhere in East Africa.

Another example of the allure and persistence of fabricated topography was the notoriously migrating "Mountains of Kong" in West Africa. These mountains, while never proven to exist, were actually maligned as a hindrance to European travelers to the interior there. Early explorers to the region attempted to identify the topography they walked over as forming those very mountains.³⁰ Because they had seen maps and read geographies describing these mountains, the explorers were influenced in their direct observation of distant landforms.³¹ In East Africa, the Mountains of the Moon fill the same role.

Roy C. Bridges, who produced one of the few biographical treatments of the largely forgotten Cooley argued that Ptolemy's attraction and reputation was due to his presentation of tables of latitude and longitude.³² This numerical data satisfied the geographers who worked in the shadow of Roger Bacon and Alexander von Humboldt; they increasingly saw numbers as the path to objectivity. By the eighteenth century, the maps of Africa had been

³⁰ Mungo Park was one of the faithful believers in the Kong Mountains. See the following paper for an excellent analysis of this unique history. Thomas J. Basset and Phillip W. Porter, "From the Best Authorities: The Mountains of Kong in the Cartography of West Africa," *Journal of African History* 32 (1991).

³¹ *Ibid.*,: 381.

³² Bridges, "W. D. Cooley, the RGS and African Geography in the Nineteenth Century,"; 37.

mostly 'cleaned' of the fanciful monsters and continent-spanning mountain ranges that in empiricists' eyes were merely folly but vestiges of the ancients remained. D'Anville's map of 1749 is a typical example of this process and he commented on his techniques of interpolation between known locations as "positive geography".³³ In the early nineteenth century any attempts to fill in the blank spaces would require trusted observations, measurements with instruments, or a methodical treatment of classical sources. It is important to note that while Cooley and others were constructing a map of Africa based on logic and reason, India was being mapped by a highly sophisticated triangulation survey.³⁴ The old Renaissance paradox of unequal standards of evidence persisted in the early nineteenth century.

What we find in Cooley's work is that the classical sources are less and less reliable the further south on the Nile we travel. Cooley and other members of the RGS recognized that the next place to turn would be the Arab geographers of Europe's medieval period and the Portuguese travelers.

Arab Sources

The Arab geographers probably received Ptolemy's text via their long contact with the Eastern Roman Empire. Through the ninth century their information about sub-Saharan Africa, called by them the Bilad al-Sudan was largely Ptolemy's.³⁵ Later, beginning from the tenth century through the fourteenth century, more geography was written, partly influenced by direct observation facilitated by the spread of Islam in West Africa. The work of Al-Bakri (c.1040-1094 C.E.), Al-Idrisi (fl. 1145-1153 C.E.), Ibn Battuta (c. 1350 C.E.), and

³³ Matthew H. Edney, "Reconsidering Enlightenment Geography and Map Making: Reconnaissance, Mapping, Archive," in *Geography and Enlightenment*, ed. David N.; Withers Livingstone, Charles W. J. (Chicago and London: The University of Chicago Press, 1999), 186.

³⁴ See the following for the history of this project: Matthew H. Edney, *Mapping an Empire: The Geographical Construction of India* (Chicago and London: The University of Chicago Press, 1997).

³⁵ Nehemia Levtzion, "Arab Geographers, the Nile, and the History of Bilad Al-Sudan," in *The Nile: Histories, Cultures, Myths*, ed. Haggai Erlich and Israel Gershoni (Boulder: Lynne Rienner Publishers, Inc., 2000).

others attempted to describe the Nile river system. However, this work is difficult to interpret because for these authors, any river system south of the Sahara could be the Nile.³⁶ Cooley relied on many of these sources, especially Al-Bakri, for his investigation into the geography of the interior of West Africa (called at the time Central Africa) titled *The Negroland of the Arabs*.³⁷ In his introduction he advises his reader that in order to understand the Arab texts, it is necessary to compare past writings with present information and use logic to remove the falsities and be left with only the best truth that can be known.

This method, resembling in some ways the prescriptions of Descartes' *Meditations*, was distinctly Cooley's. He methodically removed all doubtful landforms on the map leaving only a coastal outline. He then read all the sources he could find while checking them for internal consistency and against each other, bearing in mind more recent discoveries. Cooley also augmented the reported distances of daily travel if he thought they were excessive, thus changing the reported geography. He often compared the distances traveled by camel, donkey, or by foot per day claimed by the Arab travelers with the reports from more recent British travelers in the Middle East, checking the overall location of waypoints. Thus, in lieu of direct evidence, a map could be drawn of a region based on other sources. It was painstaking work, but the conclusions of this method were all that was available to the early RGS geographers concerned with the East African interior.

The largest stumbling block to the use of Arab sources was one of language. Only those proficient in Arabic would be able to utilize these writings effectively, for like the classical texts they required extensive philological study to be understood properly. It was the combination of linguistic and geographic skills that made *Negroland* a success for Cooley.

³⁶ Ibid.,

³⁷ William Desborough Cooley, *The Negroland of the Arabs Examined and Explained: Or, an Inquiry into the Early History and Geography of Central Africa* (New York: J. Arrowsmith, 1841).

In a review in *The Journal of the Royal Geographic Society*, Cooley's work was lauded as a great achievement in "method" and for providing "positive results".³⁸

Indeed, when reviewing the use of Arab sources for African geography in the early volumes of *The Journal of the Royal Geographical Society*, only a few names repeatedly appear: Cooley, Dr. Charles Tiltstone Beke, and M. d'Abbadie of the Société de Géographie in Paris.³⁹ These scholars in an exclusive area did not always agree. The state of affairs between D'Abbadie and Beke was shown in a review article by Frederick Ayrton in 1848: where the author attempts to outline the differences between the two travelers. Both have traveled to Africa, but neither so far south as to be able to directly comment on the source of the Nile. However, by combining their direct observations, information from local informants, and linguistic analysis of ancient and Arab sources, they offer some conjectures. In brief, Beke places the source of the Nile to the south of the Equator, while D'Abbadie places it to the north.

When reading Ayrton's article we are faced with a bewildering discussion of altitudes, longitudes, and latitudes. The data are pushed to levels of precision that the original observations would seem to preclude. This blend of recent astronomical observations and Ptolemaic co-ordinates is characteristic of any article discussing the geography of the East African interior during the first half of the nineteenth century. However, as noted above, Cooley will attack both Beke and D'Abbadie in 1854 by casting doubt on the authenticity of Ptolemy's comments on the lower reaches of the Nile due to Arab interpolation.

³⁸ "Review of "the Negroland of the Arabs, by W. D. Cooley", " *Journal of the Royal Geographical Society* 12 (1842).

³⁹ The Société de Géographie was founded in 1822. Anne Marie Godlewska argues that its program was based largely on the journal, *Annales des voyages*, begun in 1807 by Conrad Malte-Brun. See Anne Marie Claire Godlewska, *Geography Unbound: French Geographic Science from Cassini to Humboldt* (Chicago and London: The University of Chicago Press, 1999) 130..

In concluding the article, Ayrton sided with D'Abbadie's conclusion but reminds the reader that, "[The conclusions] are of course speculative to the extent that our knowledge of the facts concerning the White Nile is uncertain."⁴⁰ Beke himself wrote critically of his own method in 1847:

That speculation must still, at times, come in aid of the facts is unavoidable; but it will be our endeavour to confine this speculation within legitimate bounds, and to limit it, indeed, to the reconciling of seemingly contradictory statements and to the arranging and combining of isolated and unconnected facts, where actual information is still insufficient and unsatisfactory. To say that we shall, on all points, come to definite results, is more than is warranted by the imperfect nature of the premises.⁴¹

Portuguese Sources

By the nineteenth century, the Portuguese easily possessed more experience with Southern Africa north of the Cape than any other European nation. By the late fifteenth century they had exchanged diplomats with the Bakongo kingdom and Angola. They were established on Mozambique Island in 1505 and as far upriver as Tete by 1530. Portuguese defeats during their relations with the Kingdom of the Mweni Mutapa (also Monomotapa) during the sixteenth century in what is now the highlands of Zimbabwe caused their eradication from that area by the early seventeenth century. Over the succeeding centuries, the Portuguese farmers on their *prazos* (plantations) or merchants in their *feiras* (markets) in mainland Mozambique and Angola maintained a tenuous and sometimes tumultuous relationship with their equally powerful neighbors.

In many ways the Portuguese settlers are probably best viewed as another African ethnic group until the later nineteenth century when they embarked on a colonial effort modeled after the more recent British and French systems of dominance. Indeed, the explorers dealt with here appear to consider and interact with them in this way. Portugal

⁴⁰ Frederick Ayrton, "Observations Upon M. D'abbadie's Account of His Discovery of the Sources of the White Nile, and Upon Certain Observations and Certain Objections and Statements in Relation Thereto, by Dr. Beke," *Journal of the Royal Geographical Society* 18 (1848): 74.

⁴¹ Charles Tiltstone Beke, "On the Nile and Its Tributaries," *Journal of the Royal Geographical Society* 17 (1847): 2.

was not a powerful country in the early nineteenth century, and Portuguese settlers were for many British explorers an annoyance. Despite extensive experience with the region, the Portuguese had not embarked upon a systematic survey of the areas they controlled nor kept careful records of their journeys through the region. This lack of effort was considered by the British geographers as a failure, or even a betrayal of their “European-ness”. Even more difficult was the belief that some records did exist of inner African geography, but they were held as state secrets of the Portuguese crown or simply lost in the libraries of Lisbon. Either way, Portuguese information was lacking in the epistemic qualities that would have rendered it unassailable by the geographers of the RGS. As Cooley remarked in 1845:

Above three centuries have elapsed since accounts of a great sea in the interior of Africa reached the Portuguese settlements on both sides of the continent. But this information, though positive and well attested, was too meagre and incomplete to be capable of satisfying curiosity or of holding a permanent place in systems of geography. ...The object proposed in this paper is to collect and compare the several statements extant respecting the great lake in the interior of Africa, to determine their true meaning and value, and thus, with the aid of new particulars derived from original sources, to endeavour to establish the geography of that region on a firm and consistent basis.⁴²

The main feature of Cooley’s article was typical of the consideration of Portuguese sources. Cooley’s method resembled those used when examining Classical and Arab sources as well. The facts of this article are that in 1802 Francisco Honorato da Costa, a merchant in Angola, sent two of his *pombeiros* on a journey east across the continent to the Portuguese possessions in Mozambique.⁴³ Da Costa wanted to learn more about the interior and search for his lost brother, Lacerda. The two *pombeiros* completed their mission successfully though were delayed in travel—they returned in 1814. Their journal was full of new information, but lacking in as Cooley puts it, “the scientific elements of geography”, that is: distances, consistent astronomical observations of latitude and longitude, altitude

⁴² William Desborough Cooley, "The Geography of N'yassi, or the Great Lakes of Southern Africa, Investigated; with an Account of the Overland Route from the Quanza in Angola to the Zambezi in the Government of Mozambique," *Journal of the Royal Geographical Society* 15 (1845): 185.

⁴³ The term “pombeiro” refers to merchants of racially mixed ancestry who worked closely with the Portuguese settlers. Some authors refer to them as a tribe unto themselves, though they are probably best considered a class of merchant. They were often native speakers of Portuguese and traveled widely in southern Africa.

measurements, etc.. Cooley was also frustrated by learning that the journal of the ill-fated Lacerda who died in 1799 at Kazembe nearly halfway between Angola and Mozambique was still not published by 1845.⁴⁴ Whatever qualities the Portuguese accounts may have had, their most annoying fault was the delay in publication.

There are other examples of this almost-good-enough geography perpetrated by the Portuguese in Southern Africa. The accounts of Gamitto and Monteiro, officers in the Portuguese army who traversed Africa from coast to coast were known to the members of the RGS via James MacQueen, another comparative geographer who attempted to sort through the various sources.⁴⁵ From these journals he extrapolated the locations of certain rivers and used his research to challenge the assertions being made in 1855 about the existence of one, very large lake in the center of Africa. MacQueen would occasionally be estimating distance traveled per day by Gamitto and Monteiro based upon their descriptions of the terrain they traversed and comparing this to some “known” journey taken personally or by a reliable source. In 1859 MacQueen utilized the discoveries of Burton and Speke, as well as the 1853-54 journey of the Portuguese Silva Porto to construct a new map of the African continent between 10° N and 20° S Latitude. He was able to shore up his conjectures about Porto’s route by corroborating the Portuguese account with that of the RGS’ own expedition.

Likewise in 1855 Cooley reported that another Portuguese traveler, Joachim Rodriguez Graça, traveled to the court of the Mwata Yamvo in 1843.⁴⁶ Many difficulties were reported in trying to rectify this account with others, especially concerning the courses

⁴⁴ Cooley, "The Geography of N'yassi,"; 214.

⁴⁵ James MacQueen, "Notes on the Geography of Central Africa from the Researches of Livingstone, Monteiro, Garcia, and Other Authorities," *Proceedings of the Royal Geographical Society of London* I (1855).

⁴⁶ William Desborough Cooley, "Journey of Joachim Rodriguez Graça to the Mwata Ya Nvo," *Proceedings of the Royal Geographical Society of London* I (1855).

of several key rivers. By the mid-1850s, it should be noted, Dr. David Livingstone was beginning to send letters back from areas now comprising Botswana, Zambia, and Zimbabwe. His reports were frequently discussed and used to enlighten the works of Beke, Cooley, and MacQueen. This was the beginning of direct observation by British explorers.

To be fair to the Portuguese, the settlers and the British geographers were simply operating across purposes. With their long history in the region, the Portuguese possessed a different sort of knowledge about the geography of the area, and had different reasons for embarking on journeys to distant kingdoms; usually involving establishing new trade contacts. They also became fixed in the areas they knew, content to trade with distant societies through middlemen. The *pombeiros* were just such middlemen. This on-the-ground knowledge of the landscape was not the small-scale, drawing-room map that the RGS was looking for. It should also be noted that the Portuguese crown itself often had little real control over the activities of those who were only nominally Portuguese subjects, despite their appearance and language.

In earlier centuries the Portuguese had been innovators when exploring new areas, their largest hurdle being language. For good or bad, they often detained some of the locals they encountered and brought them back to Portugal for the sole purpose of being trained as interpreters and utilized in future voyages. There are stories that these slave-interpreters were occasionally emancipated for their services.⁴⁷ In another innovative practice, the Portuguese ships would take along a group of *degradados*. These men were convicts who were offered the choice of incarceration (or worse) to the option of joining an expedition to be used for particularly dangerous assignments on shore. A *degradado* was particularly useful when a new society was first contacted, since the immediate reaction of the new group was

⁴⁷ Jeanne Hein, "Portuguese Communication with Africans on the Searoute to India," *Terrae Incognitae* 25 (1993): 45.

uncertain. Often left for months to be picked up later, the *degradados* were instrumental to the learning of languages and gathering of basic information about areas wholly unknown to European society.⁴⁸ Against their will, they were some of the first Europeans to explore Southern Africa on the ground. While partly guilty of being unscientific in the eyes of the British geographers, the Portuguese were extremely resourceful.

Local Informants as Sources of Geographical Information

This last group of sources of information about East and Southern Africa should be discussed throughout the treatment of the other three sources. These are the local informants, the Africans themselves. All of the above sources utilized local informants when gathering data, or they interviewed merchant travelers who themselves reported information heard from “locals”. Indeed some may correctly challenge my classification of sources altogether because Ptolemy, a native of Egypt, was an African; many Arab geographers spent time living on the East African coast; and the Portuguese travelers were often from families who had been on the continent for generations. Defining a “locality” and who resides in that place is a difficult issue. Once we begin to truly distinguish who is a local informant and who is not, the distinction quickly becomes muddled by racial and ethnic prejudices.

I dedicate a whole chapter to these local informants later, but here I would like to discuss how they were evaluated before the East African Expedition, and briefly describe who these informants were. I will also highlight the difficulties encountered by positivist geographers attempting to use local informants. For the time being, a local informant in the eyes of the RGS geographers in the mid-nineteenth century can be described as individuals who were probably born in East Africa, spent most of their lives there, they were often

⁴⁸ This history of the *degradados* and early Portuguese exploration in Africa is thoroughly examined here, Ibid.

illiterate despite their knowledge of many local languages. Most importantly, these local informants did not regularly travel away from Africa by their own volition—those who did travel went as servants or slaves. When they did travel independently, it was typically by foot, canoe, or near-coastal watercraft.

Approximately four groups of people were considered “local” to the East African Coast in the mid-nineteenth century and were sources of information about the interior geography: Bantu-speaking societies, Swahili, Arab traders (typically from Oman), and Banyan merchants (Indian traders who had settled the coast).⁴⁹ Further south, away from the Sultanate of Zanzibar, there would also have been Portuguese settlers and traders. While possibly contentious divisions today, these were the obvious classifications of people employed by the geographers and explorers of Britain.

An excellent example of the use of local informants is found in another paper by Dr. Charles T. Beke, *On the Countries South of Abyssinia*, from 1843.⁵⁰ When traveling in Abyssinia, Beke visited the market town of Yejubbi, where he met widely-traveled traders. By interviewing many of them, he feels able to describe the geography further south. He explains his method here:

[In Yejubbi] I had frequent communication with individuals of all tribes, and who had visited all parts of the Galla country and the adjoining states; and from them I obtained a mass of information, which, although sometimes differing in the minor details (a circumstance which was to be expected), is, in all the main points, perfectly consistent, and in various parts mutually corroborative.⁵¹

Beke goes on to name some of his informants, and describe their backgrounds: Goshu Zaudie, the Dejazmach (Duke) of Gojam; Omar ibn Nejat, a Muslim merchant of Derita; and Ali ibn Mohammed, an Abyssinian trader. All three are noted for having traveled widely

⁴⁹ These classifications are especially important to Richard Burton when describing the members of his caravan. They are also noted by the British, French, and American Consuls resident on Zanzibar by the early 1840s.

⁵⁰ Charles Tiltstone Beke, "On the Countries South of Abyssinia," *Journal of the Royal Geographical Society* 13 (1843).

⁵¹ *Ibid.*,: 254.

and being intelligent. By naming these sources, Beke is not only pointing out his major informants, he is also enrolling his readers into the process of deciding whom to trust and whom to doubt. Beke is describing his method of collecting and editing data as he describes the countries in his essay. Without being able to check the data himself, Beke explains his criteria, describing the demeanor of the informant and his apparent honesty:

With respect to the information furnished to me by ‘Omar, I am bound to say that I have every reason to give him credit for veracity. He answered all my questions with the greatest readiness, explained cheerfully any apparent discrepancies, and sometimes called on me to say that he had been speaking to ‘Ali (who frequently took part in our conversations), and found that he had been mistaken in something he had told me, &c.⁵²

In this example, Beke added to the normal method of corroborating textual evidence the analysis of the informant himself. He could not directly observe the topography in question and measure it, but he was able to observe his informant with his own eyes. Throughout the Classical and Arab sources, there are references to individuals who supplied information. For the British geographers, this third-hand knowledge created insurmountable problems of evidence and interpretation. But given the chance to interview informants themselves, they constructed geographies that were much more convincing at the meetings of the RGS and in the published *Journal*. At least the character of the informant could be assessed directly and cross-checked. This was by no means a perfect method and is pursued only in lieu of direct observation. In the map accompanying Beke’s article, the title is parenthetically qualified with “from oral information collected in Gojam”.

The techniques employed by Beke while in Abyssinia were also employed by Cooley in London. Unwilling to travel to the continent on his own, Cooley had been arguing for more direct observations by trained observers since 1833.⁵³ He also sought out those who had directly observed the interior of East Africa. Cooley met Khamis bin Uthman, an

⁵² *Ibid.*,: 266.

⁵³ Bridges, "W. D. Cooley, the RGS and African Geography in the Nineteenth Century,"; 30.

Omani Arab, when Khamis traveled to London. Khamis had served as the British Consul to Zanzibar from 1826-31 while also in service to Seyyid Said, Sultan of Muscat and Zanzibar.⁵⁴ Cooley's 1845 article on the reports of large lakes in the interior was largely the result of his interviews with Khamis and his slaves.⁵⁵ Cooley continued through the 1830s and 1840s to develop contacts with travelers in London who had some first-hand experience with the East African coast, and developed his geography over the years in consequence of ever more information.

The RGS as the Referee of British Geography

Through the eighteenth century the Royal Society of London supported geographical research and published geographical articles in *Philosophical Transactions*. Due to changing interests among the influential members of the Society, and especially the death of Sir Joseph Banks, these activities were all but finished by 1820.⁵⁶ Geography was not an "exact enough" science and given the above discussion of difficulties with evidence and maintaining consistent standards, the complaint can be justified. Thus, the vacuum of support for geographical research and discussion lamented in the RGS charter at the beginning of this chapter was at its extreme during the 1820s. From its founding in 1830, the RGS was the only geographical society in Britain until 1885, with the founding of the Manchester Geographical and Scottish Geographical Societies.⁵⁷ The only exception would be in 1851 when the British Association for the Advancement of Science created Section E, dedicated to Geography and Ethnography. Not surprisingly, the RGS, already in existence,

⁵⁴ *Ibid.*,: 31.

⁵⁵ Cooley, "The Geography of N'yassi,".

⁵⁶ Hugh Robert Mill, *The Record of the Royal Geographical Society 1830-1930* (London: The Royal Geographical Society, 1930) 7.

⁵⁷ John M. Mackenzie, "Geography and Imperialism: British Provincial Geographical Societies," in *Nature and Science: Essays in the History of Geographical Knowledge*, ed. Felix Driver and Gillian Rose (London: London Group of Historical Geographers, 1992), 49.

had almost full control of this Section at the yearly meetings.⁵⁸ For the period in question, 1850-1875, the RGS is the only forum for geographical discussion in Britain, and its hegemony over the field allowed its members to literally pass judgment on the researches of explorers and travelers.

From the very beginning the RGS, declared itself to be an arbiter of the accuracy and precision in geographical description. While they did not propose to decide which geographical questions were to be answered or to preclude submissions from individuals outside the new Society, they did declare their intention to evaluate geographical reporting.⁵⁹ The members evaluated the various instruments that may be useful to travelers. Additionally they proposed to produce brief instructions for travelers who would be attempting journeys to new areas to aid them in making their observations. This last point was not published until 1854 in the *Journal*. These "Hints to Travelers" will be discussed at length in the next chapter

From the beginning, the RGS attracted scholars from all over Britain, including Charles Darwin and Francis Galton. Darwin, though a life member, decreased his association with the RGS after 1840. He lamented the hegemony of men like Murchison over the discussions. The difficulties in the discussions were often rooted in the problems over just what Geography represented in the greater sphere of knowledge. The RGS became a local focal point for the problems associated with applying Baconian methods for studying discrete units to the dynamic, process-and-distribution-oriented world of Geography.⁶⁰ These difficulties, it turns out, were partly due to the changing world of science. Technological innovation and new understandings of the world from the Natural

⁵⁸ Mill, *The Record of the Royal Geographical Society 1830-1930* 65.

⁵⁹ "Royal Geographical Society," *Journal of the Royal Geographical Society* 1 (1831).

⁶⁰ Bowen, *Empiricism and Geographical Thought* 52.

Philosophy reoriented the community that acts to record and analyze the earth itself. The next section will complete this chapter by focusing on these new technologies and the key figures in geographical thought in the early to mid-nineteenth century.

1800-1859: the age of Alexander von Humboldt

A few distinct technological innovations contribute to this discussion and are critical in the radical shift in geographical thought that takes place around 1800.⁶¹ The first was the development of an accurate marine chronometer by John Harrison in 1759. However, this new technology did not race around the world, and it was not until 1806 that a readily affordable chronometer was used widely in geographical exploration.⁶² The chronometer's impact was simple: it allowed for an accurate measurement of longitude, without this tool explorers (especially mariners) were left to use much less accurate methods to determine their east-west position. The chronometer ushered in new standards of accuracy and evidence in exploration, thus altering the process and added the job of utilizing another advanced instrument to the already difficult job of traveling and observing. An explorer who did not attempt to measure longitude with a chronometer after 1800 would have a difficult time proving his claims back home.

Despite advances in the chronometer, the problem of accurately surveying three-dimensional topography with a square grid was becoming apparent in Europe. A new surveying technology was introduced around 1790: triangulation. By describing each point from three separate 'known' locations, greater accuracy was possible and a higher density of control points spread across the landscape. Matthew Edney describes the impact of this new technology:

⁶¹ All of the Historians of Geography I have researched agree with this statement.

⁶² Edney, *Mapping an Empire*.

The stress of the new, modern ideology was on correct and proper *observation* rather than on Enlightenment's correct and proper *reason*...Geographical memoirs were replaced by a new genre of text that laid out the mathematical calculations of each triangulation network; maps and texts were increasingly validated by their rhetoric of innate plainness and factuality.⁶³

Perhaps the “modern” aspect of triangulation becomes more apparent when we realize that the control points of triangulation were determined by the lay of the land, not predetermined as longitude and latitude were. This new method was not a predetermined scheme, but rather an evolving description dependent upon the area in question.

Exploration was little affected by triangulation because of the great expense, time input, and freedom of movement required to execute a triangulation survey. Governments in control undertook triangulation surveys, not strangers in strange lands. On expedition, triangulation survey was nearly impossible. Thus, as a new standard in mapping gained influence, the knowledge of exploration became less certain. The explorer of the mid-nineteenth century was left with only being able to describe locations by the Enlightenment grid. A reliable, certain, and above all *modern* knowledge of topography in Africa would be determined later, by the anonymous colonial surveyor, employing a panoptic technology. Many members of the RGS, like Francis Galton, understood that this was the final solution, but they also realized the impossibility of gathering that type of data given the access available to many areas of the globe. The new technologies were powerful, but far less than universally applicable.

