The Zambesi Expedition, 1858-64
African Nature in the British Scientific Metropolis

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Declaration

I hereby certify that this thesis is entirely my own work. Some portions have previously been submitted for publication, copies of which are in Appendix D.

May, 2005
Abstract

This thesis investigates the geography in and of Victorian scientific practice by examining the Zambesi Expedition (1858-1864), which was led by the Scottish explorer David Livingstone. A team of assistants accompanied Livingstone: Dr. John Kirk, Dr. Charles Meller, Thomas Baines, Richard Thornton and Charles Livingstone. The official purposes of this expedition, funded by the British Foreign Office, were to catalogue the natural resources of the regions adjacent to the Zambezi River in order to identify new sources of raw materials for British industry and to introduce commercial markets to supplant the slave trade. The scientific results of the Zambesi Expedition have never been catalogued. Only limited attention has been paid to the ways in which science was made in the field and how it returned to Britain. In order to address these issues, a survey was made of relevant scientific literature to identify published analyses of the data and specimen collections produced by the Expedition’s staff. Extant specimen collections were located and examined along with archival records and correspondence. The combined manuscript and material evidence reveals that scientific concerns were an important justification for the Expedition. Fieldwork practices are examined in depth and an ideology of technology, expressed in different ways, is shown to have structured the encounters between the British and the locals. The Expedition’s members based their assumed superiority upon technological skill, especially their abilities to understand the environment and to command power—in terms of steam navigation, instrumental authority and the naming of natural productions. Power differentials were apparent in the field when the information possessed by local informants was required for the success of the scientific goals of the expedition. Credibility in the field became a tenuous quality negotiated between local informants, explorers and the metropolitan scientific community. The expedition’s members, as interpreters, were required to navigate the social and physical spaces of the field and the metropolis in order to produce and present credible knowledge. The thesis examines for the first time elements of the reception of the expedition by considering the publication of its scientific results. Critics’ voices are used to uncover those attitudes of the time that judged explorers—and this expedition—according to their prior experiences, social connections and field skills. The work of the Expedition, then, was performed in different spaces and at different scales; operating within and between the field and metropolis and actively linking local practices to global networks. These multivalent practices enabled and circumscribed a British construction of African nature.
Acknowledgements

I would like to thank my supervisors, Professors Charles Withers, Paul Nugent, and Kenneth King for all their help and guidance with this project. They allowed me the space in the beginning to find my way to this topic, trusted me throughout and encouraged me to the finish. I would also like to thank my examiners, Professor Felix Driver and Dr. Steve Sturdy, whose comments and critique will improve my future work. All students should have such careful and thorough readers.

It is no exaggeration to aver that this thesis would not exist without the support of a studentship in the History and Philosophy of Science from the Darwin Trust of Edinburgh. The support granted by Professor Sir Kenneth Murray and the Trust was crucial and I extend my sincere gratitude to them for allowing me this opportunity. I also extend my thanks to Dr. Mark Nesbitt and Julia Steele at the Centre for Economic Botany in the Royal Botanic Gardens, Kew. Their provision of the Sir Joseph Banks Scholarship provided the means for me to spend an extremely fruitful residence at Kew performing research in the collections and archives there. I continue to benefit from their hospitality and support. As the list of abbreviations shows, the staff of many institutions contributed to this thesis I would like to thank them all and in particular: Dr. Colin McCarthy and Carol Gökçe at the Natural History Museum and Michèle Losse at the Kew Gardens archives.

In expressing my appreciation to everyone else—the friends, family and colleagues who all in their own ways have given me confidence and support over the years—I am left speechless. I therefore hope it is not too forward to borrow some words Richard Thornton wrote to his teacher and mentor, Sir Roderick Murchison:

3 March 1858, Liverpool

...I wished personally to thank you for all your great and continued kindness to me, in obtaining me the appointment, in helping me—often undeservedly—out of all the difficulties I got into and on every opportunity giving me advice, instruction, and encouragement, not only concerning my public duty, but private life. It shall always be my endeavour, by carefully obeying your instruction, by working diligently and reporting faithfully to justify the confidence you have placed in me, and to deserve your future countenance and help. You may be sure that I shall always have the greatest pleasure in communicating to you on every opportunity the results of my labours and I shall be always glad to receive any hints or instructions from you....
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</tr>
<tr>
<td>APS</td>
<td>American Philosophical Society, Philadelphia</td>
</tr>
<tr>
<td>DLC</td>
<td>David Livingstone Centre, Blantyre</td>
</tr>
<tr>
<td>EUL</td>
<td>Edinburgh University Library</td>
</tr>
<tr>
<td>PRO</td>
<td>Public Records Office, Kew, London</td>
</tr>
<tr>
<td>NAZ</td>
<td>National Archives of Zimbabwe, Harare</td>
</tr>
<tr>
<td>NHM</td>
<td>Natural History Museum, London</td>
</tr>
<tr>
<td>NLS</td>
<td>National Library of Scotland, Edinburgh</td>
</tr>
<tr>
<td>RBGE</td>
<td>Royal Botanic Gardens, Edinburgh</td>
</tr>
<tr>
<td>RBGK</td>
<td>Royal Botanic Gardens, Kew</td>
</tr>
<tr>
<td>RGS</td>
<td>Royal Geographical Society, London</td>
</tr>
<tr>
<td>RME</td>
<td>Royal Museum, Edinburgh</td>
</tr>
<tr>
<td>RNML</td>
<td>Royal Naval Museum Library, Portsmouth</td>
</tr>
<tr>
<td>RSL</td>
<td>Royal Society Library, London</td>
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<tr>
<td>STS</td>
<td>Science and Technology Studies</td>
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<td>UMCA</td>
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Chapter 1: Introduction

While researching this thesis I spent one month in the chilled space (12°C) of the Economic Botany Collections of the Royal Botanic Gardens, Kew. Clutching copies of the entry books for Joseph Hooker’s Museum of Economic Botany, I sought specimens that were collected in the field by members of the Zambesi Expedition.\(^1\) As I opened tiny vials of seeds, manhandled beams of wood or peered into jars of spirit, one after another, the handwritten and printed labels attached to the specimens revealed that, curiously, the Expedition was known by many names. ‘The Zambesi Expedition’, ‘Livingstone’s Second Expedition’, ‘Livingstone’s Zambesi Expedition’, even the scandalous ‘Dr. Kirk’s Expedition’ all appeared on the various labels. For many specimens there was no particular expedition indicated, only the collector’s name—Kirk, Livingstone, Baines or Meller—and a date or location provided the clues that this cotton distaff or that block of raw latex was collected during the particular expedition I was interested in. Did the ‘Zambesi Expedition’, which I had been confidently referring to and researching, have a name at all?

Victorian popular periodicals and newspapers offered no more consistency than the old museum labels. Readers of The Times were regularly informed of the activities of ‘Dr. Livingstone’s Expedition’, ‘Dr. Livingstone’s African Expedition’, ‘The Livingstone Expedition’ or ‘The East African Mission’. The Royal Geographical Society used some of these variations in its publications, while adding ‘Livingstone, or Zambesi Expedition’ and ‘The Central African Expedition’ to the possibilities. Furthermore, the location of these activities equally challenged editors and as a result ‘East Africa’, ‘Eastern Africa’, ‘South Africa’, ‘Southern Africa’, ‘South-eastern Africa’, ‘Central Africa’ or ‘South-Central Africa’ were variously offered as possibilities. It appears that in Victorian Britain no one was very concerned with consistency in naming this project, as long as it was clear what was being discussed. How can this indeterminacy contribute to how we understand the expedition today? How did the Victorians understand an expedition? By way of answering these questions, it will be helpful to first consider the Zambesi Expedition—used with consistency here despite the anachronism—as a sum of parts.