In addition to technological developments, new theories in natural philosophy challenged notions of what geography could do. The community of natural philosophers was critical of Geography's reliance on explorers' reports and the on-the-spot interpretations offered by untrained traveler/observers whose only claim to authority appeared to be their physical presence at the observation site. Likewise, the “armchair” geographers, such as

⁶³ Ibid., 191-92.

Cooley, MacQueen, and Beke, were heavily criticized for their production of geographies and maps from texts only. They were also maligned for their harsh criticism of some explorers, essentially correcting their direct observation, though they had never been to the region themselves. For critical empiricists, this process appeared nearly laughable.

One final change in geographical discourse marked the difference between the nineteenth century and those previous: the establishment of the geographical societies. These societies, by supporting exploration and bringing under one roof the many 'disciplines' that contributed to geographical research became the clearing houses for new knowledge. They also provided the forums for challenges to exploratory knowledge. As the Burton/Speke controversy revealed in the early 1860s, expeditions did not end with the triumphant return home, they continued on through the process of publication and peer review. These societies provided credentials for explorers, and most importantly, verified the explorers' work. As a response to the challenges from institutions, like the Royal Society, that some aspects of Geography were not mathematically demonstrable and that Geography was not in the least dynamic, the RGS promoters continued to remind the public that the world map still contained blank space that needed to be filled. For its supporters, this fact alone established Geography's relevance.⁶⁴

The geographical societies did not challenge the empiricists' criticism alone. One of the greatest champions of geography in the nineteenth century was Alexander von Humboldt (1769-1859). A widely famous polymath of the late Enlightenment, Humboldt's career stretched far into what many would call the Modern era. He was at once a prince of the Enlightenment while one of its greatest critics. Over the course of his world-traveling career, producing works in various sciences, Humboldt became more and more certain that

⁶⁴ The yearly presidential addresses published in the RGS *Journal* make repeated reference to the necessity of mapping the globe.

the empiricist tradition was faulty. His concern was lodged both against a Baconian study of discrete entities as well as the Newtonian concepts of universal similarities of cause.

Humboldt's travels had shown him that in geology and biology there could not possibly be universal explanation for phenomena expressed in just a few laws.⁶⁵ He saw that geographical thinking could be the way through the wealth of data being collected. This sentiment echoed that of Emmanuel Kant, who also saw the larger perspective as a crucial feature of Geography, but without any connection to providential teleology. David N. Livingstone, a modern Historian of Geography calls this shift of thinking in Geography the "Kantian Turn".⁶⁶ Humboldt went beyond Kant's course on Physical Geography by proposing that generalizing concepts of nature are not innate, but built over human history, that is, through experience.⁶⁷ He truly felt that if we are unable to draw meaningful connections between the different aspects of human life and the environment, then there is a problem with the scientific tradition.⁶⁸ The conflicts described above concerned Humboldt deeply, he wrote:

The totality of empirical knowledge and a fully developed *philosophy of nature*...cannot be in conflict as long as the philosophy of nature, according to its promises, is a reasoned comprehension of the actual phenomena in the universe. Where any contradiction appears, the fault must lie either in the hollowness of the speculation or in the arrogance of empiricism, which believes more to be proved through experience than justified.⁶⁹

Humboldt appears to be looking for a third way through the debate, though unlike Bernard Varenius, (1622-1650), he will not cleave geography into separate areas of discourse—

⁶⁵ Keith J. Tinkler, "Worlds Apart: Eighteenth Century Writing on Rivers, Lakes, and the Terraqueous Globe," in *History of Geomorphology: From Hutton to Hack*, ed. Keith J. Tinkler, *The Binghamton Symposia in Geomorphology: International Series* (London: Unwin Hyman, 1989), 67.

⁶⁶ David N. Livingstone, *The Geographical Tradition: Episodes in the History of a Contested Enterprise* (Cambridge: Blackwell Publishers, 1992) 116.

⁶⁷ Bowen, *Empiricism and Geographical Thought* 12.

⁶⁸ The fragmentation of the epistemological field in the nineteenth century was completely at odds with Humboldt's emphasis on the unifying nature of geographical analysis and description. See, Godlewska, *Geography Unbound*.

⁶⁹ quoted in Bowen, *Empiricism and Geographical Thought*.

physical, humanistic, etc.—rather, he will persist in forging the links between science and literature, sense experience and common-sense, just as Strabo had argued.⁷⁰

Given his life as a field naturalist, it is not surprising that Humboldt thoroughly supported fieldwork as an important component of knowledge generation. This position made enemies for him. Consider the following excerpt of a review in 1807 written by Georges Cuvier of Humboldt's *Tableaux de la Nature*:

The travelling observer can only travel one road. One can only roam freely through the universe, by staying in one's study. For that, a different sort of courage is needed...courage which does not allow its possessor to leave a subject, until by observation and...connected thought, he has illuminated it with every ray of light possible in a given epoch of knowledge.⁷¹

Cuvier is solidly planted in the mode of an Enlightenment taxonomist operating in a cabinet of curiosities. For enlightened naturalists like him, the only way to properly classify was to consider a very specific set of characteristics. Therefore, control of the environment in which they worked was key. In their scheme, fieldworkers were collectors, their place was not to interpret and classify. If Cuvier allowed context into his epistemology of knowledge, it was the contrived environment of the study, not that of nature.

For Humboldt, and many of the geographer/explorers of the RGS, context was of critical importance, and observation of natural phenomena *in situ* was absolutely necessary. They felt that field workers had an innate sense of the world that was impossible to theorize or comprehend from purely laboratory research. Richard Burton seems to be responding directly to Cuvier in his preface to *The Lake Regions of Central Africa*:

We are told somewhat peremptorily that it is our duty to gather actualities, not inferences—to see and not to think; in fact to confine ourselves to transmitting the rough material collected by us, that it may be worked into shape by the professionally learned at home. But why may not the observer be

⁷⁰ Varenus' *Cosmographia Generalis* was probably the last great work in geographical theory before Humboldt. See, *Ibid.*, 80.. Like Humboldt, Strabo wrote about his ideas concerning the scope of geography. Strabo's oecumene was a geographical unit that comprised both physical and humanistic phenomena, including history and language.

⁷¹ quoted in Dorinda Outram, "On Being Perseus: New Knowledge, Dislocation, and Enlightenment Exploration," in *Geography and Enlightenment*, ed. David N.; Withers Livingstone, Charles W. J. (Chicago and London: The University of Chicago Press, 1999), 286.

allowed a voice concerning his own observations, if at least his mind be sane and his stock of collateral knowledge be acceptable?⁷²

Indeed this quote sums up many of the tensions between the explorers and the RGS that will be elaborated in this thesis. Burton is indeed defending the case of the field worker's claim to certain aspects of knowledge unavailable through empirical measurement.

Roderick Murchison was a great follower of Humboldt, even if as a geologist he tended more towards utilizing Newton's universal methods as stated in "Rules of Reasoning in Philosophy" in Book III of the *Principia*.⁷³ Murchison was a stubborn catastrophist though, and tended to eschew the universal processes of Charles Lyell. When Humboldt died in 1859, Murchison, then president of the RGS wrote in his obituary, "We all consider him a master."⁷⁴ From the early days of the RGS Humboldt was an Honorary Member and his writings were eagerly acquired for the RGS' library. It was Humboldt's romantic view of Geography and its critical relevance to the development of a civilized society combined with his exhaustive scholarship that no doubt attracted Murchison and the other members of the RGS to his work. He was a model figure for the discipline in a time when its focus and purpose were uncertain.

Conclusion

With this chapter I have shown some aspects of the field of Geography, and specifically the role of the RGS in British Geography. By pointing out the sources available on the lake region of East Africa before the First East African Expedition, I highlighted the types of information that the RGS geographers would have used to construct maps without the privilege of direct observation. The problems associated with each of these sources may be summarized as the lack of verifiability and inconsistent method. The chief overall

⁷² Richard Francis Burton, *The Lake Regions of Central Africa, a Picture of Exploration* (New York: Harper & Brothers, 1860; reprint, 1995, Dover Publications, Inc.) vii.

⁷³ Tinkler, "Worlds Apart: Eighteenth Century Writing on Rivers, Lakes, and the Terraqueous Globe,".

⁷⁴ Sir Roderick Impey Murchison, "Presidential Address," *Journal of the Royal Geographical Society* 29 (1859): cxii.

complaint of many geographers was that they could not be sure of the method used by their sources to gather the information.

In the second part of the chapter I explained the epistemological changes that were occurring in Geography and the responses of geographers to some of these difficulties. I hope that by juxtaposing these two discussions, the problems faced when discussing an unknown area like the interior of East Africa become more apparent. Geographers like Cooley and MacQueen were challenged to deal with inadequate sources while performing their work according to methods that would stand up to the new scientific scrutiny of empiricism. Pushing the Society past these problems was the belief among the members of the RGS that they were the rightful “cultivators” of Geography in Britain, and that their efforts were not without success.⁷⁵ By 1844, Murchison, in his first address to the Society as its president, declared, “[The RGS] no longer stands in need of any appeal to principles explanatory of the nature and design of its researches.”⁷⁶ It was within the assumed domain of the RGS to decide the epistemology of Geography.

Despite the meteoric bravado of the Presidents’ speeches the answer to the lack of reliable data appeared simple—direct observation of a region by competent practitioners of field geography. As early as 1833, the RGS unsuccessfully attempted to send an explorer to East Africa at Cooley’s proposition. Cooley understood the inadequacy of his method and desired more data, if it was reliable. However, the early attempts failed and in the 1850s articles continued to be published in the *Journal* that discussed East African geography based upon ancient sources and unsubstantiated travelers’ accounts. The next chapter will focus on the RGS’ role in training explorers and providing instruction for data collection in the

⁷⁵ William Richard Hamilton, "Presidential Address," *Journal of the Royal Geographical Society* 12 (1842): xxxv.

⁷⁶ Sir Roderick Impey Murchison, "Presidential Address," *Journal of the Royal Geographical Society* 14 (1844): xlv.

field. With these efforts the Society was hoping to make certain that each new expedition would provide reliable data and be a step forward—not a source of further dissent.

Chapter Two: Modes of Discovery

The twenty-ninth volume of the *Journal of the Royal Geographical Society* was solely the work of Sir Richard Burton. Instead of the usual collection of articles, the Society published, in full, Burton's report on the First East African Expedition. This was a unique volume, no explorer up till then was given this honor and very few afterwards. For the purposes of this chapter I highlight Burton's opening remarks to section two of his report:

On the 1st of October, 1856, the following instructions were received from the Expeditionary Committee of the Royal Geographical Society. They are published in detail, not only because they may be useful to future explorers in the same path, but also as showing what is expected from the African traveller in this portion of the nineteenth century.⁷⁷

I have included the complete letter of instructions in Appendix I. Along with other documents, this volume presents a unique opportunity to view the prescriptive instructions given by a scientific society to its field workers. This chapter will attempt to discuss these methods and instructions.

From its beginnings, the Royal Geographical Society saw a great need for training explorers and travelers in the art of observation. This was not the first instance when such a need was perceived. Robert Boyle had written a guide for travelers, and it was published posthumously with the embellishment of another author in 1692 as *General Heads for the Natural History of a Country Great or Small*.⁷⁸ Overall, Boyle stressed induction as the proper method for geographical observation and research. Another example of such texts is *Questions de Statistique à l'usage des voyageurs* written by Constantin-Francois Volney around

⁷⁷ Richard Francis Burton, "The Lake Regions of Central Africa, with Notices of the Lunar Mountains and the Sources of the White Nile; Being the Results of an Expedition Undertaken under the Patronage of Her Majesty's Government and the Royal Geographical Society of London, in the Years 1857-1859," *Journal of the Royal Geographical Society* 29 (1859): 4.

⁷⁸ I have not had the chance to review this text myself nor have I seen it mentioned by members of the RGS in their writings. Whether or not it was important for explorers in the nineteenth century is unknown to me at this point. Livingstone, *The Geographical Tradition: Episodes in the History of a Contested Enterprise* 102.

1795.⁷⁹ Volney's text is more concerned with social statistics rather than location and topography, but it does discuss the important empirical issues surrounding the recording of geographical data.

As we saw in the last chapter, there was a general feeling in the RGS that untrained travelers and unsupported accounts may be causing more contention than solving problems. Likewise the logical analysis of many received texts on the same region, with the hopes of distilling some mean of truth, was not enough to put geographical questions to rest. The results and theories being proposed about the geography of East Africa lacked conclusive certainty. Leaders of the Society therefore became desirous of sending skilled observers—true geographical explorers rather than simple travelers. This mood was often expressed in the presidential addresses made yearly at the RGS meeting in late May. Murchison noted in 1844 that when the Society sent explorers on expedition they were, “scientific travelers competent to explore those tracts.”⁸⁰ Given the amount of debate surrounding the data in explorers' reports, this statement appears more wishful thinking than reality.

In 1846, Lord Colchester, in his address as President of the RGS, noted that the continuing uncertainty about the source of the Nile was due to a lack of consistent observation. He declared, “There is therefore but one certain way of ascertaining the course and direction of a river, and that is by tracing it down its whole length from source to recipient.”⁸¹ In other words, with so much uncertainty, direct observation, methodologically applied by trained Europeans is the only solution to geographical questions. However, no one had answered the questions of exactly who was suitably trained, and which skills they should be experts of. Despite the RGS' expressed wishes to improve the skills of explorers

⁷⁹ Constantin-François Volney, *Questions De Statistique À L'usage Des Voyageurs* (1795). A lengthy discussion of Volney's geographical writings may be found in Godlewska, *Geography Unbound*.

⁸⁰ Murchison, "Presidential Address,"; cxxvii.

⁸¹ Lord Colchester, "Presidential Address," *Journal of the Royal Geographical Society* 16 (1846): lxix.

they had yet to publish any sort of guide for explorers. However, they had published some articles on certain instruments useful for navigation and surveying in the field. A classic example of this sort of article is the 1838 appearance of “On the Use of Common Thermometers to determine heights”, by W.H. Sykes.⁸²

A true guide to travel would not be published directly by the RGS, they preferred to have their Expeditionary Committee speak directly with the explorers who were preparing an expedition. Baron von Müller, who traveled in the Nile Valley of Sudan from 1847-49, noted in his article that he had received “scientific training” with the help of the RGS before his journey.⁸³ This training seemed to have been mostly concerned with determining his position by celestial navigation and taking meteorological measurements.

Another example of explorer training occurs during the heat of the Nile controversy, Murchison commented about Paul du Chaillu’s preparations before his trip to West Africa in 1863:

M. Paul du Chaillu has announced his immediate intention of again starting for the Gaboon, now adequately prepared to map his future journeys; and I confidently hope that by the study he has recently gone through, he will be enabled to make accurate astronomical observations, and add materially to the value of his published work which has so much interested the public of England, France, and America.⁸⁴

Despite such instances of assistance and education for explorers, the lack of any sort of published guide from the Society does seem surprising. Felix Driver has proposed recently that the RGS did not publish a guide because this would let out the secrets of the trade.⁸⁵ If anyone, he asks, with a bit of courage could pick up a guide and then head out to the unknown world, what was special about the RGS’ explorers? In the first half of the

⁸² W.H. Sykes, "On the Use of Common Thermometers to Determine Height," *Journal of the Royal Geographical Society* 8 (1838).

⁸³ Baron von Müller, "Travels in Africa," *Journal of the Royal Geographical Society* 50 (1850).

⁸⁴ Murchison, "Presidential Address,"; clxxxvii.

⁸⁵ Felix Driver, *Geography Militant: Cultures of Exploration and Empire* (Oxford Malden, Mass.: Blackwell Publishers, 2001) 61.

nineteenth century, when scientific disciplines were being defined, Driver offers that to publish a “guidebook” to an entire scientific specialty would have been a bit odd.

Whether or not the Society purposefully controlled who was told “how to explore”, they were receiving texts and letters offering observations that proved to be useless in an increasingly empirical age. Likewise, many letters were received at the Society asking for advice on how to properly observe areas undocumented by western geography. These questions were left unanswered—too vague or general to be effectively responded to. This is in some respects a completely fair reaction. If a traveler writing to the Society had no knowledge of celestial navigation, and was asking about how to report on the latitude and longitude of a new location: then the Society would be hard-pressed to answer in brief.

In 1854, the RGS’ Expeditionary Committee decided to append a section titled “Hints to Travellers” at the end of that year’s volume of the *Journal*.⁸⁶ In a haphazard way the Subcommittee put together some opening remarks; three letters from: Rear Admiral Smyth, Rear Admiral Beechey, and Francis Galton on taking celestial observations and outfitting an expedition; Colonel Sykes writes again on boiling-point thermometers; and finally an incredible list is included titled, “Hints for Collecting Geographical Information”, which I have included entirely in Appendix II and will discuss shortly.⁸⁷ In the opening remarks, written by Captain Fitzroy and Henry Raper, the policy of the RGS towards a guidebook is succinctly given—the RGS will not publish a formal volume. But they add that they do receive a number of questions concerning method, so they do present these few

⁸⁶ Captain R. Fitzroy and Henry Raper, "Subcommittee Report: Hints to Travellers," *Journal of the Royal Geographical Society* 24 (1854).

⁸⁷ W. H. Smyth, "Extracts from a Letter Addressed by Rear Admiral Smyth to the Secretary," *Journal of the Royal Geographical Society* 24 (1854)., Beechey, "Extracts from a Letter Addressed by Rear Admiral Beechey to the Secretary," *Journal of the Royal Geographical Society* 24 (1854)., W.H. Sykes, "On the Use of Common Thermometers to Determine Heights," *Journal of the Royal Geographical Society* 24 (1854)., Francis Galton, "Letter Addressed by Francis Galton, Esq., to the Secretary," *Journal of the Royal Geographical Society*, (1854)., "Hints for Collecting Geographical Information," *Journal of the Royal Geographical Society* 24 (1854).

pages of information. They note that the essays presented have been provided by “scientific men” and are to be considered valuable suggestions.⁸⁸ The main reason offered for why complete book would not be useful nor published is that it would be of little use to the experienced traveler and not extensive enough for the inexperienced. Considering this, I can agree with Driver that the RGS is being a bit elitist about travel skills. However they are not in a position to open a night school for prospective explorers either.

Realistically, walking long distances while keeping a reasonably exact record of one’s position is a difficult task. Learning the skills of navigation requires some study and a decent knowledge of mathematics. Moreover, geographic co-ordinates were not the Society’s only desiderata. Explorers were asked in the “Hints for Collecting Geographical Information” to record information about almost every aspect of the physical geography as well as answer a host of ethnographical questions. What types of methods did the members of the RGS expect to be employed for these various observations? In order answer this question and simplify my discussion of the modes of exploration and discovery, I will look first at methods of navigation and location, then collection of biological and earth science data, and finally ethnographic research.

Navigation and Location

Using the word “navigation” may be misleading here as it commonly refers to finding one’s way. In this application though I will be using the maritime usage, where navigation is more concerned with knowing one’s present position. Explorers in East Africa were very rarely “lost”. They traveled along established caravan routes, and employed experienced guides. Where finding the route was not a problem, recording that route in an empirical fashion was critical. The RGS geographers wanted the course of a caravan route

⁸⁸ Fitzroy and Raper, "Subcommittee Report: Hints to Travellers,"; 329.

to be described accurately, using as many instruments as possible. In his article on terrestrial observation, Colonel G. Everest implored, “The traveller should have at his disposal a serviceable and portable instrument of which he is thoroughly a master.”⁸⁹

The three most important points of information desired were: magnetic variation, altitude above the sea, and geographic location.⁹⁰ Magnetic variation represented the drift of the compass needle away from true north. Nineteenth century geographers were aware that magnetic north was different from true north. They also understood that magnetic variation altered from place to place and over time. This variation was important to navigators and geologists, so the explorer would have been expected to check his compass against true north (ascertained astronomically) and record the trends.

Altitude was typically determined by boiling-point thermometer.⁹¹ The boiling point of water decreases proportionally with decreasing air pressure, typically as a result of increasing altitude but also due to meteorological conditions. Performing this operation appears simple but the results of this procedure were subject to influence. The thermometer had to be calibrated at sea level and checked against a barometer in order to ascertain the ambient air pressure and adjust to sea level. The water had to be quite pure, heavy mineral content would affect the boiling point. Additionally the thermometer should be checked against a second thermometer for variation. The conversion tables themselves were considered as “works in progress” and empirical research in this area showed that improvements were being continually made—resulting in more accuracy.⁹²

⁸⁹ G. Everest, "On Instruments and Observations for Longitude for Travellers on Land," *Journal of the Royal Geographical Society* 30 (1860): 315.

⁹⁰ As explained to Burton by Admiral Beechey of the RGS, these observations are the minimum required. Burton, "The Lake Regions of Central Africa, with Notices of the Lunar Mountains and the Sources of the White Nile,"; 7.

⁹¹ Sykes, "On the Use of Common Thermometers to Determine Height,".

⁹² *Ibid.*

Another method for determining altitude was to compare barometric readings of a barometer at unknown altitude with another barometer located at an initial location with a known altitude. If the two barometers are not too distant from each other then air pressure can be assumed constant at the same time of day and the difference in readings would be due to altitude. This method, while considered more precise, was not suitable for an expedition traveling long distances. The authors in “Hints to Travellers” differed in their recommendation of barometers, of which a great variety were available. In general, they suggested taking them along for meteorological purposes only—overall the preferred method of determining altitude was by boiling water.

Geographic location meant determining one’s position on the face of the Earth relative to an established meridian, in this case 0° Longitude, or the Greenwich Mean; and the Equator, 0° Latitude. This graticule, the network of parallels and meridians covering the globe represented the universality of geographical thought in the nineteenth century. Conceptually developed by Ptolemy, the graticule allowed any point on the globe to be quickly identified and located. Like an Enlightenment cabinet of curiosities with empty cubbyholes, the graticule in the 1850s stretched over many areas of the globe enticingly: the empty spaces waiting to be filled with lines indicating rivers, mountains, and lakes. In a region like East Africa, the graticule was already present; all that remained was to relate the regional geography to its invisible web. Because of its importance as the scale to which all locations were relative to, determining the geographical position of a place relative to the graticule was of the utmost importance for any expedition.

Determining one’s geographical position accurately and precisely is far easier said than done. Unless the time and expense was taken to perform a survey by triangulation of a given area, then only two methods existed in the mid-nineteenth century: dead reckoning or

celestial navigation.⁹³ Both methods were better suited for maritime travel, but in theory could be quickly adopted for terrestrial use. The technology of navigation was essentially nautical as well and the instrument makers of the day typically built for marine, not terrestrial applications.⁹⁴ The more bulky instruments used by land surveyors were not always considered practical by explorers seeking to reduce equipment loads and cost of transport.

Dead reckoning is the method of determining one's position by keeping a careful record of time traveled, speed of travel, and direction of travel by compass. Using this knowledge it should be possible to plot one's position relative to an established starting point. Keeping this process up day after day should allow for a route to be charted on paper. However, determining speed and distance while walking a trail is quite difficult and usually necessitates a bit of estimation. Dead reckoning is fine for shorter distances and time periods, but over the months and years of an expedition, it was considered ill suited.⁹⁵ In maritime travel this method was only used when celestial observations were impossible or for short-term navigation.

Celestial navigation was the gold standard for the RGS. The sky is a giant Newtonian clock, and the movement of every heavenly object was predictable then and now. No other method for determining location on expedition could be as trusted as sextant readings of the position of celestial objects. If the sextant was precise, the chronometer properly working, and the user skilled, then the calculated positions obtained from the observations would be accurate. The only difficulty in relying on the sky came with bad weather. When the clouds obscured the sun and stars, observations were impossible.

⁹³ The general aspects of survey by triangulation is discussed in Chapter Two.

⁹⁴ Galton lamented this point in his letter. Galton, "Letter Addressed by Francis Galton, Esq., to the Secretary,"; 346.

⁹⁵ The authors noted that sextant reading were overall preferred to the compass. Fitzroy and Raper, "Subcommittee Report: Hints to Travellers,"; 331.

The explorers themselves were not required to undertake the lengthy mathematical calculations necessary to thoroughly reduce the raw observations to geographical positions. However, most performed rough calculations for their own use. Reducing observations in the nineteenth century required the use of large reference books for determining the predicted location of celestial objects, logarithms, trigonometric functions, adjustments for altitude above sea level, parallax, and other corrections. In lieu of carting around such a library, the explorer would be expected to turn his unreduced data over to an astronomer who would spend a few weeks going over the observations and converting them to positions. An 1857 letter from Th. MacLear, Royal Astronomer at the Cape of Good Hope sent to the RGS and published in the *Proceedings* described the process by which Dr. Livingstone's observations were being checked.⁹⁶ MacLear stated that he has found data points where errors were apparently made, however adjustments can be made through analysis of the whole data set. Overall he was pleased with the data. Alexander George Findlay, a cartographer, calculated the data provided by the First East Africa Expedition.⁹⁷ At the end of the Second East Africa Expedition Speke requested that his data be checked and compared by "competent authorities". Consequently Murchison reported to the Society that, "On this point, I am happy to say, that Mr. Airy, the Astronomer Royal, has, with his well-known love of our science, undertaken this important task."⁹⁸ The process of checking through years' worth of observations was tedious at best, but it was not below the top astronomers of the day to take up this task and contribute to discovery.

This thesis is not the time nor place for a lengthy, internalist discussion of celestial navigation and geodetic astronomy. However a few points may be helpful in order to fully

⁹⁶ "Meeting, 26 January, 1857," *Proceedings of the Royal Geographical Society of London* I, 1855-1857: 268.

⁹⁷ Alexander George Findlay, "On Dr. Livingstone's Last Journey, and the Probable Ultimate Sources of the Nile," *Journal of the Royal Geographical Society* 37 (1867): 193.

⁹⁸ Murchison, "Presidential Address,"; clxxxii.

understand this aspect of exploration.⁹⁹ The chief tool in navigation is the sextant. Really just a protractor with sights and mirrors, the sextant allows the altitude of a celestial object to be measured above the horizon in degrees. The challenge for terrestrial navigation was finding the horizon, which on the ocean would be the sea horizon. On land, with undulating terrain, the explorers had to make use of an artificial horizon—a dish of some liquid that would reflect celestial objects on its surface. This provided a plane that was perpendicular to a line drawn from the center of the earth through the dish. In the mid-nineteenth century the best substance known to provide an artificial horizon was a dish of mercury. Its surface stayed level, was resistant to wind disturbances, and had unsurpassed reflective properties.

The chief celestial objects in use at that time were: the sun, the moon, nine stars, and four planets. Noontime altitudes of the sun and some calculations rather easily determined latitude. In the northern hemisphere, the North Star, Polaris, could also be used at night to determine latitude. Longitude was a much more difficult problem. The chronometer had recently become a standard item on expeditions but they required a bit of care. Beechey recommended two chronometers be taken along, and frequently more were carried.¹⁰⁰ Multiple chronometers could be checked against each other for error and provide backup against breakage. The purpose of the chronometer was to preserve the time being kept at the Greenwich Observatory. By noting this time when making sightings, the position of celestial objects could be compared to theoretically predicted position. Very simply put, by noting the difference between predicted positions and actual positions of celestial objects, the position of the observer, which caused the difference, could be determined.

⁹⁹ Aside from my personal knowledge of navigation, I also resort here to the methods suggested by mid-nineteenth century texts as some methods used today are more recent developments. I have also made reference to Henning Umland, *A Short Guide to Celestial Navigation* (Henning Umland, 2001). to check my understanding of the theory. Many other extensive texts are available. Mariners today still resort to these techniques as the final backup to modern electronic aids to navigation.

¹⁰⁰ Beechey, "Extracts from a Letter Addressed by Rear Admiral Beechey to the Secretary,"; 338.

The chronometer, as readers of Dava Sobel's *Longitude* are aware, was not the only route to longitude. Francis Galton, in his letter, recommends against chronometers.¹⁰¹ He felt they were too delicate. The visible moons of Jupiter could be used if a telescope was available. The appearances and disappearances of these moons, made famous by Galileo, could be observed and used to aid in the determination of the observer's longitude. Another common method was using normal watches and taking sights called lunar distances. The motion of the moon across the sky is obviously predictable and so are the positions of the stars. Therefore the distance of the moon from the stars and planets at any given instant, or the moment at which the moon occludes a certain object in the sky, should, through calculation, indicate where the observer was at the moment of observation. Reducing these observations to longitude is a quite complex procedure. These "lunars" as they were known were only reduced roughly in the field and were subject to recalculation by an astronomer with access to reference texts in a more controlled environment.

Geographers like Francis Galton, a statistician who had made a name for himself through his travels in South-West Africa (now Namibia), were keen to promote excellence in method among explorers. A few years after the "Hints to Travellers" section was published, Galton produced the first edition of his widely read *Art of Travel, or, Shifts and Contrivances Available in Wild Countries*¹⁰². Even though the RGS opted to not publish a guide to exploration, Galton filled the void himself. This book resembles a Boy Scout's field guide and Burton carried a copy of it with him to East Africa in 1857. Galton saw the writing of *Art of Travel* as an evolutionary process; in his 1854 letter he specifically requested that copies

¹⁰¹ Galton, "Letter Addressed by Francis Galton, Esq., to the Secretary,"; 348.

¹⁰² Francis Galton, *Art of Travel; or, Shifts and Contrivances Available in Wild Countries*, 5 ed. (London: John Murray, 1872; reprint, 1971, Stackpole Books). In the 1872 edition of this book Galton mentions another text called *How to Observe* by a Colonel Jackson, I was unable to find this text in time for this thesis, but Burton definitely carried it with him. He also brought a copy of Jackson's *Military Surveying*.

of the inventories of geographical expeditions be sent to him along with assessments of their utility. This would allow the standard lists to be improved and for geographic science to progress.¹⁰³ This book proved very popular and went through five editions, with significant additions by 1872.

Galton and the other authors of “Hints to Travellers”, direct the explorer to employ a consistency of method when taking sights. They desired that the same observer throughout the journey use the same instrument. A logbook for observed altitudes and distances should be kept, preferably pre-inscribed with forms.¹⁰⁴ When attempting longitude, Galton writes, “make a night of it.”¹⁰⁵ He recommended a specific rug or cloth be laid out for the observer to lie upon. The artificial horizon, watch, sextant and compass were to be laid out according to a pattern. In all, the proposition was that upon a small cloth in East Africa, a miniature European celestial observatory station should be set up. On that cloth the standards and rigors of Western science ruled over the explorer and his instruments. Employing this method was not only proposed for the ease of the explorer, it was for the geographers at home as well. In order to fully trust the observations, taken over years, the universality of the data could be assumed via the universality of the method employed to collect them. This consistency of method was especially important for the measurement of longitude, which was considered a tricky enterprise under the best conditions.

It was believed that explorers were at their most scientific when they were making observations for geographical position. Instruments were a necessity and were loaned from the Society’s stores if the explorer expressed a need for them. Explorers were required to

¹⁰³ Galton, "Letter Addressed by Francis Galton, Esq., to the Secretary,"; 345.

¹⁰⁴ The layout of the logbook was a point upon which the authors differed, but the universal theme was consistency.

¹⁰⁵ Galton, "Letter Addressed by Francis Galton, Esq., to the Secretary,"; 349.

provide evidence of consistent method. Their knowledge of celestial navigation theory and the requisite instruments would have been expected to be excellent. Their logbooks were to be complete, neatly written, and without lapses.¹⁰⁶ Even if the explorers did some calculations in the field, all the raw figures were to be recorded so that every point could be checked. They were expected to keep sketch maps of their travels, estimating their route, and drawing in all significant features. The bearings, distances, and altitudes of all major hills and mountains were to be estimated or better yet, determined by triangulation. Rivers and lakes were to be described as fully as possible.

Despite this consistency of method required, there was a bit of disagreement about exactly what that method should be. Each letter presented in “Hints to Travellers” disagrees with the others on some point or another, whether on design of the logbook, or type of instrument to be used. It was up to the skill of the explorer to decide the specifics of the situation as stated in the opening remarks to the section:

The nature of the observations which a traveller may make must depend on the character and quality of the instruments he carries—that is, on the quantity of baggage which it may be convenient or safe to carry with him, and therefore on his personal resources.¹⁰⁷

Collection of Biological and Earth Science Data

In the long tradition of scientific travel inherited from the seventeenth century, one of the most celebrated results of any journey was the collection of samples from the area explored. The geographical expeditions supported by the RGS were no exception. Explorers were expected to bring back as much as they reasonably could. Burton’s instructions concerning samples were compiled by Beechey:

¹⁰⁶ Everest makes a clear point of neatness, Everest, "On Instruments and Observations,"; 435.. There are documented cases in the 1880s of expeditions returning from the interior and finding that they had lost a day or more somewhere along the way. See, Johannes Fabian, *Out of Our Minds: Reason and Madness in the Exploration of Central Africa* (Berkeley: University of California Press, 2000).

¹⁰⁷ Fitzroy and Raper, "Subcommittee Report: Hints to Travellers,"; 328.

Although the Expedition cannot be expected to collect largely objects of natural history, it is highly desirable that you should bring away dried specimens of any very remarkable plants, noting their habitats and the height at which they grow. Specimens may also be easily collected of the land and river or lake shells, as these, as well as the plants, will be the first indications ever obtained of the flora and fauna of this region. Of the larger animals due notice only may be taken.

If possible, some specimens of the rocks or fossil organic remains from the countries traversed should be sent home. In regards to mere rocks, no specimen need exceed the size of a *walnut*; but they must be carefully labeled as to locality, and well wrapped up in two envelopes. Any remains of fossil shells, especially if found at a distance in the interior or at some altitude above the sea, will throw a most important light on the structure of Africa and be most highly prized by all geographers.¹⁰⁸

The Society and its members were generally excited by the prospects of new samples from unexplored areas. New species of plant and animal might be identified and the geologic structure of Africa would be revealed further. Any new information was critical, especially in Geology. At this time Cuvier and Murchison's catastrophist theories were being pitted against Lyellian uniformitist leanings and no conclusion was in sight.

While the Society does not spend much space in writing discussing their advice concerning the preservation of biological specimens, a look at the list of equipment taken by Burton and Speke demonstrates that some thought did go into the matter. In the list, Burton reported that the ammunition boxes, once emptied would be used for specimens.¹⁰⁹ Just below this he mentions two pillows, the contents of which will be used for stuffing birds. There is also an editor's note mentioning that a box of botanical and geological specimens was sent to the Bombay Geographical Society, but its contents were as yet unknown.

A bit more information is found at the end of Speke's published record of his second expedition to the lake region with James Augustus Grant, *Journal of the Discovery of the*

¹⁰⁸ Burton, "The Lake Regions of Central Africa, with Notices of the Lunar Mountains and the Sources of the White Nile,"; 8.

¹⁰⁹ Richard Francis Burton and John Hanning Speke, "A Coasting Voyage from Mombasa to the Pangani River; Visit to Sultan Kimwere; and Progress of the Expedition into the Interior," *Journal of the Royal Geographical Society* 28 (1858): 224.

Source of the Nile. Appendix G, which catalogues the 750 species of plants collected by Grant, was introduced by Speke as follows:

This unique collection is the first that was ever made *by the drying process* in the interior west of Zanzibar. It has been arranged at Kew by Dr. Thomson, and is highly commended by Dr. Hooker, who regrets with myself that better facilities are not instituted for the guidance of explorers in foreign countries.¹¹⁰ (*italics his*)

Closing this appendix is a note by Dr. Thomson who states that other collections from Africa had been received at Kew in recent years but were still mostly undescribed. These few excerpts and the lack of other references to collection and preservation in the RGS publications leads me to suppose that this aspect of exploration was not given priority. It is possible that botanists and zoologists from other scientific societies in London were consulted informally, but Speke's comment on the lack of facilities in this regard indicates that these connections were not frequent. Moreover, the fact that other specimen collections were being somewhat ignored shows that communication between the RGS explorers and other scientists was possibly not as strong as would be expected. The natural specimens brought back from new areas were apparently not being "attacked" by botanists eager to describe new species. Though the RGS of the 1840s and 50s was often shunned by many scientists for being too "populist", these collections did offer unique opportunities.¹¹¹ The exchange of natural specimens between scientific communities during this period deserves further research.

Ethnographic Research

Reading through the literature dedicated to the methods of empirical research to be conducted by an expedition, it would appear that the interior of East Africa was an almost

¹¹⁰ John Hanning Speke, *Journal of the Discovery of the Source of the Nile*, 1996 ed. (Mineola, New York: Dover Publications, Inc., 1863; reprint, yes) 561.

¹¹¹ Darwin, Hooker, and Wallace were all life members of the RGS but had ceased to be active in the Society by the 1850s due to their distaste for the overly popular nature of the meetings and *Journal*. See, Mill, *The Record of the Royal Geographical Society 1830-1930*. and Livingstone, *The Geographical Tradition: Episodes in the History of a Contested Enterprise* 158-60.

uninhabited country. Actually collecting data on the inhabitants is barely mentioned. The only exceptions to this are the “Hints for Collecting Geographical Information” questions at the end of “Hints to Travellers” that focus on Ethnography or Ethnology. This list of questions is remarkable for its thoroughness, but also for its expectations. I have included the entire list in Appendix III. The explorer was expected to gather a vast array of knowledge that would have required enough work to keep an entire expedition busy on only the ethnographical questions.

The historiography of Victorian ethnography is replete with accusations of racism, research tainted by preconceived notions, and outright misrepresentation in order to promote colonial aims. Much of this criticism stems from an assumed historical connection between mid-nineteenth century exploration and late-nineteenth century colonialism in East Africa. Roy Bridges finds this interpretation to be “whiggish” and simplistic.¹¹² Explorers are too quickly classed as colonialists; an equation that requires a bit more substantiation than would immediately appear requisite.

Certainly, to the modern reader the explorers’ accounts often appear to be written from a standpoint of assumed superiority and notions of racial hierarchies. This interpretation is fair to an extent, but it tends to obscure the excellent observations made by some explorers and the degree to which they strove to understand the societies they were visiting. To the consternation of many Africanists, the only written records of many East African societies during the mid-nineteenth century are just these same explorers’ journals. The records are not perfect, but they are often unique.

In the writings prior to the first East African Expedition, much of the reference to locals concentrated on their role as informants, as noted in the previous chapter. This is the

¹¹² Roy C. Bridges, “The Historical Role of British Explorers in East Africa,” *Terrae Incognitae* 14 (1982): 2.

beginning of a paradox that I will draw out through the rest of this thesis—local informants were at once sources of information for the geographical aspects of the expedition while at the same time they were also the objects of ethnographical research. This situation resulted in the high levels of doubt with which local information was received, especially information concerning geography.

Of particular interest was the opinion of some members of the RGS that local informants could not be trusted to report river direction correctly. See, for example, MacQueen's comments on reports of river direction in the center of the continent:

We have so much experience of this mode of reversing the course of the river by native Africans, that we can have no difficulty in seeing the error. The river running from the lake in the direction of the Congo is in reality a river flowing from the centre of Africa into the lake.¹¹³

In other words, MacQueen proposed that reversing the reported direction of a river's flow is a permissible action to take when interpreting local information and trying to draw a map. Speke used this logic in 1860 in order to further his theories about the source of the Nile. This "method" of interpretation was not universally accepted, as shown by this excerpt from the discussion at the 15 December, 1856 meeting of the RGS. Dr. Livingstone is speaking:

Some will say that the natives always tell you that one river comes out of another. Yes, if you do not understand the language you may say so. I remember when Colonel Steele and I were together, the natives pointed him out as still *wild*, and said I was *tame*, because I understood the language. Now, I suppose, that when a geographer tells you that, when the natives say, "one river runs into or out of another," they don't mean what they say; but, in reality, the natives mean that the geographer is still *wild*, he is not *tame*, i.e. he does not know the language.¹¹⁴ (italics his)

Livingstone is arguing here for caution when dealing with local informants. They know the information quite well, but will be poorly understood by an explorer who had not taken the time to learn the language. The root of Livingstone's argument is the explorer's language skills—they are essential to collecting accurate information.

¹¹³ James MacQueen, "Notes on the Present State of Geography of Some Parts of Africa," *Journal of the Royal Geographical Society* 20 (1850): 246.

¹¹⁴ "First Meeting (Special), Dec. 15 1856," *Proceedings of the Royal Geographical Society of London* I, 1855-1857: 240.

In general, there is a distinct lack of specific instructions concerning ethnographical research apart from the basic and obvious questions. A person with language skills was preferred, and Burton was the Society's choice in the 1850s because of the qualities he demonstrated in his prior publications. The journals of his travels in India and the Middle East won him fame and recognition as an expert traveler, linguist, and general observer. Burton knew the limits of his skills as well. He selected Speke to join him partly because he had advanced skills in surveying and navigation that Burton did not. Generally speaking, the First East African Expedition had Speke as its geographer and Burton as its ethnographer, linguist, and leader.¹¹⁵

Overall, ethnographical research was left largely to the prior experience, and the instincts of the explorer. This left these observations to reflect largely the opinions of the explorer and his personal assessment of East African society. There were no technologies to aid this process besides daily note taking and writing of vocabularies. Interestingly, the expedition reports indicate that this aspect of their work was the one that occupied most of their time—interaction with the local population. Also, the history of ethnography and anthropology finds its earliest roots in these Victorian explorers. Burton is arguably a “grandfather” of British anthropology. Johannes Fabian, an anthropologist himself, refers to the late-nineteenth century explorers of the Congo Basin as “proto-ethnographers”.¹¹⁶ Possibly the greatest impact of explorers' reports from this period was due to their description of the slave trade. These descriptions galvanized a generation against the evils of the trade and stoked the diplomatic efforts of Great Britain to halt the trade for good. Surprisingly, the ethnographic research that was downplayed by members of the RGS in the

¹¹⁵ Both Burton and Speke mention this division of labor in various places. It appears to have been decided upon beforehand.

¹¹⁶ Fabian, *Out of Our Minds*.

mid-nineteenth century as a tangential, unscientific aspect of exploration has become, in hindsight, one of its most important aspects.

Conclusion

In this discussion of the modes of discovery, one point may not have been emphasized enough—there was no universally agreed upon method for performing the myriad observations expected of an expedition. Many members of the RGS had done a bit of traveling themselves and were therefore aware of the unpredictable nature of the endeavor. Each region and climate had its own unique challenges, and the areas that “needed exploring” were obviously unknown. Still, attempts were made along many lines to assist and advise prospective explorers. After all, these expeditions were not inexpensive. The first East Africa Expedition was granted £1,000 by the Foreign Office via the RGS. This sum today, by rough estimate, would be worth approximately \$120,000.

Looking for success but little able to advise exactly how to achieve it, the members of the RGS sought out a few recognized experts such as Sykes, Galton, and Everest for guidance. Their instruction concerning navigation was extensive and detailed—the heavens followed the same rules the world over. Concerning the collection of specimens, less advice was available, and this was lamented. However, I suspect that more published material concerning the preservation of biological specimens in the field may exist from this period but have fallen outside the area of my research. Concerning ethnographic research, little or no instruction was provided. Barely considered a science in the 1850s, Ethnography was still a subset of Geography in Britain, lumped together since 1851 as Section E of the BAAS. That this section existed at all was largely the work of Murchison and the RGS.¹¹⁷

¹¹⁷ Mill, *The Record of the Royal Geographical Society 1830-1930* 65.

This whole chapter has been devoted to prescription—what was expected of the explorers sent by the RGS in the 1850s and 1860s and how they were expected to do it. The next chapter will challenge these normative statements by looking at the realities of exploration. The letters and publications generated by the First East African Expedition describe in detail how the explorers solved the problems of fieldwork and how homebound scientists dealt with the information the expedition brought home.

Chapter Three: 'Remote Sensing' and Victorian Exploration

From the years 1850-1870, the Royal Geographical Society (RGS) met almost exclusively in London. At their biweekly meetings, the most recent information concerning far-flung areas of the globe was presented and discussed. The sessions were organized geographically during this period with one meeting typically focusing on one continent or region; the "African Nights" routinely drew the largest crowds. Many of the members of the audience, including those who stood up and spoke, rarely, if ever left the British Isles. Others had journeyed in their youth, and thus claimed expertise well into old age. By 1863 the Society had two thousand members and was growing rapidly¹¹⁸. These members were interested in Africa for a variety of reasons—from the purely commercial to simple curiosity and may have been members of anthropological, commercial, colonial, and philanthropic societies as well.¹¹⁹ The RGS was an arena for the discussion of information about Africa and those who attended these meetings considered themselves to be possessing informed opinions about Africa. If we follow Dorothy Helly's analysis, then it becomes apparent that the number of 'experts' on Africa was actually quite small in England during this time and they comprised a loosely-knit clique.¹²⁰

A close reading of the minutes of these meetings, published from 1855 to 1878 as the *Proceedings of the Royal Geographical Society*, provides a glimpse at how opinions were formed about Africa and the style in which information was presented and immediately discussed.¹²¹ They also allow us to examine the reception given to new information from the field. In this chapter, I will use minutes from the *Proceedings* and articles from the *Journal of the Royal*

¹¹⁸ Ibid., 74.

¹¹⁹ Helly, "'Informed' Opinion on Tropical Africa in Great Britain 1860-1890,"

¹²⁰ Ibid.,; p.217.

¹²¹ From the birth of the RGS in 1831 until 1878 the papers presented at these meetings were published yearly as the *Journal of the Royal Geographical Society*. The two publications were conflated in 1878 as the *Proceedings*.

Geographical Society and other publications to analyze the reception of information from the remote explorer at a metropolitan society. Looking at the contentious debate surrounding the findings of John Hanning Speke and Sir Richard F. Burton places the explorer as a member of a scientific society and as a tool of that society's data-gathering project.

I propose here that when we consider explorers and their relationship to the societies that desired their observations, we may consider this relationship more clearly as observer/instrument rather than admirer/explorer. The members of the society were the observers of African geography, but lacking the ability to observe it directly, they used their instruments—the explorers. Like modern space probes sent to orbit the sun or submersibles diving to film the inside of the *HMS Titanic*, Victorian explorers were do-it-all instruments of remote sensing, outfitted for the project, and expected to provide accurate results—and just like modern-day remote-sensing devices, the explorers did not have the final say concerning the conclusions drawn from the data they gathered.

This model of the relationship between explorer and society does not attempt to downplay the bravery and independence of the explorers. Nor do I wish to contend that the explorers saw themselves as instruments. It would be outrageous to contend that Speke or Burton considered themselves as merely the extended senses of the RGS. However, when trying to account for the immediate doubt and criticism that typically followed many explorers' reports, using the analogy of the instrument may help us to explain the debate

Considering explorers as instruments also helps to explain articles such as, "The Climate of Lake Nyassa. Deduced from the observations of Capts. Speke and Grant," by Francis Galton; then active in the Meteorological Society as well as the RGS.¹²² This article is a classic example of how the observations of explorers are used as data by a British

¹²² Francis Galton, "The Climate of Lake Nyanza," *Proceedings of the Royal Geographical Society of London* VII, 1862-1863 (1863).

scientist. By combining the observations with other sources and analyzing them by a variety of methods, Galton sets forth a paper on meteorology. Despite its title, this article is an exercise in induction, not deduction, as he describes the region's climate from a limited number of sources, many of them the data collected by explorers.

In order to discuss the practice of geographical fieldwork in the mid-nineteenth century, I will initially set the historical background of the East African Expedition. Second, I will look at the inventory of the first East Africa Expedition, headed by Burton, and the realities of caravan life. Third, I will comment on the observational style of the explorers and how they went about collecting geographical information via instruments and informants. The fourth step will be to examine how the initial letters and reports of the expedition were received at the meetings of the RGS.

Historical Background

Aside from the long-standing desire of the RGS to send an expedition to the interior region of East Africa, certain events during the 1850s led directly to the expedition of Burton and Speke. The 1849 presidential address of William Richard Hamilton to the RGS mentioned Johann Rebmann, a German Lutheran missionary. Rebmann had joined Dr. Ludwig Krapf at Rabbai M'pia in 1846, where Krapf had set up mission station about 25 miles inland from Mombasa.¹²³ In his address, Hamilton referred to Rebmann's startling report of a snow-capped mountain called "Kilimandjaro" found between 3° and 4° South of the Equator. As Hamilton pointed out, this report strengthened the argument for all who would argue that the sources of the Nile were below the Equator, but he recommended caution for those who would jump to conclusions.¹²⁴

¹²³ MacQueen, "Notes on the Present State of Geography of Some Parts of Africa,"; 242.

¹²⁴ William Richard Hamilton, "Presidential Address," *Journal of the Royal Geographical Society* 19 (1849): lxxvi.

The following year in the *Journal*, MacQueen wrote about Rebmann's report and other observations from Krapf. As usual, MacQueen corroborated these reports with others, specifically mentioning a list of tribal names sent by the American Consul at Zanzibar.¹²⁵ Another article published in 1850 by Baron von Müller also mentioned that he had heard of these tall, white-capped mountains being the source of the Nile.¹²⁶ Müller also thought that calling any mountain, the "Mountains of the Moon" was probably folly as they could be any mountain chain. This mountain chain, he said, was the same as Herodotus' anthropophagi (cannibals) who dwelt far up the Nile—everyone he met told him to be cautious as they were just nearby, though he never met the mysterious tribe.

Presidential addresses continued to pay lip service to the sources of the Nile over the next few years, though not much new information was forthcoming. It seemed clear to many that some lakes must lay in the interior, too many local informants had attested to the fact. Murchison, in his address of 1852, initially proposed his theory of the geology Central Africa consisting of a, "great lacustrine interior, subtended by mountains near the coasts."¹²⁷ This rainy, lake region, he proposed, should be the source of all the great rivers of Africa, whose mouths had been known for centuries.

Murchison would refer to this theory repeatedly for the next twenty years, reminding everyone that he had proposed it in 1852. Looking at the theory in perspective may help to realize the common-sense hunch that it really was. In truth the African continent was slowly being charted by the early 1850s. The only remaining "box" of truly *terra incognita* was about 4° N. to 20° S. Latitude and about 20° to 38° E. Longitude. The Zambezi, the Congo, and the White Nile all disappeared into this box. It was no great "theory" to claim that this

¹²⁵ MacQueen, "Notes on the Present State of Geography of Some Parts of Africa,"; 244.

¹²⁶ Müller, "Travels in Africa,"; 287.