\(^1\) Museum Entry Books, Economic Botany Collections, RBGK.
Conceptually and physically, the Zambesi Expedition was deployed into many different fields, and observed from many different vantage points. Politicians, a botanist, a zoologist, and a geologist wrote letters of instruction for members of the expedition. Naval officers and ships provided logistical support at the coast and some help in surveying the delta. British diplomats placated Portuguese fears that the expedition possessed ulterior motives to extend British power into an area that had been nominally within a Portuguese sphere since the early sixteenth century. Politically, the project required bureaucratic moves within Parliament, the Foreign Office and the Admiralty. Numerous scientific societies were involved in aiding the selection of members and analysing specimens and data. Steam ships were built on the Mersey and Clyde to be used for transport on the Zambesi.

Official letters and despatches sent from the expedition went to a variety of government offices. Letters also went to various scientific, commercial and missionary societies. These many correspondents had different expectations of the expedition and different levels of risk invested in its success or failure—thus they required different information. Planning, financing, outfitting, and supporting the expedition included inputs from powerful and distinct sectors of British society; and each had its particular interests. Looking at the personnel, members of the expedition possessed different types of experience, held different views on scientific practice, were charged with particular tasks, and corresponded with different individuals and groups.

Given this variety of skills, activities, interested parties (with their many expectations), and indeed the various locations of these activities we might consider the Zambesi Expedition as many different expeditions at once, operating in different fields. One would be hard-pressed to point at ‘the Expedition’ at a particular time on a map without waving a hand over Central Africa and Great Britain. Hence, in this thesis the Expedition will be presented as a loose aggregate of projects unified by goals, relationships, and responsibilities, not a singular project or location. This stands in contrast to contemporary writing and secondary literature about the Zambesi Expedition that use language which constructs it as a unified whole. Determining how contemporary and modern sources unify this aggregate and understand a geographically distributed project as a unity will assist in understanding how social structures provide

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2 David Livingstone’s travels throughout Britain in 1857 promoting the expedition and the correspondence he maintained between a variety of scientific, political, and commercial interests demonstrate the heterogeneous nature of the expedition’s supporting network.
cohesion for a scientific project that has no single site where it may be unambiguously located. This thesis will attempt to characterise the various fields, or spaces, where scientific practice takes place and how these spaces constitute the historical whole. Thus what is presented here is one anatomy, if you will, of the Zambesi Expedition.

Before commencing with the dissection, it will be necessary to step back and present an overview of events that will later be examined thematically. This introduction will first describe the physical and social geography of the Zambezi basin in the years around 1860. Especially important here will be the effects of the mfeane, the movements of Ngoni northward from the area around Natal and the reactions of Portuguese settlement and colonial administration. The Expedition quite literally took their steamer into a conflict zone. Following this, the six-year story of the expedition will be presented as a straightforward chronology. The introduction will end with a discussion of the overall thesis.

Before beginning, a final note on names and spelling. In order to preserve the contemporary experience of the Expedition and of Victorian English, the spelling of place names in all quotes will remain as in the original. Most often it will be phonetically obvious which town or feature the author intended. In other cases an entirely different name appears; when this occurs, an explanation is offered in the footnotes. For reasons of historical consistency, I preserve the spelling ‘Zambesi’ in the proper name of the Expedition as this was by far the most commonly used at the time. Today, ‘Zambezi’ is more commonly used in English and will be used here in all other cases. Additionally, because the modern countries—nor their colonial precursors—of Malawi, Zimbabwe, and Zambia were not even remotely imagined in the 1850s and ‘60s, the location of events will not be considered in terms of those later political entities. Only ‘Mozambique’, which already had some geographical meaning by this time, may appropriately be used in particular circumstances. For the area along the river, essentially the entire lower watershed which includes the Shire and Lake Malawi, the collective ‘Zambezi Basin’ is used. Two equivalent terms for the area, more strictly along the banks of the Zambezi below Zumbo, are ‘the Rivers’, based upon the Portuguese administrative region ‘Rios de Senna’, and ‘Zambesia’. The lake that is now called ‘Lake Malawi’ was variously called ‘Nyinyesi’ or ‘Nyassa’ by the members of the

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3 This term is used interchangeably with ‘Zambesia’ in M. Newitt, Portuguese Settlement on the Zambezi: Exploration, Land Tenure and Colonial Rule in East Africa (Harlow: 1973).
Expedition and ‘Lake Nyasa’ during colonial times, when Malawi itself was ‘Nyasaland’. A last point to direct the reader, the River Shire does not recall an undetermined British county and is pronounced ‘shee-ray’.

The Zambezi Watershed: People and Places

The Zambezi flows east to west across 3000 km of Africa, entirely contained in the southern tropics. Its major tributaries include the Chobe, Kafue, Luangwa and Shire, the latter drains Lake Malawi. The Expedition spent the majority of its six years in the region along the final 400km of the Zambezi between Tete and the delta; or in the lower 200km or so of the Shire (Figure 1.1). Below the Cahora Bassa gorge, impassable cataracts until it was hammered in 1974, the Zambezi is wide and generally shallow except where briefly constrained by another gorge, the Lupata. Immense quantities of sand brought down from the interior during the rainy season are deposited in the lower Zambezi, leaving a river bed of sinuous and ever-changing channels. Navigation is thus difficult in the lower stretches and cannot continue above the Cahora Bassa gorge on the Zambezi and the cataracts of the Shire, which begin about 10km upstream from the modern town of Chikwawa in Malawi.

When the Ma Robert first steamed up the Zambezi in May 1858, the members of the Expedition appear to have had little idea of the world they were entering. Livingstone’s first book, Missionary Travels and Researches in South Africa was for most people in Britain at the time the only readily available source of information about the river and the people who lived along it. By 1857, even in Portugal itself, the public was only recently beginning to receive up-to-date information about this ancient outpost of the Portuguese empire. An exception to this in Britain, limited to the readers of the Journal of the Royal Geographical Society, was a report made in 1832 by Captain William Owen based upon the journals of three naval officers who died exploring the river in 1823. For the members of the Zambezi Expedition, the general story of Portuguese

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5 Newitt, Portuguese Settlement on the Zambezi, 342.
6 As Newitt explains, before the publication of Memoria Estatistica sobre os Dominios Portuguese na Africa Oriental in 1835 by Sebastião Xavier Botelho, very little information circulated in Europe concerning Zambesia. Ibid.
7 W.F.-W. Owen, “Particulars of an Expedition up the Zambezi to Senna”, Journal of the Royal Geographical Society 2 (1832), 136-52. Notably, the officers found the river difficult to navigate.
Figure 1.1 Map of Zambesi Basin
settlement on the river since the early sixteenth century was known, but precise details about the social and political situation in the late 1850s appear to have been either unavailable or unsought. That history will be reviewed here.