¹²⁷ Sir Roderick Impey Murchison, "Presidential Address," *Journal of the Royal Geographical Society* 22 (1852).

region was the source of many rivers, this was already known. However, it had previously been proposed by some that the equatorial region of Central Africa was an arid region, so Murchison was promoting an alternative hypothesis.

As mentioned in chapter two, Cooley published his critique of Ptolemy's geography of Africa in 1854, and brought into serious question any who would use the ancient geographer without qualifying reservation.¹²⁸ He also reported on caravan journeys that had apparently crossed the continent.¹²⁹ These publications were typical of the kind of research being done on African geography at the time: corroboration of insufficient modern reports combined with ancient sources.

The next big event in the uncovering of the region's geography was the arrival of the famous "Slug Map" at the RGS in 1855. (see Map 2, page 129) Rebmann and Jacob Erhardt, a missionary who had joined Rebmann and Krapf, produced this map, titled "The Sea of Uniamesi &c." In it, Erhardt and Rebmann pieced together the accounts of traders who traveled yearly from the coast to the interior. The map showed that a very large inland sea in the interior was the destination of many caravans. The map gave no indication to the source of the Nile. This map was derogatorily called the "Slug Map" because of its shape. Speke referred to it as, "this monster piece of water".¹³⁰ Despite the criticism that missionaries received when they attempted to be geographers, some, like Livingstone, became famous for their efforts. Like it or not, many untrained geographers provided the initial pieces of

¹²⁸ Cooley, *Claudius Ptolemy and the Nile*.

¹²⁹ William Desborough Cooley, "Notice of a Caravan Journey from the East to the West Coast of Africa, Sent by Vice Consul Brand through the Foreign Office," *Journal of the Royal Geographical Society* 24 (1854).

¹³⁰ John Hanning Speke, "Journal of a Cruise on the Tanganyika Lake, Central Africa (Speke's Journal Part I)," *Blackwood's Edinburgh Magazine* 86, no. 3 (1859): 340.

information about an unexplored area.¹³¹ Therefore, a missionary's report was often an important piece of information for the RGS.

At the meeting of the RGS on 10 December, 1855, MacQueen and Erhardt argued over Rebmann's map. MacQueen insisted that his research showed that there must be two lakes in the interior while Erhardt insisted that his informants' information led to the conclusion that only one, very large lake, dominated the interior. These minutes have the air of frustration throughout. The geographers truly desired an expedition to be sent in order to solve this problem once and for all. These debates, and the improved finances of the Society's coffers, prompted the serious discussion of selecting and outfitting an expedition to East Africa, an old idea that now seemed more possible.

Into the vacant post to lead the expedition the Society selected Richard Burton. Already a noted explorer and travel writer, Burton was famed as a master linguist and expert of disguise. In 1855, Burton had met John Hanning Speke at Aden, a British-controlled supply depot on the Gulf of Aden near the entrance to the Red Sea. Burton was heading up a small expedition across the Gulf of Aden to Somaliland. One of the members, J.E. Stocks, had died suddenly and a replacement was needed. Speke, recently on leave from the Indian Army was in Aden and eager to visit Africa. At the last minute, he was added the group. The first portion of the expedition was generally successful, but when the group returned to Somaliland in April of 1855, their camp was raided, Lt. Stroyan killed, and the others gravely wounded. The events of the raid have been a source of contention for biographers since then, but many assume it is the root of the difficulties between Burton and Speke. Burton, it is argued, had questioned the courage of Speke during the raid.

¹³¹ The impact of missionaries upon exploration is discussed here, Hildegard Johnson, "The Role of Missionaries as Explorers in Africa," *Terrae Incognitae*.

After Burton returned to England and spent some time recovering from the wounds he received, he began to plan an expedition to find the source of the Nile. In a letter sent in April, 1856 to Norton Shaw, Secretary of the RGS, Burton proposed heading an expedition, or traveling alone to Eastern Africa.¹³² Burton wrote that he had been directly inspired by an article in the *Journal* written by Colonel William Sykes in 1852, where Sykes had pointed out deficiencies in East African geography.¹³³ Burton proposed that instead of sailing up the Nile as many explorers had tried, his expedition would go to Zanzibar and penetrate the interior by traveling westward to the reported lakes. Given permission to proceed and assistance with funds, Burton left England in September of 1856 and traveled to Bombay in order to complete preparations, obtain more equipment, organize his leave from the Army and secure companions.

In November of 1856, from Bombay, Burton requested that Speke and John Steinhauser, a surgeon and friend of Burton's, be given leave from their positions in the Indian Army to join him. Speke was successful, but Steinhauser became ill at the last minute and was unable to journey. Both Burton and Speke lamented this loss of medical advice in the field, because as they had predicted, it was sorely needed. Despite this setback, the expedition continued as planned and the two left Bombay 2 December, 1856 and landed at Zanzibar on 19 December, 1856.

The East African Expedition as a Workplace: daily realities of life on safari.

At Zanzibar Burton was immediately faced with a task for which there was no advice: forming an African caravan. This task and its difficulties filled many months in

¹³² Donald Young, ed., *The Search for the Source of the Nile: Correspondence between Captain Richard Burton, Captain John Speke and Others, from Burton's Unpublished East African Letter Book; Together with Other Related Letters and Papers in the Collection of Quentin Keynes, Esq. Now Printed for the First Time.* (London: Quentin Keynes, 1999) 57-58.

¹³³ W.H. Sykes, "Notes on the Possessions of the Imam of Muskat, on the Climate and Productions of Zanzibar, and on the Prospects of African Discovery from Mombas," *Journal of the Royal Geographical Society* 23 (1853).

Zanzibar. Burton and Speke learned the social necessities of a caravan, hierarchy of members, standard pay rates, possibility of routes, appropriate seasons for travel, and goods required for food and payment of ‘tolls’ to local chieftains whose land they would pass through. The first conclusion to be drawn from this process is to recognize that Burton and Speke were the financiers and owners of a normal East African caravan traveling along an established route to a known destination: Ujiji on the shore of Lake Tanganyika. The only difference with this caravan was that it was not formed for the purposes of trade. In constitution the caravan was African; in purpose, European

Richard Burton led the First East African Expedition and was thus the ‘leader’ of the entire caravan. The second European member of the expedition was John Hanning Speke. The remaining leading members of the expedition hierarchy were: Sheikh Said bin Salim el Lamiki (the Ras Kafilah, or head of caravan), Muinyi Wazira (Salim’s assistant and a linguist), Seedy Mubarak Bombay (Speke’s personal assistant), Muinyi Mabruki (Burton’s personal assistant), Valentine and Gaetano (Goanese servants hired in Bombay), Mallok (Jemadar, or leader of the guard), Muinyi Kidogo (Mtu Mku, or head man of the “Sons of Ramji”, nine slaves hired at the coast to act as extra guards, interpreters, and guides), the Kirangozi, or guide was also the head of the porters and responsible for their welfare. The porters themselves are very rarely named in the journals and they were only hired for specific legs of the journey. The majority of porters were Nyamwezi, a tribe long-associated with caravan trade. A new gang of porters was required to be hired at large markets like Tabora. In the third appendix, I present the detailed description of the caravan, men and inventory, as described in a letter from Burton to Francis Galton.¹³⁴ As noted before, Galton had

¹³⁴ Burton and Speke, "A Coasting Voyage,"; 224-26. Other descriptions are also found in: Speke, "Journal of a Cruise on the Tanganyika Lake,". and Burton, *Lake Regions of Central Africa*.

requested that explorers provide him with the details of their outfits so that he might better adjust the advice he was providing in his book, *Art of Travel*.

So what did the explorer do everyday in the field? Despite the adventure and daring, there was a day-to-day routine, almost a rut of monotony as the long spans of time taken to reach a goal stretched out in front of and behind the explorer. In Burton's analysis, his expedition was actively traveling for 420 hours in their journey from Kaole on the coast, to Ujiji on Lake Tanganyika.¹³⁵ This is 420 hours out of the 5,688 hours that passed from 27 June, 1857 till 18 February, 1858, the seven and a half months it took the expedition to make the journey. They were actually walking about 7.5% of the time.¹³⁶ The rest of the time was spent resting, sleeping, cooking, eating, talking with local leaders, adjudicating disagreements in the caravan, attempting observations, and making or breaking camp. They also occasionally remained 2-3 days at principle villages. Burton calculated their average pace at 2.27 miles per hour when traveling. The extreme slowness of travel led to some amount of frustration for the explorers who saw their time and funds whittled away by the expense of merely being in Africa and not actively observing. Both complained in their journals that much more observation could have been accomplished had the realities of life on safari not taken up so much time.

The route they traveled was known and marked, and the caravans, called safari in Swahili, followed established patterns of movement. The porters were used to a certain pace and style of travel which Burton found difficult to change if he desired to travel a bit further on a given day than usual or divert the route to a site of possible geographical interest. By the end of the expedition, Burton's desire to march the caravan to Kilwa, a coastal town of

¹³⁵ Ibid., xiv.

¹³⁶ It should be noted that they spent 36 days at Kازه (Tabora), the longest stop. Less this time they still only walked about 9% of the time.

some repute, resulted in the mass desertion of all the porters; an event that was seriously discussed for months afterwards by Zanzibari and European politicians.

The daily life of a caravan started about four o'clock in the morning, with the crowing of the roosters. The actual packing up and loading of the porters was the responsibility of Said bin Salim, the Ras Kafilah, but no porter would even consider moving until the Kirangozi shouldered his load and raised the bright red flag of the Sultan of Zanzibar. The explorers' role in this process, as the financiers, was to coerce these leaders towards an early start and berate the stragglers. They were also concerned with watching against theft. Burton noted that good relations with the Kirangozi were absolutely necessary for successful traveling and no one had the right to precede the Kirangozi while the caravan moved.¹³⁷ This individual who may change during the trip as new bodies of porters are hired, was likely of the most "local" ethnic group, but no particular class traditionally held this position. Any person who knew the routes well and could command gangs of porters could serve as a Kirangozi. Another special porter acted as "Mganga" or chaplain. His load was especially light but his religious presence was necessary to secure the good fortune of the journey. The Mganga also possessed some medical knowledge.

According to Burton and Speke, mixed in with the porters were many women and children whom never seem to make it to the official lists of caravan 'staff'. These people, members of a porter's family or simply 'hanging-on' to the safety of travel in numbers, were important to the life of a caravan. Johannes Fabian has analyzed the role of the women especially in information gathering. He has noted where some explorers have admitted that much of their information, especially ethnographic data was gathered via the women

¹³⁷ Burton, *Lake Regions of Central Africa* 241.

attached to the group.¹³⁸ Nominally under the control of the caravan leaders they would be bound to provide information if asked. The women of the caravan were probably the individuals responsible for finding sources of food at each halting point and this put them in the position of being able to learn many details about the surrounding countryside.

Following the porters would be the Arab and, in this case, British leaders of the caravan.¹³⁹ This rearguard position was taken to discourage desertion and malingering. The resulting travel was not ever a long day of walking. The caravan typically stopped by mid-morning. The heat of the day was too severe in the tropics and this pattern of movement was the custom. Considering also that some men may be carrying as much as seventy-pound loads, much more than a three-hour walk would have been difficult. The halting points were either established clearings or villages that profited from hospitality. Above all, the proximity of clean water was the most important characteristic for a decent stopover. The camp was asleep by eight o'clock in the evening; the sun in the tropics always fully sets by seven. During the hot season when the moon was near full, the caravan would walk mostly at night, halting with the rising sun.

The weather would affect the caravan greatly; the onset of the monsoon rains in November impeded progress, brought on fevers, and made the hiring of new porters exceptionally difficult. The rains were a critical time for agriculture and thus the men who worked as porters part-time sought to be home tending their fields. Alternatively, the drier periods made the planning of each stage critical, as water sufficient for up to 200 persons must be found each night.

To comment further on sickness, it is important to note that Burton and Speke, as well as many other member of the caravan, were affected by tropical illness and the muscle

¹³⁸ Fabian, *Out of Our Minds* 32.

¹³⁹ Caravans were not only Arab-led. Some caravans were Swahili-run, or exclusively Nyamwezi ventures.

and joint pain associated with hard travel anywhere. The malaria and dysentery of the tropics was extremely serious business; the causes of these diseases were unknown at the time and drinking water was not boiled. Many members of the caravan were rendered severely dehydrated, blind, deaf, and lame at times due to various fevers and parasites. At the back of the caravan finding either Burton or Speke delirious in a stretcher was not an uncommon sight, as their own journals admit.

Payments to all the hired staff would be promised ahead of time, with portions advanced and other portions left until service was completed. Extra payments had to be made if extraordinary duties were required. The typical porter could expect a standard ration each day with occasional feasts provided by the purchase of cattle or the killing of game. All food had to be traded for daily from villages along the route, and some stored for legs of the journey through lightly populated areas. Payment was made in beads, cloth, or the Spanish dollar, which was accepted at the coast.

As can be seen by reading through the inventory, Burton and Speke were not without the instruments and reference books necessary for geographical exploration. Galton's *Art of Travel* was present; Cuvier's *Animal Life*; and language references made up by Dr. Krapf. They also had some of the conjectural maps drawn up by Cooley along with them for reference. They had a collection of instruments clearly influenced by the recent work by Galton and the "Hints to Travellers" section in the 1854 *Journal*. Many of the important instruments were duplicated to prevent against a total loss due to breakage. An additional instrument, never mentioned in the "Hints" was the "pocket pedometer by Dixie".¹⁴⁰ This instrument was used for the dead reckoning of distance traveled per day. However its output depended upon the gait of the walker it was attached to. Normally

¹⁴⁰ Burton and Speke, "A Coasting Voyage,"; 225.

Speke wore it, but if he was prostrated by illness, it was worn by Bombay. Considered invaluable, the explorers wanted three more, probably so that all could be used and averaged for a more precise reading.¹⁴¹ I will discuss the use of these instruments and books in the next section.

Overall, Burton and Speke were in a situation where the essential conditions of knowledge production were beyond their control: climate, road conditions, illness, politics, and noise.¹⁴² Every aspect of their daily life occurred within the confines of an East African caravan, while they were bound to observe as European geographers. The style of life they wished to live was affected by their presence in a society that considered them a spectacle of difference. Quite frequently in their writings Burton and Speke complain of being stared at, laughed at, insulted and taken advantage of. Local politics and the culture of safari determined their every move, not their own epistemic desires. This essential tension, between the purpose of the expedition and the realities of daily life had profound effects upon the methods they used to gather information. Consequently, by resorting to methods devised in the field, Burton and Speke broke away from the methods proposed by the RGS geographers and brought criticism upon the expedition's results. The next section will take a close look at how these explorers went about gathering data.

Methods of Observation: instruments

Upon their arrival in Zanzibar in 1857, Burton and Speke attempted to interview the Europeans living there, but found them mostly ignorant of the interior. The Arabs they met could describe the routes but not appropriately. In his first letter to the RGS from Zanzibar,

¹⁴¹ My attempts to find drawings of this instrument have failed, though it is possible that the RGS archives in London have an example. Pedometers typically work by recording the movement of weights, caused by walking; thus the number of steps taken is known. If the average stride of the wearer is known, then the distance walked can be computed.

¹⁴² Fabian, *Out of Our Minds* 141.

Burton mentions that the Arabs and Swahilis are fearful and adverse to “white travelers”.¹⁴³ The local merchants were wary of the British because they were known to be against the slave trade and keen to take control of new trade routes. A certain class of traders, the Banyans, knew well about the British style of trade because they originally came from India. Despite this animosity at the coast, merchants were some of the most important informants in the interior.

Before setting out on the expedition to the lake, Burton decided that they would take a short journey north along the coast to the Pangani River and attempt to meet Rebmann, the missionary/cartographer responsible for the “Slug Map”. The RGS had thought he might accompany Burton and Speke, but Burton, already adjusting the plans, realized that the Muslim Arabs would be doubly skeptical of and adverse to an expedition with a Christian missionary member. They did meet Rebmann at his new station in Kusolidini, near Mombasa. This journey lasted from 17 January, 1857 until mid-March and was successful on two points: they met Rebmann and they were stricken by malaria. The current belief was that all Europeans came down with an “acclimatizing fever” soon after journeying to the African tropics. They intended to be struck by this fever while still within a few days’ reach of medical care at the British Consul in Zanzibar. The major journey was subsequently outfitted with difficulty before leaving Zanzibar for the second time 14 June, 1857. This expedition would simply not follow the pre-arranged plans.

From the very beginning of his journey Burton had to improvise the plans for his expedition, finding the expected assistance at Bombay to be less than helpful.¹⁴⁴ In Zanzibar, while preparing to leave for the supposed lakes, Burton had to abandon an iron

¹⁴³ Quoted in a letter dated 22 April, 1857 from Burton to the RGS. "Meeting, 23 November, 1857," *Proceedings of the Royal Geographical Society of London* II, 1857-1858: 52.

¹⁴⁴ Burton, "The Lake Regions of Central Africa, with Notices of the Lunar Mountains and the Sources of the White Nile,"; 9.

boat that had been broken into pieces small enough to be carried, and rebuilt at the lake.¹⁴⁵ The boat had been brought all the way from Britain, but due to a lack of funds for porters, could not be taken inland. Once they were at Lake Tanganyika, the absence of this boat was deeply felt; it would have greatly assisted their attempt to observe the lake.

While on Zanzibar, Speke spent his time rating the chronometers, and checking the instruments, preparing to make systematic observations inland. Meanwhile, Burton scrambled to hire enough staff and porters while not going over budget. The British Consul at the time, Colonel Hamerton, dedicated funds to the expedition but he died soon after they left. His successor, Captain Rigby, did not honor Hamerton's promises and this caused Burton great problems when he returned.¹⁴⁶ Despite difficulties with funds, the expedition finally set out after nearly six months on the coast. Life on safari had begun.

As described in the preceding section, the caravan normally ceased its major movements for the day by mid-morning. Once settled and fed, Burton typically found a shady spot, rarely his tent, recording the days' reflections in the diary or sketching.¹⁴⁷ It is during these sessions that Burton apparently recorded his voluminous ethnographic observations. We may also assume that he spent part of this time speaking with his servants and other members of the group, especially the women, about the customs of the area, languages, history, etc. Possibly he took walks in the villages and took notes on small strips of paper as he did during his trip to Mecca, in order to avoid detection. Unfortunately neither Burton nor Speke provided much information about how they went about observing

¹⁴⁵ Referred to as the "Francis Metallic Life Boat" by Norton Shaw, Secretary of the RGS, in a letter to Burton dated 2 February, 1857. Young, ed., *The Search for the Source of the Nile: Correspondence* 77.. Shaw was asking if the boat had arrived safely. Of course, Burton did not receive this letter until 5 December, 1858, and the boat was long gone.

¹⁴⁶ See all of Appendix II of Burton, *Lake Regions of Central Africa*. for the correspondence relevant to this debacle. On the whole Burton resented Rigby's complete lack of support for the expedition and accused him of endangering their lives. For the text of Burton's letter from the field pleading for assistance from an as yet unknown Consul see, Young, ed., *The Search for the Source of the Nile: Correspondence* 100.

¹⁴⁷ Burton, *Lake Regions of Central Africa* 247.

the people, but given the amount they wrote about this topic, we can assume they spent some time on this aspect of their project. Aside from observing and writing, Burton would also deal with any caravan business that required attention. If needed he would join the daily meeting of the caravan leaders to discuss the next day's stage.

Speke regularly went hunting in order to help feed the group and as a pastime. He also maintained the instruments and prepared for observations at night, if planned. Speke would have also spent time on his field books and maps, keeping track of the expedition's progress, as well as reducing previous observations. Because the tropical day lasts about twelve hours, never much longer, it is fair to assume that book work was done mostly during the day, when light was available.

By reviewing Speke's letters to the Society, it becomes clear that he too had to make considerable adjustments to his plans for the caravan. Writing from Zungomero, 192 miles from the coast, on 2 August, 1857, Speke says, "The chronometers have all failed in their ratings, notwithstanding the time and trouble I devoted to them at Zanzibar."¹⁴⁸ Barely 2 months' travel from Zanzibar had shown that chronometers were completely useless as observation instruments in the field. Speke had to resort to the more complicated lunar observations in lieu of chronometers in order to determine the caravan's longitude. Since this was an expedition that was traveling mainly along a west-east axis, longitude was critically important. Unfortunately for Speke, the sky proved too cloudy for regular observations, while the necessities of caravan culture required that they move on nearly every day, whether or not the astronomical position of the previous position was fixed. Given these difficulties, Speke was forced to improvise:

I have, in consequence [of losing the chronometers], been obliged to depend on the few latitudes by stars the ever-cloudy sky afforded me, on a pedometer for distances, and the general direction by

¹⁴⁸ Burton and Speke, "A Coasting Voyage,"; 221.

compass to guide me in the construction of the map. I carried the latter instrument in my hand the whole way, constantly observing the observations of the card and taking the means...Taking lunars is quite impossible so near the hills; two objects scarcely ever being in view at the same time in consequence of the constantly cloudy state of the weather, added to which my assisting servants are both ill...I must add that I commenced the journey by taking rounds of observations, with the heights of all the useful celestial objects, but the unfavourable nature of the atmosphere soon caused me to desist, and now I think myself lucky to catch a latitude occasionally. About the value of the Government boiling thermometer for determining heights I am in great doubt; it is the only one I have that reads to tenths, but another, on which I feel great reliance, affords a good check to it, and will always be a means of detecting the quality of water used.¹⁴⁹

The recommended instruments failed to live up to their expectations, while weather and disease interrupted Speke's scheduled, methodological observations necessary for the expedition's success. He also admits that when too sick to walk he must give the pedometer to his assistant, Bombay. In a subsequent letter dated 20 November, 1857, Speke wrote that the last dedicated boiling thermometer was broken. He had to resort to a simple bath thermometer for further altitude determinations. Years later it was realized that Speke's measurements were up to one thousand feet in altitude too low. Speke reduced all his altitude readings by using the method proposed by Sykes in "Hints to Travelers", which he had with him.¹⁵⁰

Referring to Burton's published journal of the expedition reveals more about the fate of the instruments—they all suffered breakage or loss of precision before the caravan ever reached Lake Tanganyika, the chief object to be observed.¹⁵¹ Burton admits that the pedometer broke on 25 August, 1857, and even when used gave wild readings when given to anyone besides Speke. Burton wished they had a wheeled device to measure distance; he called them "wheelbarrow perambulators". They had to resort to dead reckoning estimates cross-checked by occasional celestial observations. Anyway he writes, "a handful of miles

¹⁴⁹ Ibid.,: 221-22.

¹⁵⁰ Ibid.,: 224., Sykes, "Notes on the Possessions of the Imam of Muskat, on the Climate and Productions of Zanzibar, and on the Prospects of African Discovery from Mombas,".

¹⁵¹ Burton, *Lake Regions of Central Africa* 129,41-43.

little matters.”¹⁵² Over the first few months of travel, the explorers quickly realized that they would be unable to record data with the level of precision desired by the Society’s geographers. Consequently their maps would be less accurate.

A particularly disheartening event for Burton was the failure of the last chronometer. This occurred on 9 November, 1857, a day before Burton and Speke had planned to “make a night of it.” This quote, a reference to Galton’s advice, means that they were planning to stay out through the night and take celestial observations in order to accurately fix their longitude and latitude.¹⁵³ Thus gaining a critically needed control point. But the night’s work was thwarted. From this point on, the explorers used their sundial during the day and constructed a makeshift pendulum. It was necessary to count the seconds elapsed during an observation of lunar distance in order to attempt longitude. This was the method they used until they returned to Zanzibar in March of 1859. Galton later advised in his book that using a properly constructed pendulum is actually quite accurate when done properly, citing Burton and Speke’s success.¹⁵⁴

Burton lets us know how all the instruments fared. The barometers were useless and delicate—they quickly broke. The chronometers and watches all failed. Of five compasses taken, only one returned. The pedometer seized up. Luckily, the sextants remained useful and trusted, their demise would have rendered all further celestial observations impossible.

All of these instruments were extremely important, without them; the explorers would have been unable to relate their journey to the established geographical norms: latitude, longitude, and altitude. For the purposes of the British geographers, Burton and

¹⁵² *Ibid.*, 142.

¹⁵³ *Ibid.*, Galton, "Letter Addressed by Francis Galton, Esq., to the Secretary," : 349.

¹⁵⁴ Galton, *Art of Travel*.

Speke would have had no idea where they had been, even if they could return to Africa and retrace their route exactly. Burton and Speke wrote about the loss of instruments apologetically but calmly, each breakage was “disheartening.”¹⁵⁵ But with great seriousness, the explorers then carefully explained their substitutions and new methods. In order to be successful, they must provide convincing data for their locations. Each narrative description of a place was required to be accompanied by some attempt to determine that place’s geographical location. As instruments of remote sensing for the RGS, Burton and Speke had to keep a careful record of where they were. Without a location, their observations would be random, isolated events with no relation to the region as a whole. The explorers were beginning to see how easy it was to fall into this trap, and desperately sought convincing methods to avoid this danger.

A prime example of Burton’s worries about the reception of his data concerns meteorological observations. He knew that his instructions included recording meteorological data and he brought appropriate instruments. However the instruments failed to work properly and required too much time to use. The caravan could not stop to measure each rain shower. Burton opted to not pursue this project at all. He explains thus:

A few scattered observations may have been registered, but it was judged better to bring home no results, rather than imperfections which could only mislead the meteorologist.¹⁵⁶

Consequently, the meteorological data given by Burton or Speke was qualitative—when the monsoon stopped or started and how long it rained each day. They reported cloud types, wind direction, and air temperature as general aspects of the regions they traversed, not as a distinct project.