After the voyage of Vasco da Gama from Lisbon to Calcutta in 1498, the Portuguese built up a strong trading network in the Indian Ocean based at Goa. The Ihla de Moçambique was selected as a site for a factory and later a fort in 1507. The government traders soon followed the lure of gold and ivory (and Muslim traders) up the Zambezi, establishing trading posts at Sena and Tete by the early 1530s. Yet, the ‘official’ sites of Portuguese activity are only part of the story, the sertanejas, or backwoodsmen, regularly left or escaped the life of the military forts and fairs (ferias) to make their own way in the interior; the existence of hundreds of such individuals was reported as early as 1528.\footnote{Newitt, Portuguese Settlement on the Zambezi: 36.} The tradition of such persons, who self-identified with Portuguese culture but lived well beyond the control of the Portuguese crown, continued until the early twentieth century. They are important to the story of the Expedition and the history of Zambesia. Many of the ‘Portuguese slavers’ whom Livingstone describes were quite independent of the colonial administration.

In the late 1850s Zambesia was officially divided into three captaincies: Quelimane, Sena and Tete. Each captaincy was further divided into prazos or large land concessions granted by the Portuguese crown (Figure 1.2). The senhor of a prazo had full jurisdiction over the free Africans, called colonos, who lived within it. Newitt argues that they are better thought of as African chiefly tenancies in their own right: ‘areas of tribute collection and jurisdiction, surrendered by the different African monarchies and with traditional boundaries that had never been surveyed’.\footnote{Ibid.: 104.} Rule was authoritative but depended ultimately upon patron/client networks.\footnote{M. Newitt and P.S. Garlake, “The ‘Aringa’ at Massangano”, Journal of African History 8, no. 1 (1967), 133-56: 135.} Power was wielded through the Chikunda, slaves who were essential to the running of the prazos. The colonos and their chiefs (jumos) interacted directly with a Chikunda mucasambo, appointed by the senhor to oversee sub-districts of the prazo. Primarily composed of young boys taken from deep in the sertão, the Chikunda, like the Mamelukes of Egypt or the Janissaries of the
Figure 2.2: The *Prazos* along the Zambezi River
Ottoman empire, were the enforcers of the *prazo*-holders in the eighteenth and nineteenth centuries; a fully-armed militia class which had a distinct ethnic identity and no ties of kinship to the governed population.\(^{11}\) Where the total population of the whites, Indians and mixed-race persons along the Zambezi was probably no more than 500 or so in the late 1850s, there were probably tens of thousands of Chikunda.\(^{12}\) The slave-raiding caravans that Livingstone described in such detail to shock Victorians into donating money were often Chikunda operations. The Chikunda also served as expert canoe men and were certainly in the employ of the Expedition on numerous occasions.

In the mid-nineteenth century the majority of the *prazos* around the Crown towns of Sena and Tete had fallen unoccupied.\(^{13}\) This was due to the growing insecurity along the river. The arrival of various groups of Ngoni, called by the Portuguese *Landeens*, at the southern banks of the river from the early 1830s caused great disruption. Each year the *impis* arrived demanding tribute from the *senhors* and their *colonos*. They were usually paid. The journals of the members of the Expedition record these events in detail; clearly stunned by seeing Europeans pay tribute to African kings.

As Newitt demonstrates, the disruption caused by the Ngoni caused two power shifts, first the authority of *prazo*-holders and the colonial government diminished. Into the vacuum stepped powerful *sertanejo* family clans who consolidated their independence and built up large numbers of *aringas* or fortified towns. These families, such as the Periersas of Macanga, the Da Cruz of Massangan and the Vas dos Anjos of Massingire resisted governmental authority and occasionally received recognition as sovereign governments in their own right, with defined territories.\(^{14}\) Already by Livingstone’s time the militias raised by these clans included many Chikunda.\(^{15}\) When the clientage networks of the *prazo* fell apart, Chikunda looked elsewhere for a patron.

Often the leaders of these clans were of mixed-race, typically Afro-Indian-Portuguese. The ‘white’ Portuguese thus referred to these clans as *mzungo* in order to distinguish them from other African leaders.\(^{16}\) Regular skirmishes and sieges between these clans and government officials from the coast—along with other chieftaincies in

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12 Newitt, *Portuguese Settlement on the Zambezi* 140; Isaacman and Isaacman, *Slavery and Beyond* 52.
14 Ibid.: especially chapters 13-16.
15 Isaacman and Isaacman, *Slavery and Beyond* 71 and 290.
16 *Mzungo* or its variants remains as the identifier for a white person in East African Bantu languages.
the region—were the dominant feature of disrupted life along the Zambezi. Meanwhile the Ngoni threat hung over the heads of all the residents. The period of the ‘Zambezi Wars’ lasts from roughly 1840 until 1902. In September 1858, a few months after entering the Zambezi, the Expedition steamed straight into a siege at Shamo, near the confluence of the Shire and Zambezi, pitting a force of Portuguese government troops and local militia against the aringa of Paul Marianno Vas dos Anjos II. The aringa was under the control of Marianno’s brother, Bonga. While they struggled to maintain neutrality, Kirk provided medical care to the victorious but wounded government officials and received a commendation.

To conclude this section we can refer to how the members of the Expedition tried to make sense of the situation. They often referred to the ongoing wars and battles as conflicts between rebels and ‘government’. This does not reflect the situation as it was. Following Newitt, it can be said that the muzungu clans represented an indigenous resistance against colonial rule. In Europe, Portugal claimed sovereignty over the entire Zambezi as far as Zumbo. Actually on the Zambezi, the situation was one where outposts of crown control coexisted with essentially independent polities. The colour of a person’s skin or the language they spoke would have been little indication as to where allegiances were placed—until the end of the century prazo-holders committed troops both for and against the crown in Lisbon. It is no wonder that the ongoing feuds and shifting alliances perplexed the members of the Expedition who struggled to interpret it along the model of the British Empire. They concluded that where sovereignty was claimed in Lisbon, it was not apparent or, at least, was very limited. It has been argued elsewhere that the presence of the Expedition, by making the weaknesses of Portuguese rule in Zambesia public, spurred Lisbon to build and enforce and more effective government. The later Zambezi Wars had this exact motivation.

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17 Newitt, Portuguese Settlement on the Zambezi.
18 Many of the muzungu clan leaders used African as well as European names, this reflected their fusion of the two cultures.
19 This was occurring especially at the end of August and early September, 1858. E. Tabler, ed., The Zambezi Papers of Richard Thornton, Geologist to Livingstone’s Zambezi Expedition, 2 vols. (London: 1963) 61-62.
20 Newitt, Portuguese Settlement on the Zambezi.
An Overview of the Expedition\textsuperscript{22}

The plan developed for the Expedition was straightforward. It would reach the delta of the Zambezi and proceed as quickly as possible to the Batoka highlands beyond Victoria Falls (Figure 1.1). Once there the members would construct an iron house, set up cotton gins and sugar mills, begin planting crops and explore the surrounding countryside. Their main work would be cataloguing the natural resources of the country with an eye to future trade. They hoped that the Africans (who, it was assumed, would gather around their base) would benefit from observing the moral conduct of a British community. After two years the Expedition would return to the coast with reports and specimens. The government would then decide upon an extension. Correspondence between the field station and Britain would be facilitated by scheduled stops at the delta by Admiralty ships that regularly patrolled the Mozambique channel for slavers. The entire plan rested on one important but unknown detail, the navigability of the Zambezi.