¹⁵⁵ Burton, *Lake Regions of Central Africa* 142.

¹⁵⁶ *Ibid.*, 337, footnote.

The most challenging aspect of African travel that affected the explorers' ability to observe was disease. When prostrated by fevers, they lost the ability to accurately determine the distance they traveled each day. They also lost the ability to protect what instruments they had from further damage. To complicate matters further, parasites and infections rendered both Burton and Speke blind for periods of time. Back at the RGS in May of 1859 Speke told the group:

My positions were fixed by astronomical observations, certainly under painful and considerable difficulties, owing to my constantly impaired state of health: weakness and blindness not being the least of these difficulties which I had to contend with.¹⁵⁷

The constant onslaught of disease frustrated Burton and Speke. They knew full well that each day that passed with either of them delirious and in a stretcher, blind and weak, was another day lost to the eyes of the British geographers. That day did not exist for science. It did not matter that the explorers expended most of their money, time, and energy simply existing; what mattered was what they did once they got there. The bodies of the explorers were merely the vehicles for their senses; the extended senses of the geographers of Britain. In the next sections I will further discuss the reception of the explorers' reports by members of the RGS, after discussing a final point about observation.

Methods of Observation: local informants

When looking at Burton's map of the route taken by the expedition, it becomes clear that the senses of the explorers were not always the direct route by which the topography of East Africa was transferred to paper. There are a number of topographical features that are expressed on Burton's map by dotted lines—an expression of uncertainty for features that could not have been seen by either explorer. Speke's field maps also show such unseen features, though he characteristically used solid lines, implying more reliability.

¹⁵⁷ "Meeting, 9 May, 1859," *Proceedings of the Royal Geographical Society of London* III, 1858-1859: 212.

Aside from accusing them of complete fabrication (an accusation sometimes made by homebound geographers against explorers in the nineteenth century and not without just cause) we must assume that this information was gathered from local informants.¹⁵⁸ Local informants were individuals who dwelt in the “unexplored areas” and had visited these places themselves or knew of them indirectly. Burton and Speke spent every single day of their expedition meeting and conversing with the local residents of East Africa, and they spent much of this time discussing the geography of the region. It was through these conversations that they began to construct mental images of the regional geography, in conjunction with their instrument-based observations.

The two explorers do not often relate these conversations directly, preferring to use terms such as: “all of my sources” or, “all of my native informants”. It should be noted here as well that interpreters, sometimes more than one, facilitated most of these conversations.¹⁵⁹ Using all the available members of the caravan, a chain of interpreters would be set up if necessary to get from the informant’s language to one understood by Burton or Speke. If the informants were Arab merchants, then Burton could easily speak to them directly. Speke and Burton also both spoke Hindustani, which was understood by Indian Banyan merchants as well as Bombay, Speke’s assistant. Both explorers attacked Swahili, trying to learn it as quickly as possible. Unfortunately for the explorers, the Bantu language group was unknown to most European linguists in the nineteenth century, and its grammar structure is quite different than Indo-European languages. Burton apparently had much more success

¹⁵⁸ Cooley famously criticized an explorer in 1832, accusing him of fraud. See, Bridges, "W. D. Cooley, the RGS and African Geography in the Nineteenth Century,"; 29.

¹⁵⁹ See this article for a close look at the role of interpreters in Portuguese exploration, Hein, "Portuguese Communication with Africans,".

with learning Swahili than Speke, but both had problems. Speke insists that neither of them ever became proficient in any African language until near the end of the expedition.¹⁶⁰

Possibly due to the language problems, the first time we really get a glimpse at how Burton and Speke relate to local informants occurs in the reports of their month-long stop at Kazeh (Tabora), about halfway from Zanzibar to Lake Tanganyika. Kazeh was a large trading market run by Arab and Swahili merchants. Burton was able to converse in Arabic here, a language he spoke fluently. The opportunity was taken to talk with the local merchants about routes, lakes, rivers, and mountains. In particular, Burton spent most evenings with Snay bin Amir, an Arab merchant who lived at Kazeh. Burton freely tells us that Snay was a key source of information about East African geography and ethnography. It helped that Snay was also a traveler and literate. Burton considered him honest and honorable. Burton found the Arabs more familiar than other groups of East Africans.

Burton's relationship with Snay characterizes a chief mode by which local informants were employed; they became trusted patrons to the explorers, providing them with safe lodging, advice, and geographical information. This is a different relationship than simply interrogating locals met en route; more trusting and detailed. It was in talking with Snay that Burton and Speke learned that there were three distinct lakes in East Central Africa: The Nyassa (Lake Malawi), The Sea of Ujiji (Lake Tanganyika), and Ukerewe (Lake Victoria). Some of the confusion surrounding previous maps was beginning to come clear. Burton and Speke were still not in a position to directly observe these lakes, but they were learning much about the region. This knowledge is being generated through their cultivation of relationships with East Africans.

¹⁶⁰ John Hanning Speke, *What Led to the Discovery of the Source of the Nile*, 1967 ed. (London: Frank Cass & Co., Ltd., 1864) 199.

Besides the random encounters and conversations of daily caravan life, and the befriending of certain locals who could be probed for information over a number of days, a third method was employed: calling a meeting. In Speke's writings he reveals that from time to time a meeting was held in order to discuss geography:

At my request Mahaya [a Chief at Mwanza, on Lake Victoria] assembled all his principle men, and we went into a discussion about the lake.¹⁶¹

Elsewhere, Speke refers to these discussions as, "the usual debates."¹⁶² The explorers' job at these meetings was to get a sense of the geography they could not directly observe through the knowledge of others. Interpreters were very important for these conversations. A frequent difficulty arose when the various informants disagreed with each other or were ignorant of the area. Speke and Burton both find these meetings important and tend to trust information that can be corroborated by many individuals. Another method of checking this information, and that of any informant, was for Burton and Speke to actually visit the described places, as a result of the caravan's route. If an informant was found correct in this way, then their information about other areas was considered more reliable. When citing local informants in their journals Burton and Speke are careful to mention when local informants are proven reliable by direct verification.

This method for making use of local informants was quite similar to the already familiar use of ancient or foreign sources utilized by the RGS geographers. Multiple sources were checked if possible and they were crosschecked for corroboration and internal consistency. This is also a method that was fraught with difficulty and lacked conclusiveness as seen in the debates outlined above. Despite the fact that Burton and Speke were in the

¹⁶¹ John Hanning Speke, "Captain J.H. Speke's Discovery of the Victoria Nyanza Lake, the Supposed Source of the Nile. From His Journal--Part I," *Blackwood's Edinburgh Magazine* 86, no. 4 (1859): 416.

¹⁶² Speke, *What Led* 350 footnote.

region, they still had to resort to informants in lieu of the ability to directly observe geography—in spite of their charge to directly observe all that they could.

I will deal with local informants more specifically in the following chapter, but it is important to note here another aspect of how they were used by Burton and Speke. In Chapter Two, I discussed the problem of determining river direction from the reports of local informants. When concerned with the key issues about the great lakes of Africa and whether or not specific rivers were influents or effluents, the explorers felt able to change local testimony when they thought the informants were themselves confused. A famous example of this occurs with the testimony of Sheik Hamed bin Sulayyim, a leader at Kasenge Island in Lake Tanganyika. Hamed provided Speke with a wealth of information about the lake over a few days, information that Speke saw fit to change later, due to the information of other informants and his own nascent sense of the region's hydrogeography. Speke presents Hamed's description of the southern portion of the lake with absolute confidence; but when discussing the northern portion of the lake and the nature of the Rusizi River, Speke is less confident. He writes,

I feel convinced that he was romancing when talking of the northern river's flow, not only because the northern end of the lake is encircled by high hills—the concave of the Mountains of the Moon—but because the lake's altitude is so much less than that of the adjacent plateaus.¹⁶³

In this case Hamed's testimony was only valid so far as other forms of evidence corroborated it. He was not a fully empowered ruler of the land, but a part of it. Speke felt able to draw a map of the land based upon three forms of evidence: his senses, instruments, and informants. Of these sources, none were considered more reliable *de facto*, but only after the data were appropriated into the explorer's geographical schema for the region.

¹⁶³ Speke, "Journal of a Cruise on the Tanganyika Lake,"; 352.

Depending upon the situation, one of these sources may be faulty, though for the explorers, local informants were most often found to be fallible.

Back Home: the reception of expedition data

The process of geographical exploration does not end with the expedition, just as it did not begin with the journey abroad. Mid-nineteenth century geographical exploration in Britain was almost entirely under the control of the RGS. The members of the Society, and especially those who were considered experts on African geography were a critical part of the process. Geographical exploration involved many people beyond the explorers. The explorers did not finalize the knowledge produced by an expedition; it was analyzed and debated by many homebound geographers.

From the point of contact with the unexplored region, a process began that involved many steps of translation and interpretation. For Clive Barnett, any deconstruction of the African travelogue involves examining the processes of contact and appropriation that underscore the exploration project.¹⁶⁴ His analysis stops in the field, but it is important to remember that Burton and Speke were members of a Society that acted over very long distances. Steven J. Harris refers to such institutions as long-distance corporations.¹⁶⁵ By remembering the corporate nature of the East African Expedition, we cannot situate the generation of knowledge by the expedition in any one particular place, the process is both local and distributed, with no privilege to either site.¹⁶⁶ Key participants in the process, explorers were the most remotely situated members of the corporation. Their presence in the field provided other parts of the corporation with data to be analyzed.

¹⁶⁴ Clive Barnett, "Impure and Worldly Geography: The Africanist Discourse of the Royal Geographical Society, 1831-73," *Transactions of the Institute of British Geographers* 23 (1998): 243.

¹⁶⁵ Steven J. Harris, "Long-Distance Corporations, Big Sciences, and the Geography of Knowledge," *Configurations* 6, no. 2 (1998).

¹⁶⁶ *Ibid.*,: 300.

In this way, Barnett's focus on contact and appropriation is correct but limited to the field. Harris also limits his discussion to acquisition and control of remote members. Here, I propose that a five-step process best represents the entire project of geographical exploration: contact, acquisition, appropriation, reporting, meta-analysis. The first three steps have been the subjects of much of this thesis so far: contact with sources; acquisition of knowledge; and the appropriation of knowledge for new purposes, i.e. the development of a European geography of East Africa. This section will look at the final two steps: reporting of findings by explorers and the meta-analysis of this information by other members of the RGS.

Burton and Speke were not completely cut off from the RGS during their journey. When the opportunity arose, they would send correspondence to Britain via Zanzibar. This could happen when a caravan traveling to Zanzibar was encountered and the leaders of the caravan appeared trustworthy. The explorers also received letters when caravans from Zanzibar caught up with them, or left letters at important depots. This correspondence was not frequent and depended on many other individuals, but it did function.

By using the minutes published in the *Proceedings of the Royal Geographical Society*, I will discuss the reception of letters from the field. The roles of explorers and homebound geographers are shown here as they engage in a conversation extended over thousands of miles. One of the first packages sent to the RGS from Zanzibar included details of Burton and Speke's trip to see Rebmann in early 1857 as well as the initial stages of their journey inland. This information was discussed at the meeting of the RGS 23 November, 1857.¹⁶⁷

The letters were read to the members present, and then the President, Murchison, noted that:

¹⁶⁷ "Meeting, 23 November, 1857," *Proceedings of the Royal Geographical Society of London* II, 1857-1858.

As there are distinguished African travelers in the room, I hope we may hear observations from them on this memoir.¹⁶⁸

Given the floor, the now famous Livingstone related that he had never traveled to the regions referred to in the letter. However, he did feel that Burton would have no problem reaching the lake, which he also agreed could not be as large as that depicted in the “Slug Map.” He looked forward to Burton’s future reports because, “One observation is worth a wagon load of speculations.”¹⁶⁹ Calling upon other explorers was usual at the meetings. In this way the audience would gain from the comments of an expert, and also receive some verification of the comments made in the letters from the field.

The next discussion of letters from Burton and Speke occurred over a year later, 24 January, 1859. The RGS had received Speke’s field book and a map and letters dated 24 June and 2 July, 1858. Burton and Speke had visited Lake Tanganyika by this time. The information and manuscripts were joyously received by the Society, and Murchison, again President, began the discussion. After quickly praising the explorers, he made the following point:

We are not yet acquainted with all the scientific details, nor able to answer for the exact longitude and latitude of different places; for you have heard how the travellers have been exposed to dire illnesses, and have been rendered almost incapable of making observations.¹⁷⁰

Having made this disclaimer, Murchison suggests how the information presented may affect other theories of the region’s geography—noting that the reports possibly corroborate his 1852 theory of a great watery plateau in the middle of Africa. He also proposes that Ukerewe (Lake Victoria), not yet visited by Speke, may prove to be the source of the Nile, mainly because it appears to be in the correct location.

¹⁶⁸ "Ibid.,"; 56.

¹⁶⁹ "Ibid.,"; 58.

¹⁷⁰ "Meeting, 24 January 1859," *Proceedings of the Royal Geographical Society of London* III, 1858-1859: 113.

Following Murchison, James MacQueen stood up to give his somewhat acidic opinion, excerpted here:

There is not much room for any observations regarding this route, except, perhaps, with reference to the position of the lake. The latter point is the only position that has been determined by astronomical observations. Every other position in the journey is fixed by bearings and estimated distances, and even those estimated under confessed difficulties. The lake I consider is too far to the west...

With regards to the accounts given by the Arabs, I pay no attention to them; the Arabs make such gross mistakes about lakes of water...

I beg that it might not be supposed for a moment that I wish to under-rate in any way what Captains Burton and Speke have done. I have no hesitation in saying that theirs is the best route we have, but I think that there are some parts of it that are not quite accurate, especially those portions on the first highlands from the sea coast¹⁷¹

MacQueen wastes no time in using his excellent research to question the explorers' reports. While he does not doubt their truthfulness, like Murchison he doubts their fitness and ability. MacQueen seems to also have some problems with the choices being made by the explorers about local informants; he feels they should be used with extreme reservation. The discussion then turned to the possibility of snow on top of Kilimanjaro, a very popular question at that time, and how the recent letters may affect this possibility. Murchison reminded the group that this was not the question at hand and not to mix up the exploits of the explorers with "our theories"; the meeting then closed.

An interesting exchange occurred between Speke and MacQueen at the meeting of the Society on 9 May, 1859, only two days after Speke had returned from Aden, where Burton remained. MacQueen had just presented a paper titled, "Observations on the Geography of Central Africa" when Murchison introduced Speke to the group. Speke proceeded to make his claims that Ukerewe, now named Lake Victoria by him, was the source of the Nile. His conclusion was based on both direct observation and local testimony. Speke's conclusions put the northern edge of his lake at 3°30' N Latitude, which directly covered a range of mountains proposed by MacQueen. In response to this attack

¹⁷¹ "Ibid.,"; 114.

upon his theory, and aware that Speke had not directly observed the area anymore than he had, MacQueen questioned key points in Speke's comments that relied on local informants. In response to this Speke could only say that his information was from, "highly intelligent Arab merchants."¹⁷²

Such debates and comments continued when Burton returned a few weeks later. The two explorers presented a joint paper on their findings. The Earl of Ripon was now in the President's chair and he opened the discussion by stating:

The arguments adduced by Captain Speke, [that Lake Victoria is the source of the Nile] I think all will admit, are of very great weight, although probably some gentlemen here may be inclined to question them. No doubt his conclusion cannot be taken as absolutely established until farther explorations have been made, which I hope will be carried on under the same excellent explorers: and I trust such fresh discoveries will bring forward complete evidence of the fact, or rather support that which is now only a matter of opinion.¹⁷³

In fact, doubt surrounding Speke's conclusions and the expedition's geographical data were mounting from new areas. Francis Galton thought that "serious anomalies" existed in the maps, especially where "native testimony" was the main source of information.¹⁷⁴ Colonel Sykes thought that the doubt required another expedition to be sent immediately. He had also questioned the entire debate as asking an unanswerable question, because the Nile is certain to have more than one source.

Burton and Speke were not the only explorers to receive immediate criticism. During 1859 Livingstone was also questioned and his reports analyzed for possible exaggeration.¹⁷⁵ By 1860 Speke had been sent back with James Grant to further explore the region, and answer the questions raised by the first expedition. It should be remembered that Africa was not the only region being discussed at this time. Other meetings focused on Australia, Asia, and the Americas and all reports read were open to discussion.

¹⁷² "Meeting, 9 May, 1859," *Proceedings of the Royal Geographical Society of London* III, 1858-1859: 214.

¹⁷³ "Meeting, 13 June 1859," *Proceedings of the Royal Geographical Society of London* III, 1858-1859: 352.

¹⁷⁴ "Ibid.," : 355.

¹⁷⁵ "Meeting, 28 November, 1859," *Proceedings of the Royal Geographical Society of London* IV, 1859-1860: 22.

In the mid-nineteenth century the culture within the RGS allowed for the immediate questioning and doubt of explorers' reports. Explorers were not accused of lying, but of misinterpretation, or over-interpretation. Many homebound geographers who had researched thousands of sources for their information were not willing to be upstaged by a handful of brave young upstarts; many with little formal training in geographical skills. They would prefer the explorers to produce observations, and leave the meta-analysis to the experts. It is remarkable that even in the very first sentences of comment on Burton's letters, the Presidents of the RGS remarked that the information was not yet certain, because it has not been checked. Until the astronomical data were verified and the instruments examined, if possible, the explorers' findings were not final: they were only opinions. In 1875, Clement Markham, Secretary of the RGS commented on the reports provided by Cameron, by highlighting the method used in presenting them. The quote will help us to see the position of an explorer to the members of the Society and what was considered good practice in exploration:

The explorer has transmitted his journals to this country in the form of diaries, entered day by day. This is quite right, and it is the form most valuable to our map compilers, and to those whose business it is to examine and scrutinize the work.¹⁷⁶

Furthermore, if an explorer's conclusions were based on local informants, then these statements were wide open for criticism. Speke could only aver his informant-based claims by noting that his informants were "intelligent" and "reliable." There was no way for him to conclusively argue that his findings were an accurate representation of the geography of the region. The same situation faced every explorer who mentioned places they did not measure themselves.

¹⁷⁶ Clement Markham, "Examination of the Southern Half of Lake Tanganyika," *Proceedings of the Royal Geographical Society of London* XIX, 1874-1875 (1875): 246.

Using informants in geographical field research was perceived no differently than using ancient texts or second-hand reports for home-bound geographical research in the style of Beke, MacQueen, and Cooley. Therefore the geographers could enter into debate with those who had direct experience of the region as equals. An explorer could be proven wrong by men like MacQueen because at this point in geographic epistemology, both research methods were acceptable.

When reporting their information to the society, Burton and Speke became reporters—a job as critical to their expedition as walking. They also entered the stage of meta-analysis where the data they collected, the instruments they used, and even the state of their own bodies at the moment of observation would be scrutinized as possible sources of error. The explorers gave up part of their own individuality as they became instruments of observation. If the calibration of this instrument was suspected to be faulty, then the results could be tainted.

Questioning the results and drawing conclusions from an expedition's data that differed from the explorer's own opinion was perfectly acceptable. No explorer at this time had any more right to determine the final empirical output of his own expedition than any other member of the Society. The group as a whole would eventually arrive at a consensus once enough trusted empirical evidence was acquired. Thus, explorers were not independent adventurer/scientists, but rather the extended senses of an institution that sought to gather a complete picture of the world, and this project rested in no particular set of hands. Neither were the conclusions

Conclusion

This chapter has attempted to draw out two important points about Victorian exploration. The first is that explorers extended the senses of the RGS to the furthest

reaches of geographical knowledge. Thus, they were instruments of remote sensing, used by a larger community as tools for their research into the geography of Africa. Evidence for this relationship between explorer and society is found in the journals and minutes of the RGS, where expeditions were discussed before, during, and after their deployment to the field. Members of the Society expected explorers to follow prescribed methods and produce data that met pre-established empirical standards. Instrument-based observations were considered the most desirable and reliable. These types of observations did not require the explorer's interpretation and their use downgraded the explorer to the status of a technician in the field. If instrument-based observations could not be made then reasons for this were required. In this event, the explorers were expected to establish their ad hoc methods of observation and defend their logic to a group of geographers. Furthermore, explorers did not possess any right to the conclusions from their data that exceeded the other members. A quote by Speke made before the RGS in 1863 as he began to present his conclusions from his second expedition demonstrates how an explorer needed to place himself firmly in control of his observations, establish his method and explain its deviations from direct observation, and argue for his authority concerning the particular geographical questions, in this case, the source of the Nile:

It must be borne in mind, however, that my observations respecting this great river are not the result of one expedition, but of two; that I have not actually followed its banks from head to foot, but have tracked it down, occasionally touching on it, and even navigating it as occasion offered, for the barbarous nature of the Africa lakes forbid the traveller doing as he likes; therefore, to give full weight to any inferences I may draw, deduced from what I have only seen in part, I shall blend native information with my own experiences, and in doing so shall hope to teach others what I know, and, beyond that, what I believe myself.¹⁷⁷

Viewing explorers as instruments, we can better understand that when the observational methods proposed by the Society were abandoned due to the realities of the field, the explorers were entering a dangerous area where their data might be judged totally

¹⁷⁷ "Meeting, 22 June, 1863," *Proceedings of the Royal Geographical Society of London* VII, 1862-1863.

useless, or little better than previous unsubstantiated journals written by ‘non-scientists’. Furthermore, using local informants as sources possessed no greater empirical weight than the already powerful secondhand sources available to the RGS geographers via ancient and foreign texts.

Explorers, we have seen, possessed very little control over the field environment in which they worked. As Fabian points out, when everything else was African, the explorers had to at least maintain a European gaze.¹⁷⁸ Thus, debates occurring after expeditions are almost impossible to avoid since explorers lacked the empirical control in the field necessary to avoid criticism. Unable to show that they maintained a consistent method of observation in a dynamic and utterly foreign environment, explorers were left with only their sanity as proof of their reliability.

The second point will lead us to the final chapter on local informants. The greatest conclusions made from the reports of the First East African Expedition were based on information gathered almost completely from local informants. In the area of ethnography it has been shown that most of the information came from local informants, not direct observation. In fact, any piece of information beyond the direct gaze of the explorer/observer must have come through conversation with locals. It is for this reason that I proposed my five-part scheme for analyzing explorations: contact, acquisition, appropriation, reporting, and meta-analysis.

The five steps lead us from the explorer’s contact with local informants to the meta-analysis by other members of the explorer’s institution. Using this framework, the key actors in geographical exploration are included completely: locals, explorers, and homebound members of the explorers’ society. The translation of knowledge from one source to the

¹⁷⁸ This is a point repeated throughout Fabian’s work. Fabian, *Out of Our Minds*.

next is thus demonstrated as a necessary part of the endeavor and constituent to the generation of geographical knowledge. However, the five steps are not strictly linear, some research by geographers jumped steps as they received local knowledge through travelers' tales. The explorers possessed already analyzed information from locals before embarking on their journeys that affected their view of a new environment. The next chapter will look very closely at how local informants were present at every step of the process of geographical exploration.

Chapter Four: The Impact of Local Informants at the Periphery to Geographical Knowledge at the Core

Burton and Speke's expedition raised more questions than it answered. Consequently, a thorough understanding of East African hydrogeography was not established by the RGS until the expeditions of Verney Lovett Cameron and Henry Morton Stanley during the mid-1870s, almost twenty years after Burton and Speke left Zanzibar for the interior the first time. This period was one where more information than ever before was available about East Africa, though no one was sure how to interpret the findings. When reading through the seemingly endless debate about the rivers and lakes of East Africa it becomes apparent that one source of information is more contentious than all the rest—local informants. What the many locals meant when they spoke with Burton and Speke about the regional geography was endlessly debated. Each geographer had a “champion” whom they would hold up as a trusted, accurate source. Other geographers were discouraged when their sources became untrustworthy. Some informants were considered reliable for some information, but considered wrong in other aspects of their testimony. During the years of this debate, local informants went about their lives unaware that a conversation they had with an unusual foreigner a few years ago was causing endless discussion in the capital of one of the world's strongest empires. Often illiterate and unnamed in the accounts, local informants had great impact upon the activities and discussions of the RGS members.

This chapter will examine a few of these informants, as closely as is allowed by the scanty resources available about them. Instead of being present at only the initial steps, local informants were influential at every single stage necessary for the generation of geographical knowledge: from contact to meta-analysis. Neglecting the full-story, modern histories of exploration present these informants only as sources for explorers. They are often portrayed

as part of the environment that explorers had to deal with in order to achieve their goals and function daily. “Good” explorers are often seen as individuals who could surmount the physical challenges and deal with locals who delayed expeditions. It is difficult to discern from these histories what active role local informants played in geographical exploration and how they contributed to the growing body of geographical knowledge presented in periodicals like the *Journal of the Royal Geographical Society*.

An attempt to look at locals who assisted the explorers was made by Donald Simpson with his study of the guides hired by explorers to work with the caravans or to be personal attaches.¹⁷⁹ One famous individual portrayed was Sidi Mubarak Bombay, who worked for at least four explorers from 1856-1870 and worked with both East African Expeditions. Simpson considered questions about the “geographical abilities” of African guides, specifically how they were able to adapt their own concept of regional geography to that of the explorers’. For example, Bombay learned how to read a European map from Speke and began to use it as a tool, demonstrating his ability to adjust to foreign representations of geography.