HMS \textit{Pearl} arrived at the delta of the Zambezi in 14 May 1858 with the Expedition on board. Navigational charts for that coast were still very incomplete and the main channel was unknown. The first month was spent first putting together the \textit{Ma Robert} and, with the officers of the \textit{Pearl}, surveying the delta and looking for the entrance to the river.\textsuperscript{23} They found the main channel on 11 June. The plan hoped that the \textit{Pearl} would be able to take all the equipment upstream to Tete, unload, return to sea and continue its voyage to Ceylon. It quickly became clear that the river was much too unpredictable to risk the larger ship, which had already grounded once (Figure 1.3). Reluctantly the stores were unloaded onto a small island at the head of the delta for the \textit{Ma Robert} to shuttle to Tete using Shupanga and Sena as relay depots (Figure 1.4). Kirk took command of ‘Expedition Island’ on 17 June, watching over the stores with Baines and Thornton while Livingstone would soon take command of the steamer. The naval

\textsuperscript{22} This section presents a general chronology of the Expedition. More detailed histories of the period are available in the sources to be discussed in the Literature Review. The most straightforward of these is \textit{Ibid.}

Figure 1.3: HMS *Pearl* aground in the Zambezi

Figure 1.4: Kirk’s camp at Expedition Island
officer who was supposed to command the *Ma Robert*, Norman Bedingfeld, resigned by the end of July 1858 due to differences of opinion with Livingstone.24

Stores of equipment were soon strewn along the river at Expedition Island, Shupanga, Sena and Tete. Only on 3 November 1858 was the entire staff with most of the stores unified at Tete. Now they could prepare to investigate the Cahora Bassa gorge and see what difficulties it presented to navigation. The plan was to move all the equipment and people quickly upriver from Tete in order to find a location for the permanent base. After two gruelling inspections by foot the gorge turned out to be totally impassable.25 Livingstone tried to make light of the situation though the outlook for the entire project suddenly looked bleak. On 21 December Livingstone and Kirk took the *Ma Robert* up the Shire to see what the region looked like and if it offered any alternatives. Thomas Baines and Charles Livingstone were left with orders to go back to the Cahora Bassa in January, during the rainy season, to see if higher water would improve its navigability. It did not. In general, for the members of the Expedition the only promising result by 1859 was a favourable report on the coal seams near Tete by Thornton; the steamer making use of this fuel when possible.

The preliminary investigation of the Shire was inconclusive but tantalising. It appeared navigable in its lower reaches and the Portuguese of Sena informed Livingstone that two large lakes were located in the highlands above the river. They returned to Tete on 2 February 1859, and spent a few weeks writing reports and specimens. They also prepared for a much longer journey to the Shire highlands. They departed again on 14 March, leaving Baines and Thornton at Tete. Once on the highlands they climbed the escarpment and visited Mount Zomba and Lake Shirwa (Figure 1.5). Kirk and Livingstone were on the highlands until early May. When they returned to the *Ma Robert* they went to the delta to see if an Admiralty ship was waiting to drop supplies. None came so they made their way back to Tete to arrive on 23 June.

At Tete, Livingstone was extremely displeased with Thornton’s performances and dismissed him.26 Baines was also suspected of stealing from the stores. The artist

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25 The first lasted from 8-13 November and the second from 22 November to 8 December. On the second journey they were guided by José Anselmo de Santanna, a locally powerful trader who was leading the Portuguese ‘resettlement’ of the lands above Tete towards Zumbo. Newitt, *Portuguese Settlement on the Zambezi*: 296.

26 He was dismissed on 25 June 1859 Tabler, ed., *Papers of Richard Thornton*: 103.
and the geologist had been left at Tete for most of the year, watching the stores. Often sick with fever or other ailments while both physicians were off exploring, they had not performed as Livingstone expected. Their later careers indicate that the rash decision should have been rethought. Thornton did not go home, he stayed at Tete and continued his geology, first accompanying a Portuguese caravan to Zumbo. He later made his way to Zanzibar where he met Carl Von der Decken and joined his expedition to Kilimanjaro. Thornton returned to the Zambesi in late 1862 and through the intercession of Roderick Murchison, was asked by Livingstone to rejoin the Expedition. He died of fever in April 1863 and was buried near to Murchison’s cataracts on the banks of the Shire river27.

Baines’s situation with Livingstone was deteriorating, but not yet critical. He was again left to watch the stores in Tete while the rest of the Expedition left on 11 July to travel to the coast and meet a ship on 31 July. After the rendezvous they returned to the Shire Highlands where they explored until October. The party returned to the Ma Robert on the Shire at Chibisa’s village. From here Kirk and George Rae, the engineer, were sent overland to Tete (Figure 1.1) as the river was too low to risk the Ma Robert. Upon arrival on 25 October, Kirk had the unpleasant task of examining the stores to see if Baines had stolen items, his findings were inconclusive. At this point Kirk, Baines and Rae hired canoes to rendezvous with Livingstone in the Ma Robert at the coast to meet a ship. Thus all the members of the Expedition steamed to the coast in November 1859 to wait for new supplies and to learn if the government would approve an extension beyond the initial two years. Permission was granted, new supplies taken on board and they returned to Tete in early 1860. However, Baines was dismissed and sent away on HMS Lynx to Cape Town. He claimed total innocence of theft and demanded a formal hearing, but none was granted.28

Much of 1860 was spent on a trip to Sekeletu and the Makololo of Linyati. Livingstone left a group of Makololo assistants waiting at Tete at the end of his first expedition in 1856 and wanted to return with them to their home. They left in April of 1860 from Tete and returned in November the same year. It was a long trek that confirmed once and for all that the Zambezi would not serve as a conduit for commerce with the centre of the continent. When returning, some of the canoes they travelled in

27 Ibid.
28 The details of Baines’s dismissal are argued at length in Ross, David Livingstone: Mission and Empire; and elsewhere.
were upset in the upper rapids of the Cahora Bassa and most of Kirk’s notes of the trek were lost. After they reached Tete, they set out for the coast in January 1861. This was the last voyage of the badly corroded and much maligned *Ma Robert*. The steamer sank into the sands near Cheba, a few miles upstream of Sena. Hiring canoes, the Expedition completed the journey to the coast. In February a new steamer, HMS *Pioneer* arrived, towed by HMS *Lyra*, and accompanied by HMS *Sidon* which also carried the first missionaries of the Universities’ Mission to Central Africa (UMCA). This group intended to travel to the Shire highlands, now famous due to Livingstone’s optimistic despatches, and set up a permanent mission station. The *Lyra* also carried Charles Meller, the second botanist appointed to the Expedition.

Though the UMCA was not, strictly speaking, part of the Expedition there was no possibility that the two projects could remain separate. The missionaries looked to Livingstone for advice and inspiration. The famous explorer was not prepared for the responsibility. There were two major problems. First, the Zambesi and Shire were not reliably navigable for steamers like the *Ma Robert* or *Pioneer*, which simply drew too much water for use on such rivers. The mission would have to rely, as the Portuguese regularly did, upon large locally-built canoes with their Chikunda crews. These were expensive and not always available. Second, the Zambezi was only used with the permission of the Portuguese, government supporters or otherwise. A Portuguese customs house was now operating at the mouth of the delta. The thought of a British civilising mission operating only at the convenience of the slaving Portuguese was anathema to members of the Expedition and UMCA alike. It was not a comfortable situation.

To these problems Livingstone offered a solution: the Rovuma River. The river was beyond Portuguese control and Livingstone believed that it was an effluent of Lake Nyassa. If true, this would provide a new and independent route to the lake and Central Africa for the Expedition and the UMCA. The Zambesians would be left to their internecine wars and the “debaucheries” of their mixed-race community. Before the UMCA had a chance to unpack, Livingstone sailed with them first to the Comoros and then to the Rovuma. The trip lasted from 12 February 1861 until 1 May, when they returned to the Zambezi delta having failed to find a new route. In the Rovuma an old problem had returned: they soon found that low water resisted their attempts to travel

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very far upstream. Rejected by an African river once again, Livingstone brought everyone back to the Zambezi and began the arduous process of transporting the UMCA with all its gear up the Zambezi and Shire to offload them at Chibisa’s village.

In May and June 1861 Bishop MacKenzie and the UMCA were literally dragged up the Zambezi and Shire to Magomero in the Shire highlands in an attempt to set up a mission station. It was the wrong season for taking a dangerously laden steamer up the rivers and they frequently grounded on shoals for days. Livingstone was also beginning to worry about Government support for the Expedition as he suspected that the engineer sent out with Pioneer was an informant for Washington in the Hydrography Office.30 To make matters worse new bands of slave raiders—some Yao and others apparently Chikunda—had begun to operate in the highlands causing widespread disruption and, consequently, crop failures. Nevertheless the UMCA was left to settle in while Livingstone, Kirk and Charles Livingstone took a small team back to Lake Malawi in order to determine how far north it extended. The trip lasted from early August until November 1861 and was a trying experience for all involved. They were robbed, were often extremely short of food, experienced difficulty in gaining permission to travel and consequently were unable to reach the end of the lake. The small sailboat they took with them was not suitable for the high waves produced by the gales that quickly rose on the lake. Therefore they could not risk crossing the lake and examining its eastern shores. For geographers in Britain, this failure to circumnavigate the lake, or to at least determine its northern extent and whether rivers flowed into or out of the lake, was the greatest single failure of the Expedition. The ‘Nile Controversy’ of the 1860s and 1870s, which found competing claims about the hydrology of central Africa debated openly and vociferously, would have been significantly curtailed by a more complete survey of Lake Nyassa in late 1861.

Meanwhile, the land-based caravan of Makololo which followed the boat’s progress encountered resistance from the topography and from Swahili traders and Ngoni further north. These Makololo, who had opted not to return to their homes, severed their ties with Livingstone towards the end of this journey. They then took cunning advantage of the political instability in the Shire valley and quickly set themselves up as a new power, taking control of important chieftaincies and raiding the

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aringas and prazos further south. The Makololo became an important ruling class in the upper Shire and never failed to remind everyone of their ‘English’ connections. They became an important part of the later history of the region and future border negotiations between the British and Portuguese.31

When they returned to the Shire river on 8 November they immediately proceeded downstream as word arrived that a ship would soon meet them. Unfortunately after only a few days the ship grounded in the Shire for almost one month. Only the onset of the rains and the consequent rise in the river finally freed the Pioneer and they reached the Zambezi on 11 January 1862. Two admiralty ships were waiting for them HMS Gorgon and HMS Hetty Ellen carrying more missionaries: Livingstone’s wife, Mary, and James Stewart, a Scots missionary who wanted to investigate the possibility of opening a cotton-producing industrial mission on the Shire highlands. He was on a ‘fact-finding’ mission and his journals offer further evidence for the events of 1862. Another steamer, the Lady Nyassa, also arrived in pieces. The plan was to get this new steamer up to the lake as fast as possible where it could be constructed and put into service in support of the missions, engaging in the cotton trade and anti-slavery activities. Livingstone foreshadowed the later extensive use of steam navigation in support of missionary activity on the lake.32 It should be noted that Lady Nyassa was not a government ship. When his requests for a third steamer had failed, Livingstone self-financed its construction.

In early 1862 a series of disasters provided further setbacks. First, by the end of January the UMCA has already lost a number of its members to fever including Bishop MacKenzie. In April, Mary Livingstone died and was buried at Shupanga. Moreover, the river was too low for the Pioneer to carry the pieces of the Lady Nyassa to the bottom of the cataracts of the Shire for portage, and a decision was made to assemble the latter steamer at Shupanga without its boilers. It could then be towed up, disassembled, carried thirty miles around the cataracts—on a portage road that had yet to be built—and reassembled on the upper course of the Shire where it would steam into the lake. This was a massive undertaking, the engineer, George Rae, was required to essentially construct a shipyard, complete with cranes on the banks of the Zambezi. While waiting

for the construction to progress, Livingstone took Kirk and a crew in Pioneer back to re-examine the Rovuma. They left the Zambezi on 6 August and returned 23 November. Clearly frustrated by geographical facts, Livingstone had dragged his staff in small boats through water at times only inches deep hoping to find that it exited the lake. Kirk and the others followed quietly, though their journals record their doubts and that these were correct. The Rovuma proved to be unusable for navigation.

By January of 1863 the Lady Nyassa was ready to be towed and with much difficulty was brought by Pioneer to the foot of the cataracts. News had already reached the Expedition that the UMCA was struggling to feed itself. The members of the Expedition assisted by going overland to Tete to purchase more supplies. A difficult journey, the effort killed Richard Thornton in April. Furthermore, it became clear that the government intended to recall the Expedition by the end of 1863. Quickly, Kirk and Charles Livingstone departed for Britain on 19 May. Livingstone could not leave immediately because the river was again too low for transport and he would wait for the rains at the end of the year. In the interim he explored the lands to the west of the lake, a flying march that demonstrated the extent of Swahili influence upon the slave trade centred at Nkhotakota. The UMCA also began to cease its operations. In June 1863 they received a new Bishop, Tozer, who first moved the station to the top of Mount Moramballa, hoping to find respite from fevers. They fared little better there and in December the UMCA moved to Zanzibar. Livingstone left the Zambesi in January 1864 and took the Pioneer and Lady Nyassa to Zanzibar. In April he captained the Lady Nyassa to Bombay to sell her and returned to London in July. The Expedition had ended with a whisper.

Activities related to the Expedition were not restricted to the field. Through all this time bureaucratic and scientific work supported and analysed the fieldwork. The Expedition was formally a project of the Foreign Office, which was ultimately responsible for the cost. The day-to-day bureaucratic work of managing the finances and organising regular shipments of supplies and correspondence was handled by the Admiralty through its Hydrographic Office. Any personnel, diplomatic or logistical issues were handled by these two offices. The government turned to the scientific community for assistance with the Expedition’s reports of the natural history of the

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33 This journey is detailed in G. Shepperson, ed., David Livingstone and the Rovuma: A Notebook (Edinburgh: 1965).
region. All data and specimens were government property. In order to ensure their proper treatment botanical specimens were sent to Kew Gardens and zoological specimens were sent to the British Museum of Natural History for ‘first refusal’. Portions of despatches sent to the Foreign Office containing scientific information were copied out and forwarded to these institutions.