One book focusing on those who were in direct contact with explorers through a contract of employment cannot cover the immense history of interaction, but there are no others dedicated to this topic. Johannes Fabian documents the interactions between Africans and foreigners in parts of his book *Out of Our Minds* and in a previous article, *Remembering the Other*.¹⁸⁰ Fabian highlights the concept of recognition in the knowledge generation process during the type of research done by geographical expeditions. He

¹⁷⁹ Donald Simpson, *Dark Companions: The African Contribution to the European Exploration of Africa* (London: Paul Elek Ltd., 1975).

¹⁸⁰ Johannes Fabian, "Remembering the Other: Knowledge and Recognition in the Exploration of Central Africa," *Critical Inquiry* 26, no. Autumn (1999).

acknowledged that participants in a cross-cultural conversation had to maintain their identity while establishing that of the other. This is not a simple process as Fabian points out:

Identity must be maintained because action needs an agent; it must be abandoned because no action, certainly not the kind of action intended in exploration and ethnography, could take place if identity were rigidly maintained. This apparent contradiction resolves itself as soon as identity-- and its recognition--is thought of not as a property or state but as a process.¹⁸¹

Indeed, the inherent paradox of local informants in geographical journals was not only linked to their identity but also to the fluidity of their position in reference to the explorer's process of knowledge acquisition and appropriation. Locals were objects to be observed as well as sources to be mined for information. We can see in the same passages a local individual transform from one position to the other as the explorer's purposes change. Explorers either interrogated or observed locals, depending upon the type of information desired.

The status of the informant changes with the explorer's changing perception of the individual once contact is made. How a local is perceived is not predetermined but rather determined by the relationship's progress. Once the contact commences the explorer begins to acquire knowledge about the informant and about what the informant knows. If the explorer desires more of the knowledge possessed by the informant, then the relationship is changed to facilitate this new mode of information exchange. Not merely an object, the informant's assessment of the explorer also had influence upon status. Informants who opted to freely provide information, gained agency for themselves in the explorers' journal—they became named individuals and valuable informants. Other locals, who did not possess or provide useful information, are remembered only as nameless objects of ethnographic research. While arguably still controlled by the explorer as author, local individuals had some unseen influence over their portrayal through their assessment of the explorer.

¹⁸¹ Ibid.,: 67.

Thus, the identity of the local individual remained the property of neither party, although arguably weighted towards the explorer as author. Identity was produced by the *relationship* between the foreigner and local. This relationship had no agency of its own, but as an entity requiring the contribution of both parties, it produced something different than the solitary thoughts of each participant: the text describing information exchange between two people.

This relationship was not only a story to be told, it produced results as part of a larger epistemic process. Burton and Speke utilized their perception of the relationship between themselves and locals during their determination of whose information to trust and whose story to discard. We may consider that the explorers accepted trusted informants into a relationship where the “otherness” of the local was reduced. Certainly with regard to Arabic speakers, Burton considers them less “African” and therefore more agreeable and consequently, probably more trustworthy. Burton’s own self-identification with the Arab people had no small influence upon this determination.¹⁸²

These considerations of identity and position challenge our ability to sort out the processes of developing geographical knowledge through local informants’ testimony. Only able to perceive the local informant through the text of the explorer distances us from their own thoughts and actions—they are, in a sense, out of context. This is a major reason for why this aspect of the History of Geography remains at least partly covered. It must be remembered that in most cases, using local informants represented a methodological error on the part of an explorer whose job was to directly observe phenomena. Thus, local informants are not always highlighted in accounts of expeditions but alluded to reluctantly.

¹⁸² The biography of Burton is well-known, but it bears repeating that he was indoctrinated into secret Muslim religious societies and is assumed to have practiced Islam as a believer for some parts of his life. He found the nomadic lifestyle of Bedouin societies especially fascinating.

Developing a historiography that will effectively deal with half-hidden individuals who were both objects and sources precludes any attempt at looking at exploration entirely from the standpoint of the explorer. Thus, a new way of looking at the journals is required.

An explorer's journal does not stand alone as a work of literature; it is a conglomerate of many inputs. Moreover, we cannot embrace the explorer's text without also considering the reception of the text in the European geographical community. In order to draw out these problems, I will use the example of the Rusizi River, which is located at the northern tip of Lake Tanganyika. Various theories concerned with the aspect of this river, never seen but often discussed by members of the RGS from 1859-1874, proved to be extremely important to the understanding of East Africa hydrogeography during this period. After this I will discuss Speke's claim about the size of Lake Victoria and its contribution to the Nile River. In both cases I will be focusing on the documents relating to the First East African Expedition, the second expedition (1860-1863), led by Speke is alluded to as well but not in as much detail.

Sheikh Hamed bin Sulayyim and the Rusizi River

On the 18th of February 1858, when Burton and Speke's caravan reached Ujiji, on the coast of Lake Tanganyika, they were exhausted and quite ill. Speke was mostly blind and both of them were weak from fever. The other members of the party were suffering similar fates. But time was not wasted. There was an entire lake, never seen before by a nineteenth-century British geographer that needed to be observed

According to Burton, several informants had told him that a large river flowed north from the lake. Because the entire northern part of the lake required exploring, and the observation of this river would be critical to understanding the connection of Lake Tanganyika to the overall hydrogeography of Central Africa, some proper conveyance would

be required. The iron boat they had planned to take with them was left behind at Zanzibar and the local canoes were considered inadequate for the task. The only possible solution arose when it was learned that an Arab merchant, Sheikh Hamed bin Sulayyim, owned a sailing dhow, the only such boat on the entire lake. But Hamed lived across the lake on Kasenge Island. As a result, Speke took two canoes with crew on a solitary mission to Hamed's island to see if he could hire the boat.¹⁸³

The journey was a failure in terms of obtaining transport; Hamed kept promising but never delivered the vessel. Speke spent a few days under Hamed's care trying to secure use of the boat and in the process, learned quite a few things from him about the lake. On his journey to and from Hamed's island Speke made some measurements of the lake's width though the captain and crew of the canoes would not allow Speke to ask strange questions or use his foreign instruments while the canoes were underway because this was seen as a bad omen. Unfortunately, he did not have sounding leads with him so he did not attempt to measure the lake's depth. Consequently, Speke's observations of the lake would have to be augmented by local informants in order for his report of the lake to be complete. Sheikh Hamed turned out to be a major source of information, according to both Speke and Burton's accounts.

Sheikh Hamed said he had visited both ends of the lake. Two rivers flowed into the lake, one at the southern end, the Marungu, and on the eastern shore the Malagarazi, which Burton and Speke had already seen. At the northern end of the lake a large river, the Rusizi, flowed out of the lake. However, Hamed's easy divulgence of geographical information

¹⁸³ The story of Burton and Speke's time on the lake is told in four places: Burton's journals, both written in late 1859, and Speke's accounts in *Blackwood's Edinburgh Magazine* during 1859 and a book written by Speke in 1864 called *What led to the Discovery of the Source of the Nile*. Burton, "The Lake Regions of Central Africa, with Notices of the Lunar Mountains and the Sources of the White Nile,"., Burton, *Lake Regions of Central Africa*., Speke, "Journal of a Cruise on the Tanganyika Lake,"., Speke, "Captain J.H. Speke's Discovery of the Victoria Nyanza Lake-Part II,"., Speke, *What Led*.

came at a price: Speke was unable to truly explore the western side of the lake because Hamed kept the status of the dhow unknown, and kept Speke from taking canoe trips for observations. After about twelve days Speke finally left in frustration and had to proceed directly back across to Ujiji—without a proper boat with which to conduct a thorough survey of the lake.

Hamed had provided Speke with much information and his reports of the rivers connected to Lake Tanganyika were forceful. He appeared truthful, even if less than accommodating about the dhow. Subsequent to Speke's trip to Hamed's island, Burton and Speke condescended to hire some canoes and spent nearly a month trying to reach the northern tip of Lake Tanganyika. They wanted to reach the Rusizi, because if it proved to exit the lake, as Hamed said, then it could contribute to the waters of the Nile and thus constitute a major discovery. A discovery like this would require the direct observation of the explorers.

Thwarted by local politics and an unwilling crew, they could not sail further north than Uvira, a town about twenty miles south of the river. Burton describes Uvira as, “the northernmost station to which merchants have as yet been admitted.”¹⁸⁴ It was impossible for them to go further. At Uvira, they learned from the sons of the local Sultan, Maruta, that the Rusizi flows into the lake, not from it. Speke writes that he wouldn't have agreed with this counter-statement immediately, but it seemed to agree with his observation of the landscape—he noticed tall mountains in the distance. A river would not flow through the mountains. Dejected by the news, Burton lamented the information but accepted it at that point, aware that he had become irrational with the chance of glory:

¹⁸⁴ Burton, *Lake Regions of Central Africa* 352.

I had not, it is true, undertaken to explore the Coy Fountains by this route; but the combined assertions of the cogging shaykh and the false Msawahili had startled me from the properties of reason, and—this was the result!¹⁸⁵

He felt that his own preconceived notions of the region's geography, unreliable local informants and the glory of finding the source of the Nile had momentarily clouded his mind. They never saw the river, but its direction of flow seemed to be determined, at least in their minds.¹⁸⁶ The Rusizi flowed into the lake. The final bit of proof was the testimony of Bombay, who had been with Speke to see Hamed and thought that Speke had misunderstood the Sheikh anyway.

This whole situation became a problem for Burton and Speke when they returned to the RGS because they had no idea where all the water that flowed into Lake Tanganyika went. The initial conclusion of both explorers was that the lake had no outlet because the lay of the land they observed suggested this, and no outlet had been reported to them by anyone they met. This description was impossible for the geographers in Britain to accept because the lake was fresh water; Speke and Burton drank from it. Lake Tanganyika, they argued, would be the “Dead Sea” of Africa if evaporation were the only process by which water left the basin. Burton strangely supposed that the lake was salty, but lacked some key mineral that would have produced the salty taste. This was a defensive theory made in the absence of reliable observations. The facts were that there was neither information nor hint of any effluent river, and without any clue, where would it be?

Because geographers could not wholly accept Burtons and Speke's conclusions about the lake, the testimony of Hamed was reinterpreted many times by the explorers and members of the RGS in order to solve this difficulty. Hamed may have been wrong about

¹⁸⁵ Ibid., 353. By “shayk”, Burtons refers to the local ruler at Ujiji, and the other Swahili (“Msawahili”) traders who, as it seems to Burton, were completely unreliable sources of geographic information.

¹⁸⁶ By 1864, Burton will change his mind about the Rusizi, due to his re-interpretation of his journey and the further reports of other explorers.

some or all of the information he freely provided. Speke himself reinterprets his own conversations with him and makes significant changes to his reporting of these conversations. Speke first published an account of his conversations with Sheikh Hamed in *Blackwood's Edinburgh Magazine*, in September, October, and November of 1859, soon after returning. This text was largely written in the field, and Burton helped Speke with the editing. In early 1864 Speke republished this account as part of his book *What Led to the Discovery of the Source of the Nile*.¹⁸⁷ The changes made to the text before republication are important because we can see how the complicated nature of local testimony was combined with other sorts of information to draw new conclusions from the same conversation.

Speke's analysis of Sheikh Hamed's geography changes from "opinion" to "retrospective opinion" between the two texts, suggesting that other forms of information had become available to him by 1864. His own expedition with Grant to the western shores of Lake Victoria influenced Speke's conclusions about Lake Tanganyika, though he did not revisit the latter lake. Another source of new information was from Livingstone, who had visited the Nyassa (Lake Malawi). Livingstone measured the surface of Lake Malawi and found it to be similar in altitude to that of Lake Tanganyika, suggesting that a river could connect them.

Both Speke and Burton had disregarded Hamed's testimony about the northern end of Lake Tanganyika once they heard the testimony of the son's of Sultan Maruta. But in 1859 they both supported Hamed's testimony about the southern portion. By 1864, due to Livingstone's findings and his own beliefs, Speke changed his mind about the southern portion of the lake. In the new text Speke reflected on his opinion that Hamed had reported the Rusizi's flow opposite to what it was:

¹⁸⁷ Speke, *What Led*.

Had I thought of it, I should then have changed the course of the Marungu River on my map, and made it run out of the lake, but I did not.¹⁸⁸

In other words, in order to be consistent, if one river's direction could be reversed then all Hamed's river directions could be reversed if needed. This would theoretically allow Lake Tanganyika to drain into Lake Malawi, and then to the Indian Ocean via the Shire and Zambezi Rivers, by then so well known due to Livingstone and John Kirk. With that water accounted for, Speke's Lake Victoria could be the sole source of the Nile.

Speke's ability to change his logic and his interpretation of Hamed required, of course, the deletion of the following passage of the 1859 text from the 1864 version:

All that [Hamed] stated with regard to the southern half of the lake is very near the truth, for it is an exact corroboration of many evidences.¹⁸⁹

These "other evidences" were never explained with anywhere near the amount of detail given to Hamed, but the suggestion was that they were other local informants, interviewed by Speke, who had traveled to those areas. It was easy for Speke to discard them in 1864 because they were unnamed and therefore lacked any voice at all in the accounts.

Sheikh Hamed became a pawn in a cartographic game involving the continual re-analysis of his information in light of new discoveries. His testimony was manipulated between 1859-1874 to connect or disconnect Lake Tanganyika to the Nile drainage basin. In 1867, Alexander Findlay, a cartographer who worked closely with Burton and Speke, reflected upon discoveries by Livingstone which indicated that there was no river at the north end of Lake Malawi (Nyassa) and recent information about Lake Albert from Samuel Baker. Surprisingly, Livingstone did not actually observe the northern end of Lake Malawi but every local he talked to denied that any river entered the northern part of the lake. Thus,

¹⁸⁸ Ibid., 247.

¹⁸⁹ Speke, "Journal of a Cruise on the Tanganyika Lake,"; 352.

this possibility was ruled out entirely due to local informants, namely Chief Mankambira, who lived 45 miles from the presumed northern end of Lake Malawi (the Nyassa).¹⁹⁰

By the time of Findlay's article, there had been no new observations of Lake Tanganyika by European explorers, but this did not mean that new conclusions could not be made about the lake. Findlay's new theory, carefully reviewed all sources available in 1866 to conclude the following:

1. That Dr. Livingstone has determined that the Tanganyika Lake has no connection with the Nyassa Lake:
2. That all known testimony makes the river run into the south end of the Tanganyika Lake:
3. That it (Tanganyika) must have an outlet, and that is probably to the north:
4. That the observations of Sir Samuel Baker, as compared with those of Captain Speke, make the Albert Nyanza on the same level with the Tanganyika Lake; and further, that the two lakes join each other:
5. Therefore, the streams which flow north-westward from the mountains at the head of the Nyassa Lake contain the true sources of the Nile.¹⁹¹

Therefore, Findlay suggests that Hamed was initially correct in his reports of the geography of the Lake, especially where other local informants and explorers corroborate him. Burton also supported this theory until Cameron proved Hamed (and Burton) wrong about the Rusizi by observing it directly and its influent flow in late 1874.¹⁹² (see Map 4, page 132 for an example of Burton's theories)

Another important aspect of Hamed's role in the process of describing the rivers associated with Tanganyika becomes more apparent when we consider the knowledge we have now about the hydrogeography of Lake Tanganyika. This lake drains westward to the Congo basin via the Lukuga River, found about twenty-five miles south of Hamed's island. We know today that this is the case, but until Cameron's reports, a western outlet for the

¹⁹⁰ Findlay, "On Dr. Livingstone's Last Journey, and the Probable Ultimate Sources of the Nile,"; 195.

¹⁹¹ *Ibid.*,; 194.

¹⁹² Once the expeditions of Cameron and Stanley provided enough evidence, Burton had to admit that Speke was correct in his assumptions. However, Burton, Beke, Findlay, and MacQueen always insisted that Speke never had the evidence to support what was just a hunch. Richard Francis Burton, "On Lake Tanganyika, Ptolemy's Western Lake-Reservoir of the Nile," *Journal of the Royal Geographical Society* 35 (1865)., Richard Francis Burton and James MacQueen, *The Nile Basin* (London: Tinsley Brothers, 1864)., "Meeting, 11 December, 1871," *Proceedings of the Royal Geographical Society of London* XVI (1871).

lake was an unsubstantiated theory, and not a popular option among the members of the RGS. Krapf suggested the connection of Tanganyika to the Congo in the late 1840s due to his informants' testimony, but this was disregarded offhand by MacQueen and other geographers easily:

We have so much experience of this mode of reversing the course of the river by native Africans, that we can have no difficulty in seeing the error. The river running from the lake in the direction of the Congo is in reality a river flowing from the centre of Africa into the lake.¹⁹³

Indeed this solution was never seriously proposed by anyone until Cameron made his detailed investigation of Lake Tanganyika in May of 1874 and determined by direct observation that the Lake was connected to the Congo basin. The letter was received by the Society in December that same year.¹⁹⁴

So, fifteen years after Speke met the well-traveled Hamed, we learn that the Lukuga River exits the lake just south of his island, and he never mentioned it to Speke. Incidentally, Cameron also determined that Speke's altitude measurements of Lake Tanganyika were 1000 feet too low, an error suspected by Findlay, and some say known to Speke as well.¹⁹⁵ The altitude of the lake would of course be important to any theory about where the waters of the lake might flow. Without getting bogged down in a discussion about thermometers, the question I ask is: did Hamed know about the Lukuga River or not?

We cannot answer today for the extent of Hamed's geographical knowledge in 1858. We do know that he reported traveling up to 100 miles west of the lake for trading purposes. Moreover, we do have Speke's account of how he responded to the explorer's proposal of exploring the lake by sailing dhow. Hamed kept promising Speke the boat, but never

¹⁹³ MacQueen, "Notes on the Present State of Geography of Some Parts of Africa,"; 246.

¹⁹⁴ "Meeting, 14 December, 1874," *Proceedings of the Royal Geographical Society of London* XIX, 1874-1875: 75.

¹⁹⁵ Burton suggests that Speke suspected thermometer error at a meeting on 11 December, 1871, saying that he had, "Found a pencil note by Speke which had never before been published." Speke had been deceased for seven years due to his tragic hunting accident in September, 1864. Burton had to recant his theories two weeks later when Cameron's observations were presented (previous footnote) "Meeting, 11 December, 1871," *Proceedings of the Royal Geographical Society of London* XVI (1871): 131.

provided it. He kept Speke close to him while providing his own account of the lake's geography. Sheikh Hamed never tried to offend Speke, nor extort valuables from him, as many leaders had. This situation confused Speke and Bombay greatly:

I cannot divine what good [Hamed's] procrastinations and the means he took to keep me near to him so long could have been to him; for he made no overtures to me whatsoever.¹⁹⁶

When we consider that every leader they encountered suspected Speke and Burton's true purposes and feared interference with their trade, could Hamed have wanted to keep the geography of Lake Tanganyika an economic secret?¹⁹⁷ This is certainly a possibility, but not one ever seriously pondered by members of the RGS. A western outlet for Lake Tanganyika was not a seriously considered theory before Cameron proved its existence.

The reasons why a western exit for Lake Tanganyika is missing in among the various theories proposed from 1860-1874 must include the mystique of the Nile's sources and the influence this had upon research. Because the search for the source of the Nile was the major romantic feature of these expeditions, the geographers were interested in working out how these lakes connected to the Nile Basin. Throughout the discussions of the Nile's sources are references to the antiquity of the question: the Pharaohs did not know; Herodotus pondered the problem, so did Ptolemy; even Nero sent centurions to find it. Now, the problem neared solution in the hands of the greatest extant empire (and its only geographical society) on the face of the globe. If the British could possess the source of the Nile itself, then the power of Victoria's empire would be linked to the golden ages of antiquity by a question that flowed throughout history.

Another reason for not considering a western outlet can be attributed to the complete lack of any information about the regions directly west of Lake Tanganyika. It was

¹⁹⁶ Speke, "Journal of a Cruise on the Tanganyika Lake,"; 357.

¹⁹⁷ The explorers lamented that they did not begin their expedition by pretending to be traders. Many leaders they met, especially the sultan at Ujiji, gave endless trouble to the "men who live by doing nothing." The explorers assumed that local leaders did not trust their motives. Burton, *Lake Regions of Central Africa* 332.

far more difficult to draw a completely hypothetical river than to ponder the nature of at least partially known rivers. Although, as mentioned above, old Portuguese and local sources alluded to a western flowing river, they were not well-known and consequently never a serious part of the discussion.

The final reason is because Hamed never mentioned an outlet near his island, one would not have been suspected. For all the difficulties he presented as a source of information, Sheikh Hamed was the only source of information the RGS had to go by. A combination of local information (or lack of it), explorer's opinion, errors in observation, and preconceived notions led the society to research many other possibilities before stumbling upon the answer.

The Old Man and the Sea

Today, the questions concerning Speke's "discovery" of the source of the Nile in 1858 are not answered. Suffice it to say that Speke was generally correct, but he never amassed the direct observations necessary to prove his point. His guess turned out to be partly right, Lake Victoria, or Ukerewe, does have an outlet at its northern point that feeds the White Nile. For this reason he is often given credit for the discovery. But the basis upon which Speke proposed this theory was chiefly the authority of local informants. At that time this evidence was not enough to convince his peers. (see Map 3, page 130)

Speke left Burton at Kazeh (Tabora), to journey alone to the large lake, Ukerewe or Nyanza, reported by the Arabs there to lie north of the trading town. Burton did not join Speke for unclear reasons that biographers have debated since: Burton was either too sick or too busy with ethnography and logistics to travel. Speke left with Bombay, twenty porters, ten armed guards, and two further servants. He journeyed from 9 July, 1858 to 25 August, 1858. Once he returned to Burton he reported that he had discovered a lake that was the

source of the Nile. Burton was skeptical but the two agreed to leave their differences aside and complete the journey. The chief problem was one of evidence.

The root of Speke's difficulty in proving his point was that he had relied mainly upon local informants when gathering information about the lake. He was unable to travel along the shores or sail upon the waters. On 30th July, 1858 Speke caught his first glimpse of Ukerewe, or the Nyanza. In a new footnote added in his 1864 publication he remarked, "This, I maintain, was *the* discovery of the Source of the Nile."¹⁹⁸ He named the lake Victoria, after his queen, and proceeded on closer to make a few observations consisting mostly of compass headings of principle features. He was only able to spend about three days on the shores of the lake before returning to Kazeh.

Speke certainly interviewed many people about the lake, and was accompanied most of his time there by Mansur bin Salim, a character of uncertain reputation according to Burton's informants at Kazeh (Tabora). Burton and other members of the RGS did not share his trust in the locals and did not believe that Speke was able to properly interview them on his own due to his insufficient language skills. Speke communicated with Bombay in Hindustani, who then translated to Swahili. Concerning Speke's evidence, Burton comments wryly in 1860, quoting Speke's own journal, published the year before:

The main argument in favor of the lake representing the great reservoir of the White River was, that the "principle men" at the southern extremity ignored the extent northward. "On my inquiring about the lake's length, the man (the greatest traveler in the place) faced to the north, and began nodding his head to it; at the same time he kept throwing forward his right hand, and making repeated snaps of his fingers endeavored to indicate something immeasurable; and added, that nobody knew but that it probably extended to the end of the world." Strongly impressed with this statistical information, my companion therefore placed the northern limit about 4°-5° north lat., whereas the Egyptian expedition sent by the late Mohammed Ali Pacha, about twenty years ago, to explore the Coy Sources, reached 3°22' north lat. [and never saw a lake]¹⁹⁹

¹⁹⁸ Speke, *What Led* 298.

¹⁹⁹ Burton, *Lake Regions of Central Africa* 410. In fact, Lake Victoria does not extend northward as far as 1°N Latitude.

The information concerning the Egyptians had been unknown to Speke on the journey. He complained to Burton in letter dated November 1859, that Burton withheld the information during the journey.²⁰⁰ But even this complaint was made after the quotes used by Burton above were already published. Speke was obviously embarrassed that he did not know and was therefore unable to make a fully educated guess.

Burton also contended that the unnamed informant at the lake was Salim bin Rashid, a merchant from Kazeh, who returned to Kazeh soon after Speke and corrected some of Speke's interpretations of what he had said about the lake. Burton also called upon Snay bin Amir and other merchants to help correct Speke's geography. Whatever the growing animosity between Burton and Speke, their overt manipulation of local testimony was staggering. It becomes impossible when reading the journals to unravel the knots and determine who was saying what.

While Speke was still at the lake he must have realized his inability to properly observe the lake with instruments. He only took a few compass bearings, brief sextant work, and an altitude by thermometer. Speke knew he would need many informants to prove his convictions and indeed he actively sought out individuals who knew firsthand about the northern end of the lake. Some informants, like Mansur bin Salim and Salim bin Rashid mentioned above, were travelers themselves whom Speke considered reliable. In order to gather more information, Speke assembled a group of elders to discuss the lake at the home of Sultan Mahaya, who ruled at Mwanza on the south shore of Lake Victoria. In this instance not one of the male elders knew anything about the northern reaches of the lake. Only Mahaya's wife was able to comment, whom Speke describes cruelly, but does not name:

²⁰⁰ Young, ed., *The Search for the Source of the Nile: Correspondence* 165.