**Summary of Chapters**

This thesis will approach the expedition following a loose chronological order that emphasises key themes concerning scientific practice. A definition of scientific practice will be proposed in chapter 2. Here relevant literature from science and technology studies and geography will be reviewed in order to develop an appropriate method for describing the geographically extended practices of expeditions. Previous writing about Livingstone and the Zambesi Expedition will be reviewed as well. For the general story of the Expedition the great quantities of secondary literature are relied upon, but they must be interrogated carefully. Any biases about Livingstone or assumptions about the social position of scientific knowledge must be determined before the data they provide can be used with confidence.

Chapter 3 begins the analysis. Here, the formative period of the Expedition, early 1857 to March 1858, is considered in depth. The Victorian concept of the civilising mission is examined as the dominant ideology of the project as stated in its instructions. The interests of science, evangelism, commerce and philanthropy contributed to the negotiations that went on in Government to secure support and funding for the project. It is argued here that science both advised government on how to outfit the Expedition and provided justification by offering the possibility of secure results for a civilising mission project that had harsh critics. Thus, while ‘Christianity, Commerce and Civilisation’ are traditionally offered as the main themes of the Zambesi Expedition, ‘Science’ is added as a fourth, vital consideration.

In Chapter 4 the analysis moves to the field. A focused study of the role of technology in field work is undertaken. The Victorians revelled in the advancements of their age and defined themselves by their mastery of technology. The members of the Expedition based their assumed superiority over the Zambesian locals upon technological skill, especially their abilities to understand the environment and to command power—in terms of steam navigation, instrumental authority and the naming
of natural productions. This chapter uses evidence taken from their journals and correspondence to provide a detailed examination of the use of technology in the field. Questions are also raised about the tensions between the different goals of the Expedition and conflicts between the different practices used to achieve them.

Fieldwork is also the subject of Chapter 5. The emphasis here is on practice as an activity that serves to link local collection sites to local analysis sites through social networks that rely upon trust, credibility and authority to be maintained. The role of information provided by local informants is considered in depth. This examination serves to challenge post-colonial critiques that may be too quick in their rejection of a role for local or indigenous knowledge within imperial systems of knowledge production. By tracking carefully the trajectory of data and specimens from the field to the museum, the importance of local knowledge to the scientific project of the Expedition is revealed.

Chapter 6 returns us to the metropolis examined in chapter 4 and asks how the information gathered by the explorers was received by the scientific community. The presentation of information gathered by the Expedition in different kinds of literature is considered. Different results were discussed in different spaces and were analysed with different standards of evidence. In this chapter, the voices of the critics of the Expedition are the loudest. The dialectic between the critics and the explorers provides a view into the internal standards of the scientific community and the modes by which African nature could be understood in metropolitan locations.
Chapter 2: Literature Review and Methodology

‘Dr. Livingstone I Presume?: The Historiography of the Zambesi Expedition

This chapter examines the sources for the history of the Zambesi Expedition and reviews relevant literature in order to understand more generally how explorers and expeditions function as sources of knowledge within scientific culture. The emphasis will be upon descriptions of practice and knowledge in transit.

Trying to assess the nature and ‘anatomy’ of the Zambesi Expedition requires that we come to terms with its leader, the iconic David Livingstone. He continues to attract great interest as a symbol of missionary zeal and international cooperation.\(^1\) His birthplace in Blantyre is a Scottish National Memorial and he is buried in Westminster Abbey. Bronze statues to his memory are located in many of the places associated with his life. At least two cities and a town are named after him: Livingstone, Zambia along with Blantyre and Livingstonia in Malawi. Since the publication of Stanley’s \textit{How I Found Livingstone} (1872) and Blaikie’s \textit{The Personal Life of David Livingstone} (1880), dozens of biographies have appeared.\(^2\) The most recent major publications have been in 1973, 1993 and 2002.\(^3\) In 1996, his life was examined in a large-scale exhibition, \textit{David Livingstone and the Victorian Encounter with Africa}, sponsored by the Scottish and British National Portrait Galleries.\(^4\) In the catalogue to this exhibition, scholars representing many disciplines contributed essays concerning his life and its effects upon British life.

More focused treatments of Livingstone’s life have looked at his medical work and geographical contributions.\(^5\) Produced in the 1950s and 1960s, these studies were written in connection with the foundation of the Central African Federation (the two Rhodesias and Nyasaland) in the mid-1950s and sought to promote an image of

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\(^1\) The “after life” of Livingstone is examined in F. Driver, “David Livingstone and the Culture of Exploration in Mid-Victorian Britain”, in \textit{David Livingstone and the Victorian Encounter with Africa} (London: 1996): 111.


Livingstone as the mythic progenitor of all European settlers in Central Africa. The history presented in these books is descriptive and uncritical, and whose subtext supports the existence of Europeans in the region. Related to these publications is the Oppenheimer Series of the Central African Archives (now the National Archives of Zimbabwe in Harare), which, during the 1940s and 1950s, published the journals of the first Europeans to explore what was then considered the territory of the Federation. Included in this series is a two-volume set of Livingstone’s journals from the Zambesi Expedition and the journals of James Stewart, who spent over a year with the Expedition. Both provide access to otherwise scattered primary materials.

The Zambesi Expedition is normally examined in biographical and historical literature in connection with the lives of the members of the Expedition. The relevant works are examined here. The Livingstone brothers’ own published account of the Expedition provides an important record of its activities. The Narrative of an Expedition to the Zambesi and its Tributaries and of the Discovery of Lakes Shirwa and Nyassa, 1858-1864 was chiefly based upon the journals of Charles and David Livingstone. As a record of the Expedition itself, however, the Narrative presents some difficulties. Fully fifty percent of the Narrative deals with only eleven months out of the six-year duration of the Expedition. The two periods emphasised are the return journey from Tete to Sekeletu’s and back in 1860 and David Livingstone’s exploration of the areas west of Lake Nyassa made in 1863 after Kirk and Charles Livingstone had left for Britain. The chapters detailing these excursions bear strong similarities to the journeys described in Missionary Travels when Livingstone crossed large distances quickly with minimal baggage. In these situations he was the happiest and the Narrative emphasises similar events.

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6 The British South Africa Company was also involved in subsidising these book projects. See Holmes, Journey to Livingstone, 349.
7 Similarly 1960 saw the founding of the botanical journal Kirkia: Journal of the Federal Herbarium, Salisbury, Rhodesia and Nyasaland, the title reflecting a desire to promote the image of Kirk as the first true botanist to work in the region. The journal is now published as Kirkia: Zimbabwe Journal of Botany.
10 Pages 120 to 253 deal with 15 May to 23 November 1860 while pp. 348-427 cover 16 June to 31 October 1863; this adds to 212 of a total 458. A further 11 pages cover his trip from the Shire to Bombay followed by an 18-page conclusion. For comparison, Richard Burton’s Lake Regions of Central Africa (1860) allows 572 pages for a much shorter period of time.
The *Narrative* is a difficult text, raw and immediate. Written to be half travel narrative and half diatribe against the Portuguese settlers on the Zambezi, it offers a wealth of ethnographic observations along with calls for British action against the slave trade along the east coast.\(^1\) The illustrations which enrich the book were based upon Charles Livingstone’s now lost photographs and Baines’s paintings (for which he is not credited). Throughout the *Narrative*, every failure and setback for the Expedition is in one way or another attributed to Portuguese meddling. Readers were meant to be angered by the book. The solutions for the problems along the Zambesi are the same as in the *Missionary Travels and Researches* of 1857: diplomatic pressure on the Portuguese to amend their evil ways combined with British-led legitimate commerce will lead to the eradication of the slave trade. For historians, the *Narrative* provides the Livingstone brothers’ immediate reflections upon the Expedition (it is difficult to distinguish the two voices) as written for a popular audience. Read as such, it offers the leader’s own view of the project without the uncomfortable details. It is not, therefore, complete. This is especially the case with natural history, which was purposefully omitted in order to let Kirk write a separate work (which never appeared).\(^2\)

Aside from the *Narrative* itself, the only other extensive treatments of the Expedition are *Livingstone’s Lake* by Ransford and *Livingstone’s River* by Martelli.\(^3\) Ransford’s study is a history of the region around the lake, emphasising European contributions. The first section, which deals with pre-colonial history, is titled ‘Night’, the subsequent section, which discusses the Expedition, is titled ‘Dawn’. In Martelli we find the only account focused solely on the Expedition. Published in 1970 for a popular audience, this history foreshadows Jeal’s critical biography by not obscuring the comments of Livingstone’s detractors.\(^4\) They are both attempts to “unmask” the hero, written immediately after the break-up of the British Empire in Africa when the icons of imperialism were most vulnerable to revisionists. Martelli focuses on personality clashes and political contexts. He made attempts to answer enduring questions such as the content of Livingstone’s imperial motivations and whether or not he knowingly misled the Government concerning the navigability of the Zambezi. Due to the increased

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\(^1\) Ross suggests that the unbalanced tone of the *Narrative* contributed to its poor sales (in relation to *Missionary Researches*) in combination with a damaged reputation. Ross, *David Livingstone: Mission and Empire*: 195.


\(^4\) Jeal, *Livingstone*. 
amount of published primary sources available at the time of his writing, Martelli was able to provide a fuller account of the general story of the expedition than had hitherto been possible. The most important additions in Martelli’s book are the voices of the other leading members of the Expedition, whose journals and letters had been recently edited and published. They offer alternative views on the historical events and their careers have been given limited treatment (which are discussed below).

The first study of Kirk’s contribution to the Expedition, aside from obituaries, was written a few years after his death in 1922. Reginald Coupland’s *Kirk on the Zambezi*, is the first volume of what was intended to be a two-volume biography of Kirk’s life. It remains the standard text and maintains a respectful tone. Coupland had access to Kirk’s original journals and correspondence. The journals were later edited and published in 1965 by Foskett, rendering more accessible descriptions of the events of the Expedition through the eyes of its naturalist. The only other treatment of Kirk’s life is a recent popular account derived mainly from secondary sources and written by Liebowitz, a non-specialist.

Baines’s activities during his truncated appointment to the Expedition have been considered from biographical and art-historical standpoints and his journals from the Expedition published. Aside from Livingstone, Baines enjoys continued popularity through his artistic achievements. As one of the earliest landscape painters to work north of the Cape, Baines’s art holds aesthetic and historical importance. His biographers have sought to rescue his reputation from the ignominy he received at the hands of Livingstone, who accused him of theft from the Expedition’s supplies and relieved him of duty in September 1859. Biographers continue to take sides in the

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17 The originals are now held in the NLS and a close reading of them shows that at times Foskett, Kirk’s grandson-in-law, took a rather cavalier approach to his task. R. Foskett, ed., *The Zambezi Journal and Letters of Dr. John Kirk, 1858-63*, 2 vols. (Edinburgh: 1965).


20 See Wallis, *Thomas Baines.*
controversy though Baines’s guilt or innocence can never be satisfactorily judged because Baines was never allowed a fair hearing on the matter.21 Livingstone also relieved Richard Thornton of duty the same month as Baines, apparently for being lazy (although, as noted, he rejoined the Expedition in 1863 only to die a few months later). Thornton’s journals have been edited and published.22 They offer yet another view on the events of the Expedition, especially as concerns his dismissal and that of Baines.

Charles Livingstone’s role in the expedition has been examined at length by Clendennen. He utilised the letters of Charles Livingstone but little of this work has been published although his editing and publication of Livingstone’s last remaining unpublished journals is exemplary for its accuracy.23 In his thesis, Clendennen gives Charles Livingstone a more sympathetic treatment than many other biographers and historians who traditionally cast him as a belligerent gossip. In Clendennen’s thesis Charles’s contribution to the Expedition is given balance.24 Charles’s journals, apparently used to write the Narrative, have unfortunately been lost along with his photographs. If ever found, this journal, along with that of the engineer, George Rae and the second botanist Charles Meller, would be an important addition to the primary sources for the Expedition.

In addition to the records of the Zambesi Expedition itself, the members of the Universities’ Mission to Central Africa (UMCA) kept journals which offer some observations on the activities of the Zambesi Expedition. The UMCA was inspired by Livingstone’s speeches in 1857 and was in some ways the missionary adjunct to the Expedition. The group arrived at the Zambezi delta in February 1861 and remained in the region until December 1863, having failed in plans to establish a mission station in the Shire highlands. Early accounts written by members of the UMCA such as Goodwin and Rowley provide additional observations not available elsewhere.25

24 Ross follows Clendennen’s more nuanced reading, Ross, David Livingstone: Mission and Empire 161-62.
The Zambesi Expedition has received some attention in histories of the period with specific themes. Stafford’s research into the life of Murchison and the history of geology in Victorian Britain necessarily includes some discussion of the Zambesi Expedition.  

26 He demonstrates the importance of Murchison’s geological theories to the routes planned for many expeditions, including the Zambesi. Links forged by Stafford between metropolitan scientific desires and the exploration of Africa will be considered here. The photography of the Expedition has been examined by Ryan in his study of the visualisation of the Empire through images.  

27 Ryan’s view that imperialism found sustenance in various scientific practices is discussed in what follows.

The Zambesi Expedition has also been examined in its relation to the later ‘scramble’ and partition of Africa by European powers. As noted, these first forays by Europeans into Africa were seen by many to be the first steps towards imperialism. The simple chronological order of the facts supports such a straightforward conclusion. Challenging this image, Robinson and Gallagher demonstrate forcefully that until the 1880s the ‘official mind’ of the British Government was against formal annexation of territories in the interior of Africa.  

28 When the partition did occur, they argue, the motivation had more to do with strategic relationships between European powers than any imperial fantasies. Acknowledging this led to their conclusion that the explorers and missionaries of the mid-nineteenth century had no relevance to explanations of the imperial growth of the later 1880s.

Bridges has argued that in understanding the origins of the British African Empire the links between the exploration of East Africa and later imperialist moves made in that region are poorly understood.  

29 Nevertheless, he finds that the explorers did contribute widely to popular opinions of the role of Britain in Africa and he calls this the ‘unofficial mind’.  

30 He argues that the large sales of explorers’ narratives and

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the fact that they remained continually in print beyond the Victorian era suggests that they had some impact upon the reading public’s opinions.