His wife, a pretty crummy little creature of the Wanyoro tribe, came farther from the north than anyone present, and gave me the names of many districts in the Uganda country, which, she says, lies along the seashore. She had never heard of there being any end to the lake, and supposed, if any way of going around it did exist, she would certainly have known it.²⁰¹

An interesting point here is that this excerpt is identical in both of Speke's versions of his journal, 1859 and 1864. However, there is a large passage immediately after this that has been removed by Speke for the 1864 version.²⁰² In 1859, Speke made the conjecture that the elders' ignorance of the lake is probably due to the lake's large size. This is the logic that Burton ridiculed in the first sentence of his quote immediately above. Speke must have seen the weakness in this particular proof and removed it by 1864, but left Mahaya's wife testimony as an example of his investigations.

There are other informants who greatly influenced Speke as well, unfortunately most of them remain unnamed. An Arab at Kazeh, Snay bin Amir, had given Speke and Burton loads of information about Ukerewe (Lake Victoria), but Burton always insisted that Speke misunderstood him. Because Burton could converse with Snay directly in Arabic, unlike Speke, this was a powerful argument at RGS meetings. Another informant for Speke, was an unnamed local he met on the return from Lake Victoria at the village of Chief Kanoni:

At my request, [Kanoni] assembled his principle men and greatest travelers to debate upon the N'yanza [Lake Victoria]. One old man, shriveled by age, stated that he had traveled up the western shores of the N'yanza two moons (sixty days) consecutively...²⁰³

By calculating this report with standard daily rates of travel, Speke could roughly estimate the size of the lake, though in fact the size was greatly exaggerated.

Speke makes passing remarks to other informants such as this old man. They all hint at the great northern extent of the lake, but none can give any type of information that even approaches the kind of empirical data desired by the RGS members. Speke must also make

²⁰¹ Speke, *What Led* 318.

²⁰² I am comparing the previous footnote to, Speke, "Captain J.H. Speke's Discovery of the Victoria Nyanza Lake-Part Ii,"; 416.

²⁰³ This man did not report reaching the northern limit of the lake. Speke, *What Led* 348.

conjectures as to which rivers they are talking about, as local names change frequently—leading to further confusion. However, these informants are the individuals who contributed to Speke’s conclusion, an opinion that some members of the RGS, including Murchison, were willing to accept in theory.²⁰⁴

Speke’s conviction rested upon his corroboration of sources and his impressions of the vastness of the lake. At the shores of the Lake Victoria in 1858 Speke describes his thoughts:

I no longer felt any doubt that the lake at my feet gave birth to that interesting river, the source of which has been the subject of so much speculation, and the object of so many explorers. The Arabs’ tale was proved to the letter. This lake is a far more extensive lake than the Tanganyika; “so broad you could not see across it, and so long that nobody knew its length.” I had now the pleasure of perceiving that a map I had constructed on Arab testimony, and sent home to the Royal Geographical Society before leaving Unyanyembe, was so substantially correct that in its general outlines I had nothing whatever to alter. Further, as I drew that map after proving their first statements about the Tanganyika, which were made before my going there, I have every reason to feel confident of their veracity to their travels north...²⁰⁵

Thus Speke was convinced, and spent much of his time from that day until his tragic death in September of 1864 proving that he discovered the source of the Nile in 1858.²⁰⁶ He had never sailed around Lake Victoria; he never followed the Nile from where it exited the Lake until it flowed far enough North to “known” territory; lastly, he had made his important observations of the lake alone, that is, without any other Europeans around—Burton and Grant being elsewhere on those days.

Once again, as with the debate about the Rusizi River, much of the debate in the *Proceedings* centers upon the interpretation of local informants’ testimony. Despite the reluctance to rely on these informants, their statements directly contributed to the RGS deciding to send Speke back to East Africa in charge of his own expedition. Eager to be

²⁰⁴ It is argued by many biographers that Speke was supported only because of his true “Englishness”. Burton was a loose cannon in an era of Victorian sensibilities and part Irish. Livingstone’s reputation was also under some criticism in 1859. See, Young, ed., *The Search for the Source of the Nile: Correspondence* 141-50.

²⁰⁵ Speke, "Captain J.H. Speke's Discovery of the Victoria Nyanza Lake-Part II,"; 412. This text was not changed for the 1864 version.

²⁰⁶ It has been suspected since 1864 that Speke’s accidental death was a suicide.

able to announce a discovery, Murchison, President of the Society in 1859 could accept that Speke had made an important discovery, in lieu of proof. That journey, not dealt with in depth here, was a complex and long journey up the western shore of Lake Victoria. It was no more successful in solving the Nile questions than the first. Speke and Grant were unable to travel where they wished due to the Byzantine politics in the Kingdoms of Burundi and Uganda. They failed to collect enough direct observations to convince empirical geographers, and once again the Society was left with more questions than answers. It was not until 1875, when Henry Morton Stanley circumnavigated the lake that all accepted its true dimensions.

In what was a far more complicated debate than the discussion surrounding the Rusizi River, describing the hydrogeography of Lake Victoria involved many different informants. How to interpret these informants was anyone's guess. Where Speke felt convinced, Burton was dubious. Geographers at the RGS meetings fell out along similar lines or simply felt exasperated about the use of local informants at all—for the discouraged, the whole point of these expensive expeditions was to obtain direct observations.

The reception of Speke's claims about Lake Victoria is already alluded to above—geographers wanted more numerical data by direct observation before closing the issue. At every discussion of East Africa at least one speaker mentions that the whole point should be shelved until further expeditions are made. But this was not to be; the question was “too hot” and would not sit quietly. Speke, by returning to East Africa a second time and still not answering the question became the target for vociferous attacks. The details of the First East African Expedition continued to be reanalyzed, including the character of the informants. In a remarkable incident, the *Journal* published Speke's 1863 article, “The Upper Basin of the Nile, from Inspection and Information” with running criticisms in the

footnotes by the editor.²⁰⁷ The comments are used to point out, every instance where other authors disagree or where Speke is being inconsistent. Very few articles receive this harsh treatment. Speke had simply been convinced by evidence that was not acceptable in the British geographical community and he suffered the consequences.

Conclusion

Local informants were very important to the process of generating geographical knowledge about little-known regions of the world in the mid-nineteenth century. They were the topic of debate at RGS meetings and their statements contributed to the construction of maps. They provided knowledge about areas beyond the limited range of the explorers' routes. We must also remember that locals allowed the explorers to travel through their lands, though often with considerable limitations.

The knowledge provided by local informants fueled the research process of the RGS as new questions were asked based upon the partial answers expeditions offered. Like numerical data, informants' testimony was transmitted to geographers in Britain for analysis. However, as reporters of local testimony, explorers played a different role than as technicians using instruments. Explorers and local informants entered into a relationship based upon mutual assignments of identity. This relationship generated information that proved to be much more difficult to analyze than instrument-based data.

The examples in this chapter demonstrate that local information presented a methodological difficulty to the members of the RGS. Unlike instrument readings, any inconsistencies found in local information could not be explained by further analysis of the

²⁰⁷ John Hanning Speke, "The Upper Basin of the Nile, from Inspection and Information," *Journal of the Royal Geographical Society* 33 (1863).] It should be noted that Speke routinely published all his journals in *Blackwood's Edinburgh Journal* despite the RGS' wishes to "own" any writings that are the result of its expeditions. By totally snubbing the *Journal*, after his second expedition, Speke certainly offended the Society. He subsequently lost much of the support he had among RGS members.

instruments or the calculation methods used to reduce the observations. Each informant was dealt with differently depending upon the relationship that developed between the explorer and the informant. They were unique, discrete sources that were also objects of research themselves, therefore easily misunderstood and consequently potentially unreliable.

Local informants may also be thought of as *free* instruments of remote sensing; this is in opposition to my previous analogy of the explorers as *institutionalized* instruments. Unlike the explorers, who were given training and instruction, local informants appeared and disappeared in just a few sentences of a journal; their methods and background unknown. British geographers were uncomfortable relying on local information when they had such fleeting glimpses at the character of their informants. The expeditions were intended to replace old or foreign sources of information but it was proving difficult for explorers avoid employing local descriptions of places they could not visit themselves.

In the end no method was found for reliably interpreting local informants. Their information remained contentious until the regions in question were seen by European eyes and measured with European instruments. The power of empirical thinking, bolstered on by the continual demands of men like Francis Galton precluded the permanent reliability of any sort of narrative description of places gathered from illiterate Africans.²⁰⁸ Therefore, local information had no epistemic value for the closure of geographical questions, but as I have hoped to show, they contributed vitally to the discussions leading up to conclusions. Expeditions were planned and carried out based upon the enticement of local information. Moreover, when geographical questions were not yet closed, local informants powered the discussions through their recorded testimony. Unfortunately, this aspect of their contribution has been largely forgotten.

²⁰⁸ Barnett, "Impure and Worldly Geography,"; 245.

The challenges presented by attempting to discuss individuals via texts that could be characterized as rampantly imperialistic are great, but the exercise is not without merits.²⁰⁹ By viewing an explorer's journal in its historical context as part of a scientific project pursued by a large scientific society, a host of contemporaneous commentary on the text can be found. All stages of the process must be considered, from contact to meta-analysis. In this way all the contributors to the project, including the locals, stand out more clearly, though not perfectly. It was in these other texts that I found the importance of the locals to be most apparent, as Burton and Speke's peers, like myself, tried to discern just where their information had come from.

²⁰⁹ For some further discussions of these difficulties see, Ali A. Mazrui, "European Exploration and Africa's Self-Discovery," *The Journal of Modern Africa Studies* 7, no. 4 (1969)., Barnett, "Impure and Worldly Geography,"., and David Wade Chambers and Richard Gillespie, "Locality in the History of Science: Colonial Science, Technoscience, and Indigenous Knowledge," *Osiris* 15 (2001).

Conclusion

The First East African Expedition returned with a medley of observations—some instrument based, others gathered by the explorers via conversation. By combing these observations into one document, volume 29 of the *Journal of the Royal Geographical Society*, Burton was blending methods that today would be distinguished as travel literature and surveying and rarely be combined in the same work. Paul Theroux, a popular contemporary travel writer, would never spend time in his text with lists of celestial observation and determinations of altitude. In the same way, papers published in physical geography do not describe the costs of the journeys, the languages spoken by the local peoples, and their religious practices. Today, travel literature and Physical Geography are distinct endeavors and almost mutually exclusive in research and execution.

The conflict surrounding the results of Burton's expedition were a direct result of the tension between the types of evidence he as Speke used to draw conclusions. Travel literature already existed as its own genre by the mid-nineteenth century. The writings of Laurence Oliphant are a good example of this.²¹⁰ While describing the region, he also contemplates his own life while traveling, remembers his own past, and ponders what distinguishes him from the foreigners he meets. Oliphant's journals were widely read and informative, but they were not "Geography" in the empirical, numerical sense.²¹¹ At the turn of the nineteenth century, narrative descriptions were just beginning to fall out of favor in "positivist" geographical circles. As travel literature moved slowly into the realm of

²¹⁰ Laurence Oliphant, *Journey to Katmandu* (1852), Laurence Oliphant, *The Russian Shores of the Black Sea* (1853). Travel accounts of this period and the images they employ are also discussed in, Barbara Maria Stafford, *Voyage into Substance: Art, Science, Nature, and the Illustrated Travel Account, 1760-1840* (Cambridge, Mass.: MIT Press, 1984).

²¹¹ Despite their lack of numerical data, Oliphant's writings on the Russian Empire were used by British military leaders during the Crimean War. The public read them to aid their understanding of newspaper accounts of the battles. Both Burton and Speke served in the Crimea before returning to Africa after their Somaliland expedition.

literature, so did the explorers lose some of their freedom to draw conclusions in the field. As seen in the writings of Cuvier and members of the RGS who called for extensive record-keeping by explorers of their daily observations, the acquisition and analysis of data were starting to be perceived as necessarily distinct practices.²¹²

If there was a push towards removing narrative descriptions from geographical accounts, this did not solve the problem that for many areas of the world such descriptions were all that were available to Victorian geographers. What constituted proper evidence for geographical description changed depending upon how much was known about an area. In lieu of direct evidence a wealth of historical and foreign sources were open to geographers with the linguistic skills necessary. By combining a variety of these sources geographers like William Desborough Cooley perfected methods of creating geographies based on indirect evidence. Thus, lesser-known regions of the world could be described by narrative description with geographers hoping that more proper descriptions and measurements would be available later.

When Burton and Speke left for Zanzibar, they were well aware that East Africa had been described by uncertain narrative in a number of sources; the RGS members desired more precision from their expedition. This empirical push was a challenge to Burton, who followed the more holistic and humanistic approaches to regional geography preferred by geographers like Alexander von Humboldt. The potential for maintaining methodological rigor on expedition was also challenged by the fact that the explorers were “in the field”.

The harsh realities of caravan travel in East Africa seriously affected Burton and Speke’s abilities to maintain a methodical, empirical, instrument-based study of the region. Dealing with the weather, politics, and disease of the region demanded more of the

²¹² Edney, "Reconsidering Enlightenment Geography," 192.

explorers' time than had been foreseen. Likewise, the data gathered from a single track through an unknown region proved to be insufficient when trying to infer the landforms of an entire region. The explorers almost immediately began to interview locals about the region's geography and incorporate this information into a larger regional map. This process was a natural, logical step for the explorers, though they knew the difficulties of proving that these informants could be trusted.

The empirical geographers of the RGS were reluctant to incorporate second hand accounts of locals into their maps, but they did. Local informants were the only sources of information about many areas in East Africa. In attempt to maintain some rigor in their analysis, geographers and explorers would attempt to corroborate the information. If many locals reported the same information, then the reliability of the evidence increased. Relying upon 'islands of certainty' where the explorers had made precise measurements, local information filled in the intervening blanks where the explorers did not measure, or did not visit. Thus, these informants had a great impact upon British geographical discourse about Africa in the mid-nineteenth century.

Because the information gathered by geographical expeditions traveled through so many transformations, and was open for re-interpretation in light of new evidence, the historiography of exploration must track these transformations. In my thesis I proposed the steps of the process as: contact, acquisition, appropriation, reporting, and meta-analysis.²¹³ Geographical knowledge, both instrument and informant based, went through these transformations, but not always in a linear fashion. As much as they are steps in a process, these terms also hint at the context in which geographical knowledge is generated—in a

²¹³ I formulated this list partially through readings of Clive Barnett, Felix Driver, and Johannes Fabian.

sense, they locate the activities of Victorian geographers and explorer within a wider arena of interaction between locals and foreigners.

Unlike a laboratory-based investigation, geographical questions were solved across thousands of miles and many years of travel. The temporal and geographical extension of such projects challenges our abilities at analysis without following them through their circuitous journeys.²¹⁴ The cacophony of voices put forward by this description of geographical exploration reflects the plurality of knowledge forms that contributed to the process. My thesis demonstrates that Local Informants and British Explorers contributed together to the geographical exploration of East Africa.

²¹⁴ See the following for more discussion of these problems: Harris, "Long-Distance Corporations," Steven Shapin, "Placing the View from Nowhere: Historical and Sociological Problems in the Location of Science," *Transactions of the Institute of British Geographers* 23 (1998).

Appendix I: Letter of Instruction From the Royal Geographical Society to Richard Burton concerning the East African Expedition & Memorandum of Suggested Equipment

Reproduced from *Journal of the Royal Geographical Society* 29 (1859): 4-8

On the 1st of October, 1856, the following instructions were received from the Expeditionary Committee of the Royal Geographical Society. They are published in detail, not only because they may be useful to future explorers in the same path, but also as showing what is expected from the African traveller in this portion of the nineteenth century. —Richard Burton

To Captain Richard Burton
London, October 1st, 1856.

Sir—The RGS having determined to send an expedition to Eastern Africa for the purposes hereinafter mentioned, and the Council having recommended you as a fit and proper person to undertake the conduct of the said expedition, you are hereby appointed to the charge of this service.

As soon as you are in all respects ready, you are to proceed by the overland route to Bombay, where you will report yourself to the Governor, Lord Elphinstone. It is to be hoped that, through the good offices of his Lordship, you may obtain at Bombay the assistance of a person competent to undertake the necessary astronomical and meteorological observations, and willing to accompany the expedition.

At Bombay you will make such arrangements and provide yourself with such articles as may be necessary for the expedition, in which we have reason to believe you will receive every assistance from the authorities at that place.

Proceeding from thence to Zanzibar, you will report yourself there to Colonel Hamerton, H.B.M.'s Consul and Agent to the Honourable East India Company. At the same place, or at Mombas, you will also find Mr. Rebbmann, a missionary who will have been prepared for your arrival, and you will immediately place yourself in communication with him and mutually concert operations for your undertaking.

The Council has obtained the consent of the Church Missionary Society to associate this gentleman with you, and, from his long residence and experience on the coast, it is expected that he will afford important assistance. Although we consider it proper to intrust the conduct of the expedition to you, we, nevertheless direct you to give great weight to the counsel of Mr. Rebbmann, and especially in any matter upon which his local knowledge entitles his opinions to respect.

The objects of this expedition are geographical, but we see know objection to Mr. Rebbmann, while duly assisting you in the execution of the great purposes of the expedition, at the same time pursuing his avocation as a missionary. But the Council nevertheless expect that there will be upon all these points such a mutual co-operation and concert that no delay, danger, or increase of expense shall arise from such avocations of Mr. Rebbmann on the one hand, nor any unnecessary rigour or restriction be practiced by you on the other.

The great object of this expedition is to penetrate inland from Kilwa, or some other place on the East Coast of Africa, and make the best of your way to the reputed Lake of Nyassa; to determine the position and limits of that lake; to ascertain the depth and nature of its waters and its tributaries; to explore the country around it; to acquaint yourself with the towns and tribes on its borders; their minerals and other products and commerce. As much native copper is said to be possessed by the natives, you will learn whence it is procured, and, if within your reach, visit the locality and obtain specimens of the mineral *in situ*.

Having obtained all the information you require in this quarter, you are to proceed northwards towards the range of mountains marked upon our maps as containing the probable source of the 'Bahr el Abiad,' which it will be your next great object to discover.

Before this period of your journey arrives you will, it is hoped, have received replies to your communications from the interior; but should this not be the case, and should you have acquired all the information within your means, you will be at liberty to return to England by descending the Nile, where it is possible you may fall in with the expedition under the Comte d'Escayrac de Lauture, now proceeding up that river to reach its sources; or you may return by the route which you advanced or otherwise, always having regard to the means at your disposal.

To procure you a favourable reception upon the coast, and to ensure the protection of the chiefs of the country you will visit, the Imam of Muscat has been communicated with by our Government through Colonel Hamerton, Her Majesty's Consul at Zanzibar; and other diplomatic agents upon the coast, whether of

this or foreign nations, have been required by their respective governments to assist you and afford you countenance and support.

From the limited sum of money appropriated to the purposes of this expedition, it will be necessary to practice the most rigid economy, and a circumstantial and accurate account of every expenditure must be kept and rendered to the Royal Geographical Society.

The Council have directed 250*l.* (two hundred and fifty pounds) to be placed at your disposal at Bombay for the purpose of providing necessities for the expedition; and on your arrival at Zanzibar you will be provided with 250*l.* (two hundred and fifty pounds) more for any additions to your outfit that may be required. You will also be authorized to draw upon Colonel Hamerton to the amount of 250*l.* (two hundred and fifty pounds) further, making in all 750*l.* (seven hundred and fifty pounds); the remaining sum of 250*l.* being reserved for your return home, or in case of extreme emergency.

It is to be most distinctly understood that the Royal Geographical Society will not consider itself responsible for any sums otherwise procured or drawn without its express authority, and that parties drawing such bills will be themselves liable for them.

"You are to be particular in communicating, as often as possible, all details connected with your progress, the health and condition of your expedition and your prospects. All your letters are to be addressed to the Secretary of the Royal Geographical Society, under cover to the Secretary of State, Foreign Office, and care should be taken that the Society receive the *first* information of everything.

You are to keep an itinerary or daily journal of the proceedings of the expedition, in which are to be noted, as far as possible, all the particulars embodied in the memorandum hereunto annexed.

As the test of an accomplished traveller will always be measured by the accuracy with which his progress is marked by a detailed topography and satisfactory delineation of his positions, you will, no doubt, be jealous of the due performance of this essential part of your duty; but to assist your memory at a time when anxious cares may oppress, or to be useful to any person who may suddenly be called upon to succeed you, the memorandum above-mentioned has been drawn up so as to embody much of what will be required under this head, and to this memorandum the attention of yourself and the person associated with you in this expedition is particularly directed.

It is to be clearly understood that all the journals, observations, maps, MSS., and illustrations, of whatever kind, made or recorded upon this expedition, are to be considered the property of the Royal Geographical Society, and forwarded accordingly to its Secretary.

Throughout the journey all these data should be kept as to require no explanation, and nothing should be dependent upon memory alone; so that, in the event of any unforeseen incident unhappily depriving the expedition of the services of the individual in charge, his successor may be fully informed of all that has been done.

Wishing you success in this gallant enterprise, and that you may return in health to this country, covered with honour,

We are, &c.,

(Signed)

F.W. Beechey, President

W.H. Sykes, Vice President

Norton Shaw, Secretary

Memorandum on Instruments and Observations for the Eastern African Expedition, under Captain Richard Burton

For the purpose of determining geographical positions and mapping the country through which the expedition will pass, the following instruments are recommended: -

1 Six-inch sextant.

1 Four-inch sextant.

1 Mercurial horizon.

1 Prismatic compass, 0d to 360d.

2 Pocket chronometers

3 Thermometers to 360d

3 Ditto smaller, in cylindrical brass cases.

2 Casella's apparatus for measuring heights by the boiling point: 1 for steam and 1 for water.

1 Book, having its pages divided into half-inch squares for mapping.

Memorandum-books.

1 Nautical Almanac, 1856-7-8.

1 Thomson's "Lunar Tables."

1 Galton's "Art of Travel."

1 'Admiralty Manual.'

1 Tables of Logarithms.

"Hints to Travellers" by the Royal Geographical Society.'

Of the nature of the observations which the Council require to be made, the following are selected as being the fewest that, under ordinary circumstances, would be required:

- The latitude of some place on each day's journey, by meridian altitudes of a heavenly body.
- The longitude of the same place, either by the actual observation by chronometer or lunar, or by such observations brought up to it by dead reckoning.
- The variation of the compass occasionally.

At each place where the expedition may remain sufficiently long, a good series of lunar distances between the moon and heavenly bodies both east and west of her, should be observed and connected with sights for apparent time, by which the longitude may be determined and the altitudes of the bodies computed, if they are not observed.

As the accuracy of all astronomical observations must depend upon the perfect adjustment of the instruments, the greatest attention must be paid to this subject, and the errors, if any, corrected before the observations are begun. But as with some sextants the index-glass is capable of vertical adjustment only, it will be sufficient to make this adjustment and to ascertain the index-error of the instrument, by measuring the sun's diameter 'off and on' and applying the correction to all the observations.

There are various methods of mapping a country, most of which have been made in Manuals or in the pages of the Society's Journal; but, whichever of these may be adopted, the Society will expect that sufficient data be collected to fix with satisfaction the great features of the survey. The temperatures of the air should be noted daily, with the direction of the wind and the state of the weather.

The altitude of the ground may be ascertained by observing accurately the temperature at which pure fresh water boils; and as the Expedition is not provided with barometers or other instruments (except aneroids, which are subject to be damaged) by which their elevation above the sea may be ascertained, this experiment should be frequently made, especially where there is reason to (8) believe that the ground is becoming more elevated; and especially we should require these observations to be made upon the table-land near the water parting which separates the rivers flowing into the Indian Ocean from those which run towards the interior, and also at the surface of the great lake of Niassa. Note also the height upon the range giving birth to the Bahr el Abiad, should you be so fortunate as to reach that spot.

Should any wells of depth be visited, the temperature of the water should be carefully ascertained by lowering a thermometer into it and instantly registering it; and the temperature of all lakes, especially that of Niassa should be determined by the same process, noting the depths, and, of course, the temperature of any hot springs, if met with.

The height of mountains of great elevation, and more especially of such in a low latitude that are capped with snow, will engage the attention of every traveller. Such as cannot be ascertained should be measured trigonometrically by fixing the geographical position of some well-defined peak of the range by bearings from two or more well-selected stations and by observing the altitude of the peak from them, and by finding the elevation of these points by the boiling point of fresh water, as before mentioned. In all cases of this nature *astronomical bearing* will be found of the utmost use.

The width of rivers and the dimensions of small lakes may be advantageously measured by sound; but where they are of considerable extent their limits must be determined by observation, either of latitude or longitude, as the case may be.

Although this Expedition cannot be expected to collect largely objects of natural history, it is highly desirable that you may bring away dried specimens of any very remarkable, noting their habitats and the height at which they grow. Specimens may also be easily collected of the land and river or lake shells, as these, as well as the plants, will be the first indications of the flora and fauna of this region. Of the larger animals due notice only may be taken.

If possible, some specimens of the rocks or fossil organic remains from the countries traversed should be sent home. In regard to mere rocks, no specimen need exceed the size of a *walnut*; but they must be carefully labeled as to locality, and well wrapped in two envelopes. Any remains of fossil shells, especially if found at a distance in the interior or at some altitude above the sea, will throw a most important light on the structure of Africa and be most highly prized by all geographers.

(Signed)

F.W. Beechey

London, October 1st, 1856

Appendix II: Hints for Collecting Geographical Information

Reproduced from *Journal of the Royal Geographical Society*, vol. 24 (1854) 353-357

1. *Aspect*

1. What is the general aspect of the country?
2. Mountainous or hilly?—Sharp peaks or rounded outlines?
3. Of the coast? Abrupt or shelving? Rocky or in cliffs?
4. Downs of Sand ? Low or flat?
5. Any active volcanoes? or traces of extinct ones? or their probable forms in the outline of the mountains?

2. *Surface.*

1. Is the surface level or undulating?
2. Has it a tendency to table lands, or steppes?
3. Is the soil rich or poor? loamy—sandy—boggy?
4. Are the plains fertile or barren? wooded or cultivated?
5. What its general capabilities ?

3. *Physical Divisions.*

1. Note the chief divisions of the country.
2. Mark especially the line of separation of waters.
3. Trace the outlines of the principal basins of the chief rivers.
4. Group the country into basins as far as practicable, it will be found the simplest mode of describing it.
5. Trace also the limits of the secondary valleys comprising the tributaries to the main stream.
6. May they from position be called upper and lower basins?
7. Do distinct traces of mountainous—hilly—flat—wooded jungle—cultivated—sandy—marshy, or barren, country exist? If so, note their limits generally.

4. *Mountains.*

1. What the direction of the chief range, or ranges ?
2. What the general form of outline? (Describe while in sight, *not* from memory.)
3. What is the *estimated* height (if no measurement can be had) of the chief points ; and also of the general range ?
4. Are any of them snow-capped? (State the season.)
5. How far down does the snow extend? (Note north or south side.)
6. Are they wooded?—At what height does the wood finish?
7. At what height does vegetation cease?
8. Are the mountains in groups or masses? or detached?
9. Obtain bearings, by compass, of the limits of the range, and of all remarkable points, masses, gaps, &c.
10. Mark the chief mountain-passes, and note if they might be easily defended against an enemy.
11. What their general structure?

5. *Rivers*

1. What are the native names of the chief rivers?
2. Trace the general course of each; with its windings, if possible.
3. Does it receive many tributaries? note their names in order, from its sources, distinguishing on which side they join.
4. Is it navigable for large or small craft? and to what extent?
5. How far up does the tide reach? Is the current rapid? What its rate?
6. Does it flow by several outlets, or by one grand mouth to the sea?
7. Does it form a bar, or banks, or islands at its mouth?
8. What the width of the river at its outlet? and at various points?
9. Is the river ever fordable? Name the chief fords.
10. Does it form cascades, or rapids, or occasionally inundations?
11. Does it at any season lose itself in sand, or otherwise not reach the sea?

12. Does it flow from a lake, or from other sources or springs?
13. What may be the probable elevation of its source above the sea? measured or estimated?
14. Is the bed of the river gravel, sand, or mud? Does it bring down much detritus?
15. What the colour of the water? Does it retain it at any distance from land?
16. Is the river obstructed by islands, shoals, rocks, snags, or any obstacle to steam navigation?
17. Are its banks wooded? Is fuel easily procured?
18. Does it abound in fish? and in what species?
19. Is it navigated by native boats? and how far up?
20. Describe each affluent as a main stream, with its tributaries, marking the position of junction, and the angle at which it joins its recipient

6. *Lakes.*

1. What the native names of the lakes?
2. What is the situation and extent of each?
3. What its level, above and below the sea? How ascertained?
4. Is it formed by rivers or springs? or does it feed any river?
5. Is it of salt or fresh water? Is it said to rise periodically?
6. What its general depth of water?
7. Are there any vessels or boats upon it? and of what size?
8. Are its banks rocky or steep, or low? Are they wooded or barren?
9. Could fuel be readily procured? Does it offer facilities, or the contrary, to steam navigation?
10. Are its shores thickly inhabited? Are birds, fish, shell-fish, &c., plentiful, and of what sort?
11. Are any marshes or ponds known, and where? Are they constant or periodical?

7. *Sea Coasts and Ports.*

1. Does the coast form gulfs, bays?
2. Promontories, peninsulas, capes, low points, &c.?
3. Is it abrupt, bold, rocky? or low, flat, and shoal?
4. Are there currents along the coast? Note their force and direction.
5. Name the chief *ports*. Are they secure harbours, or only open bays, or roadsteads for anchoring?
6. What the depth of water, and what bottom for anchoring?
7. Is the port capable of containing many vessels? Does it offer facilities for repairs?
8. Can water, provisions, and fuel be easily procured?
9. Note the time of high-water at full and change of moon, and rise and fall of tide ; and direction and velocity of stream.

8. *Volcanoes and Mineral Springs, &c.*

1. Are any now active? or, are there traces of extinct volcanoes?
2. Give their position—height above the sea—and native names.
3. Does tradition or history record any eruption? at what date ?
4. Was the eruption of fire, lava, scorïæ, water, or mud?
5. Are earthquakes frequent? Are there records of any having occurred?
6. What were their effects? how far did they extend? any up-heaving or depression of land recorded?
7. Are many *mineral springs* known? Hot, tepid, or cold? (Note the temperature if possible) Are their waters used medicinally ?
8. Do they form deposits ? Siliceous or calcareous ?

9. *Maps, Charts, &c.*

1. Do any charts of the coast, or maps of the country, or partial surveys exist? Native or otherwise? What their respective dates?
2. Are they believed to be accurate? Upon what scale?
3. Endeavour to map the country, starting, if possible, from a fixed point; if exact observations cannot be obtained, give compass bearings, and estimated heights and distances. (N.B. Heights may often be obtained by length of shadow, &c.: distance by velocity of sound, &c.) The scale of one inch to a geographical mile is recommended.

4. Take bearings of all remarkable objects in sight from any known station, as mountain-peaks, masses, gaps, towns, villages, forests, &c. &c., and transfer all to paper immediately ; trust nothing to memory.
5. Preserve all original observations and documents relating to surveys, and make two or three copies of observations.
6. Obtain correct *native* names if possible, and keep to one standard of orthography. Mark all hearsay information with the initials of the informant. If a journey is made by night, or in foggy weather, trace it with coloured ink.

10. Astronomical Observations.

1. Are any positions astronomically determined? What reliance may be placed on them?
2. It is very important to obtain observations for the position of all capes, headlands, points, towns, villages, &c.; mountain-peaks, passes, limits of range, &c.; lakes, sources, confluence, and outlets of rivers; in short, of every remarkable object.
3. Endeavour to obtain the latitude by meridian altitude of the sun, or of a planet, or of a star, or of the moon.
4. *Longitude*—by eclipses of Jupiter's satellites, especially by eclipses of the third and fourth satellite, when both immersion and emersion can be observed,—or by any other eclipse; by moon culminating stars; by occultations of fixed stars by the moon; by lunar distances from the sun, or a planet, or a star, always East and West when possible; by an altitude of the moon in the prime vertical; or by chronometers: state always by which method obtained, and what reliance may be placed on it.
5. Observations on the variation of the compass, and dip of the needle are very important

Instruments.

A repeating circle, or sextant of five-inch radius; a pocket sextant; an artificial horizon; Kater's compass, two mountain barometers; and two mountain barometers, with a good pocket chronometer, are sufficient for all common purposes.

Meteorology.

1. Keep an exact register of the barometer and thermometer.
2. What are the prevalent winds? What the periodical?
3. What the average fall of rain?
4. What the amount of evaporation, &c.

Natural History.

1. Note the geographical distribution of man, animals, birds, fishes, insects, plants, &c.
2. Obtain information on all branches of Natural History, bearing in mind that the useful and practical is of more importance than the merely curious.
3. For detailed instructions, under each head, recourse should be had to the respective sources.

Ethnography.

1. Obtain vocabularies of the native language—phrases rather than single words. Keep to a fixed standard of orthography in writing them down: the sounds of the vowels in *father—there—ravine—mole—lunar*, are recommended as the most simple, and as being both English and European.
2. Note the habits, manners, customs, and amusement of the natives.
3. What notion have they of a supreme being? what of a future life ? what, if any, their religious ceremonies?
4. What their treatment of the aged, of the sick, and of children?
5. What seems to be the form of government? Is division of property recognised ? Do they buy and sell land ?
6. Do they trade or barter with each other, or with strangers?
7. Note the number of natives seen from day to day, distinguishing the sex, and children.
8. Are there many lunatics or idiots?
9. What the usual form of feature? the shape of the skull? hair? colour? stature? bodily constitution?
10. Is plurality of wives common? are women without husbands frequent?
11. Have they any marriage ceremonies? how do they treat their wives?
12. Do they give proof of capacity for civilization?
13. May the natives be trusted as guides—as messengers—or to procure food?
14. What presents please them best?

15. What words or signs do they use when hostile ? or when friendly?
16. What are their dwellings? What their chief articles of food?
17. What their disposition—savage or gentle ; rash, hasty, or inoffensive ? Are they disposed to receive instruction?
18. Are any cases of cannibalism reported? N.B. To investigate strictly under what circumstances they occurred.
19. Are the people said to be increasing or decreasing?
20. Does slavery exist? What is the condition of a slave?
21. What are their diseases? What their medical treatment?
22. Can the traveller point out the most probable mode of civilizing and benefiting the natives?
23. What traditions are current respecting the origin of the people?
24. Collect all information that can throw light on the migration of nations.

N.B. The greatest forbearance and discretion are strongly recommended in all intercourse with the natives—never to allow an imaginary insult to provoke retaliation which may lead to bloodshed. It must be borne in mind their's is the right of soil—we are the aggressors.

Appendix III: The Inventory of the First East African Expedition

Reproduced from *Journal of the Royal Geographical Society* 28 (1858): 224-226

Letter from Richard Burton to Francis Galton, read to the Royal Geographical Society on 23 November, 1857 and 14 June, 1858.

“Camp, Zungomero in Khutu, about 200 miles from coast, Sunday 2nd Aug., 1857

Sir,

I promised you an account of our outfit: here it is, pretty perfect. It should have been sent before, but all our camp has been laid up with fever. We are getting on better for a few days' rest. I had fever twenty days, and could not halt; some marches were 20 miles.

The Party.—R.F. Burton, commanding; second in command, J.H. Speke. (a doctor sadly wanted.) Ras Kafilah Shaykh Said ben Salim el Lamiki, with four slaves armed with muskets, 1 slave boy and 2 slave girls. His assistant, Muinyi Wazir, a Sawahili man who acts as linguist and guide. 13 Baloch guards as escort, including jemadar as commandant; with two slaves: 1 of the Baloch is a tailor, and most useful. 2 Portuguese servants. 2 black servants armed with swords, gun-carriers, &c. 9 Black guards for asses, armed with muskets, and to act as guides, slaves belonging to Ramji, an Indian Merchant (one to follow with our remaining equipment). 5 donkey-men. 36 porters (Unyamwezi men) carrying American domestics, blue cotton cloth, beads of sorts, especially pink and black, and brass wire, Nos. 7 and 8; value about 600 dollars. (We are to be followed by 22 more.) 9 extra porters engaged *en route* to assist the asses. Total 80 men.

Provisions, &c.—This is the harvest season, so travelers rarely carry provisions. At other times they drive goats and sheep for provisions. 1 dozen brandy (to be followed by 4 dozen more); 1 box cigars (tobacco here everywhere procurable—5 large cakes for 1 cloth of 4 cubits); 5 boxes tea (each 6 lbs.); a little coffee; two bottles curry stuff, besides ginger, rock and common salt, red and black pepper, one bottle each, pickles, soap, and spices; 20 lbs. pressed vegetables; 1 bottle vinegar; 2 bottles oil; 20 lbs. sugar (honey procurable in country); rice, Indian corn, holcus, fowls, ducks, sheep, goats, and eggs, are generally purchasable.

Land Conveyance.—5 donkeys for riding, with Arab saddles and halters (English would have been better); 20 donkeys for carrying goods; 20 pack saddles, with straps and ropes (these are partly procurable in the country, and partly made by the Belochies of fan-palm); 20 sacks for asses (a few extra), packing needles, and twine.

Arms and Ammunition, including 2 smooth bores, 3 rifles, a 3-revolver, spare fittings, &c., and swords. Each gun has its leather bag with three compartments, for powder-flask, ball, caps, patches, &c. Also 100 lbs. gunpowder (two safety copper magazines and others); 60 lbs. shot; 380 lbs. lead bullets, cast of hardened material at Arsenal, Bombay, placed in boxes 40 lbs. each for convenience of carrying, also to serve as specimen boxes, and screwed down to prevent pilfering; 20,000 copper caps; wadding.

The Belochies are armed with matchlocks, shields, swords, daggers, and knives; plenty of falitah, or matchlock match. They have for ammunition—40 lbs. gunpowder (4 kegs); 1000 lead bullets; 1000 flints for slaves' and blacks' muskets. To be followed by about an equal quantity of ammunition. Total 500 rounds for each big gun, and 2000 for each little gun.

Camp Furniture.—1 Sepoy's rowtie; 1 small (gable-shaped) tent of two sails joined, to cover and shelter property in this land of perpetual rains; 1 table and chair; 1 Crimean canteen tin, with knives and forks, kettle, cooking pots, &c.; 1 bed, painted tarpaulin cover, 2 large cotton pillow for stuffing birds, 1 air pillow, 2 waterproof blankets (most useful), 1 Maltese blanket (remarkably good), and two other blankets; 1 bed, cork, 2 pillows, 3 blankets and mosquito net. The Portuguese boys have thick cotton padded mattresses, pillows, and blankets. All the servants have some kind of bedding; kitandas or native bedsteads are sometimes met with in the villages, but they are about 4 ft. by 2; 3 solid portmanteaus for clothes and books; 1 box, like Indian petarah, for books; 1 patent leather bag for books, washing materials, diaries, drawing-books, &c.; 1 small leather bag, round neck, for instruments, &c.; 5 canvas bags for kit generally; 3 mats to sit on.

Instruments.—1 lever watch; 2 chronometers; 2 prismatic compasses, slings, and stands; 1 ship's azimuth compass; 2 pocket compasses; 1 pocket thermometer; 1 portable sundial; 1 rain gauge; 1 evaporating dish; 2 sextants and boxes, and canvas bags to be slung over porters' shoulders;* 2 artificial horizons (a little extra mercury, to be followed by more); 1 pocket lens; 1 mountain barometer lent by Bombay Geographical Society (very delicate); 3 thermometers; 1 measuring tape (100 ft.); 1 sounding lead; 2 boiling thermometers; 1

box of instruments; 1 glass; 1 telescope; 2 ft. rule, brass slide; 1 pocket pedometer by Dixie (an invaluable instrument, 3 more wanted); 1 parallel ruler.

* A third sextant was forwarded by Admiral Beechey. —Ed.

Tools.—1 large turnscrew; 1 hand saw; 1 hammer; 20 lbs. nails; 1 hand vice; 1 hone; 9 hatchets (as a rule every porter carries an axe); 2 files; 9 Yembe or native hoes; 9 masha or native picks; 1 cold chisel; 1 heavy hammer; 1 pair pincers. To be followed by 1 bench vice; 1 hand ditto; 12 gimlets of sizes; 1 stone grinder, with spindle and handle 18 inches; 9 splitting axes; 12 augers of sizes; 2 sets centre bits, with stock; 12 chisels; 4 mortise chisels; 2 sets drills; 24 saw files; 6 files of sorts; 4 gouges of sizes; 50 lbs. iron nails; 2 planes, with spare irons; 3 hand saws; screws. These things will be useful at the lakes, where carpenters are in demand.

Clothing.—The shirts are flannel and cotton; turbans and thick felt caps for the head.

Books and Drawing Materials.—Norie; Bowditch; Thompson's 'Lunar Tables;' Gordon's 'Time Tables;' Galton's 'Art of Travel;' Jackson's 'Military Surveying;' 'Admiralty Manual;' Cuvier's 'Animal Life;' Prichard's 'History of Man;' Keith's 'Trigonometry;' Krapf's Kisawahili Grammar; Krapf's 'Kinika Testament;' Amharic Grammar (Isenberg's); Belcher's 'Mast Head Angles;' Cooley's 'Route to Unyamesi Lake;' and other miscellaneous works; 1 paint box complete, soft water colours; 1 small ditto, with Chinese ink, sepia, and Prussian blue; 2 drawing books; 1 large drawing book; 1 camera lucida.

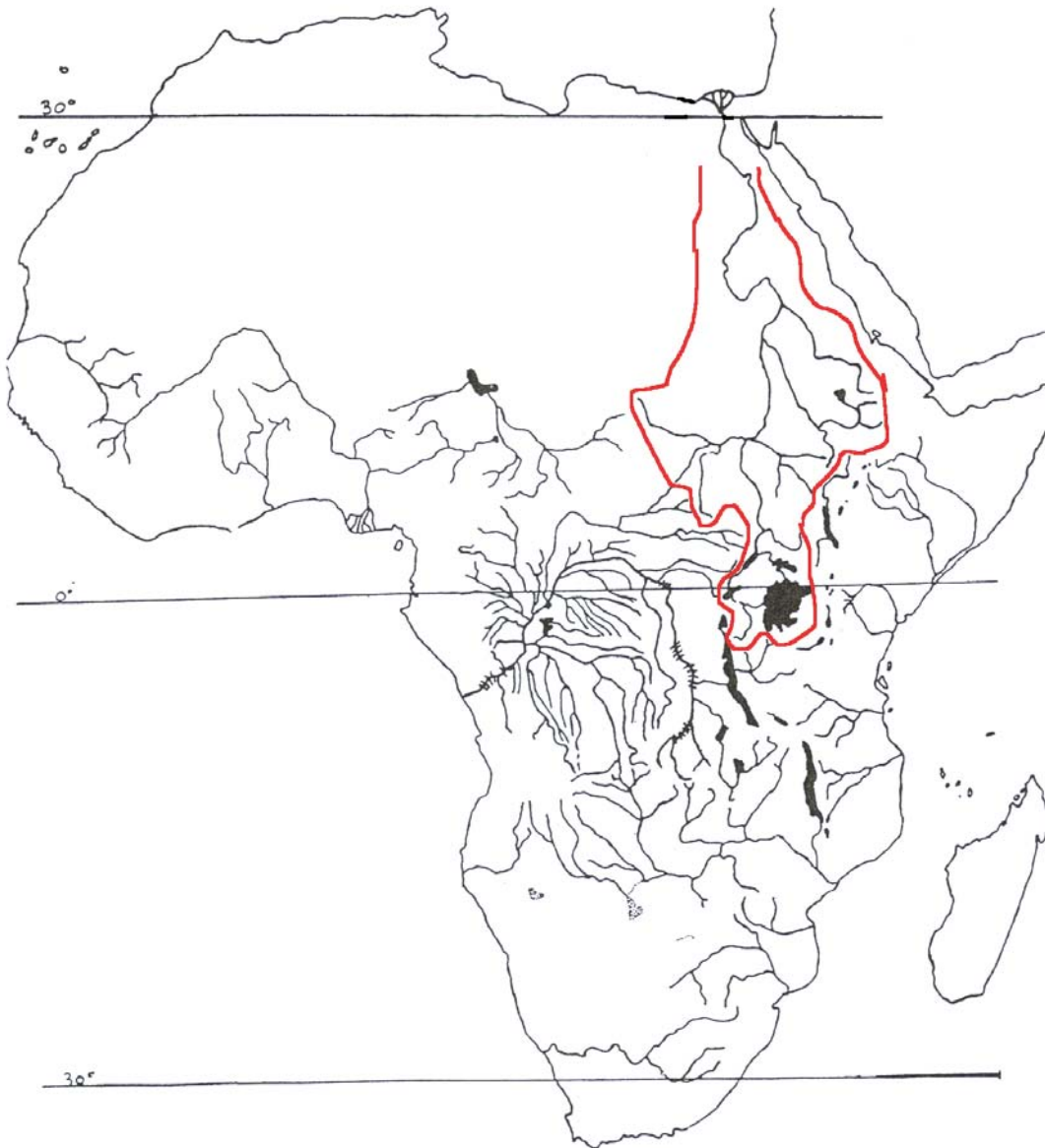
Portable domestic Medicine Chest.—Vilely made; it is glued, and comes to pieces. Some medicines for natives in packages. I have written to Zanzibar for more quinine, some morphia, Warbeng's drops, citric acid, and chiretta root. This country is a hot-bed of fevers.

Miscellaneous.—10 pieces red cloth for presents (3 extended); 3 knives for servants; 4 umbrellas; 1 hank salmon gut; 1 dozen twisted gut; 1 lb. bees wax; 2 dozen penknives; 2000 fishing hooks; 42 bundles fishing line; 2 lanterns (policeman's bull' eye and common horn); 2 iron ladles for casting lead; 1 housewife, with buttons, needles, thread, silk, pins, &c.; 12 needle (sailor's) and palms; 2 pair scissors; 2 razors; 1 hone; 2 pipes; 1 tobacco pouch; 1 cigar case; 7 canisters snuff; 1 filter; 1 mouth filter; 1 looking-glass; 1 small tin dressing-case, with soap, nail-brush, and tooth-brush (very useful); brushes and combs; 1 union jack (this precedes the caravan, in rear of the flag of Zanzibar); 10 steels and flints (matches almost useless in this damp air).*

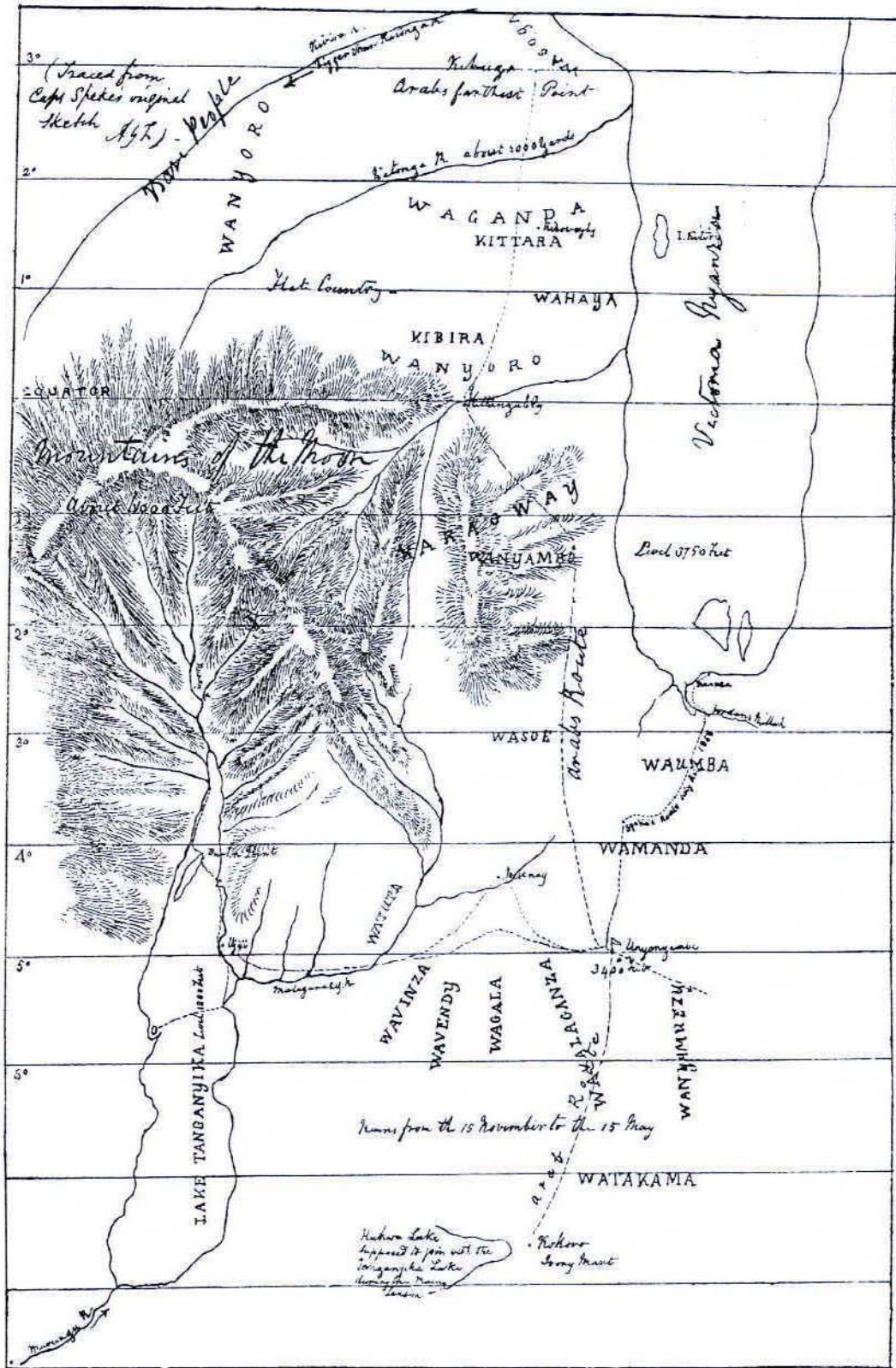
F. Galton, Esq.

* A box containing botanical and geological specimens had been sent to the Secretary of the Bombay Geographical Society. For information, since received, of the farther progress of this Expedition, see "Proceedings" R.G.S., vol.iii. —Ed."

Appendix IV: Maps



Map 1: A modern map of the main drainage channels of the African continent with the Nile basin outlined



Previous page, Map 3: Alexander Findlay's reproduction of Speke's own sketch map from his expedition with Burton. Speke and Burton's own routes are shown in dotted lines. Beyond Speke's direct observations, much of the map is based upon local informant's information and his conclusions from these reports.

Published with Findlay's article: "On Dr. Livingstone's Last Journey, and the Probable Ultimate Sources of the Nile." *JRGS* 37 (1867): 193-212

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