The influence of the Royal Geographical Society (RGS), and that of Murchison especially upon the Expedition is widely acknowledged. Historians and biographers have also paid attention to the despatches from the Expedition published by the RGS in its Journal and Proceedings, using them widely as primary sources. As a result, the Expedition’s contribution to the geography and the cartography of Africa is often presented as the main scientific achievement. The strong connection between the RGS, Livingstone and Africa has been treated in depth by Driver as part of his thorough-going analysis of the ‘cultures of exploration’ existing in Britain during the nineteenth century. Elsewhere, with the exceptions of Stafford, Bridges and Ryan, little work has been done on the scientific products of the Expedition. This may reflect the fact that Kirk never published a popular account of natural history and these results were not publicised beyond scientific literature. Further, where the David Livingstone Documentation Project facilitated research on the Expedition, it also ignored its other leading members, who were the scientists. The letters of Thornton, Kirk, Meller and others are today held in scattered locations and are not catalogued together. In the published journals of Kirk and Thornton, scientific comments were occasionally edited because they ‘quickly became monotonous and of no meaning to the layman’.

Because widely published accounts have not considered the scientific results of the Expedition other than through the RGS, few details have previously been published about this work. To emphasise the point, neither Martelli, Jeal, Holmes nor Ross mention the archives of Kew Gardens as a location of manuscripts related to the Expedition and neither do they mention Kew Gardens, Sir William Hooker or Joseph Hooker in their indices; Richard Owen and the British Museum are only mentioned in Holmes and Ross. These omissions, combined with a lack of research into the actual collections made by the Expedition, have contributed to the neglect of its non-geographical “products”, and perpetuated the impression that the Expedition was a

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31 For example, in official histories of the society, I. Cameron, To the Farthest Ends of the Earth (New York: 1980).
33 Tabler, ed., Papers of Richard Thornton: xviii. Foskett claims to have been more faithful but still indicates that he omitted ‘rough notes’ of unspecified content. Foskett, ed., Zambezi Journal of Dr. John Kirk: viii.
34 Liebowitz does provide a list of Kirk’s ‘scientific publications’ though it is not complete. Liebowitz, The Physician and the Slave Trade. Baines’s contributions to various scientific disciplines over his entire career is analysed by writers in Stevenson, Thomas Baines.
failure. While Meller and Charles Livingstone are often acknowledged as collectors, none of the standard histories have revealed other natural history collections: James Stewart and Baines also assembled small botanical collections; Charles Livingstone made a large collection of bird skins and Horace Waller, at Thornton’s request, made a collection of about thirty spiders.\(^{35}\) Many of these specimens were considered new species at the time. Exceptions are found within internal histories of botany and zoology, these are extremely useful though very specific.\(^{36}\) The lack of readily available detail has led to errors appearing in important studies of science and imperialism in the nineteenth century which must mention the Zambesi Expedition. For example, Drayton indicates in his study of Kew Gardens that the Admiralty paid for Kirk to travel with Livingstone to the Zambesi and that at the time Kirk was acting as ‘Political Administrator for the Foreign Office in Zanzibar’: neither was the case.\(^{37}\)

The medical history of the Expedition was written by Gelfand as part of his medical biographical study of Livingstone and more recently by Liebowitz.\(^{38}\) Both Kirk and Meller published work on the diseases they encountered in the region, leading to a series of analyses by Meller of the incidence of fever that contradicted Livingstone’s more favourable reports.\(^{39}\) The subsequent medical publications of Kirk and Meller have also been analysed by Larner in a paper that accuses Meller of plagiarising Kirk’s medical notes.\(^{40}\) This conclusion appears to be drawn because some of Kirk’s data was

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\(^{35}\) Many of Stewart’s specimens are held in the herbarium of the Natural History Museum, Baines’s at Kew. Clendenen’s unpublished thesis remains the best account of Charles Livingstone’s activities. I have not been able to locate Waller’s spiders aside from the initial reference: J. Blackwall, “Descriptions of Recently Discovered Species, and Characters of a New Genus, of *Araeidae* from the East of Central Africa”, *The Annals and Magazine of Natural History* 16, no. 95 (1865), 336-52. Neither have I been able to locate Thornton’s geological specimens.

\(^{36}\) Interest in Kirk’s career among botanists and zoologists is related to the need determine the precise location at which they were collected for biodiversity and taxonomic studies. Kirk’s itinerary is published as a aid to taxonomists in A.W. Exell and H. Wild, eds., *Flora Zambesiaca*, vol. 1 (London: 1960). Some of his donations to the British Museum are noted in Anonymous, *The History of the Collections Contained in the Natural History Departments of the British Museum*, 2 vols. (London: 1904): 24-25, 35.


\(^{38}\) Gelfand, *Livingstone the Doctor* and Liebowitz, *The Physician and the Slave Trade*.

\(^{39}\) One of the few biographers to make use of Meller’s letters (now located in the National Archives of Zimbabwe, Harare) and their strong critique of Livingstone is O. Ransford, *David Livingstone: The Dark Interior* (London: 1978): 228-35. Meller is also discussed at length in Gelfand, *Livingstone the Doctor*.

used by Meller without citation in his articles on fever.41 There is little to support such a conclusion in the extensive evidence available for the amicable relationship between the two physician-botanists. Moreover, Meller stepped back and allowed Kirk to receive credit for most of the botanical work performed on the Expedition despite making considerable contribution to the collections himself. Indeed, one of the most important findings of the Expedition: that quinine provides an effective cure for malarial fevers, but is an inadequate prophylaxis has been widely overlooked. It was at the time a controversial and important finding, as Meller’s articles demonstrate.

In sum, the history of scientific practice on the Zambesi Expedition has been unintentionally fragmented and made incoherent. Previous historians have been at best reluctant to use the ‘hard’ scientific literature as source material. Until now, a thorough analysis of the scientific work of the Zambesi Expedition has not been undertaken. In order to fill this gap, this thesis provides a survey of the scientific literature from 1858-1868 in order to identify any articles that utilise data or specimens collected on the Expedition. This list approaches one hundred articles and is discussed at length in Chapter 6.42 By working “backwards” from the specimens’ descriptions in the published literature, the main sites of analysis were identified, Kew Gardens and the British Museum, along with the analysts themselves. An extensive investigation was then made into the fate of the specimens at these locations.43 Lastly, all surviving correspondence between leading members of the Expedition and scientific leaders in the metropolis were consulted.44 In the case of Kirk and Meller especially, these had previously been overlooked.

In documenting surviving material outputs, the accessions registers for the collections at Kew and the British Museum provided a wealth of detail concerning field practices and the types of specimens acquired. By viewing a large number of the actual specimens, the identification of further manuscript evidence in the form of packing labels and those original field notes that remain attached to the specimens themselves provided further clues for investigating fieldwork practices. In contrast to much extant

42 The complete list appears Appendix A.
43 In January 2004 I was awarded a Sir Joseph Banks Scholarship by the Centre for Economic Botany, Kew Gardens which allowed one month of research in the collections there.
44 This correspondence is normally one-sided, as letters sent to the field have not survived as extensively as those sent from the field.
literature, then, this thesis will demonstrate the importance of the manuscripts and material remains located in ‘scientific’ archives as well as the more commonly cited documents from the Public Records Office, National Library of Scotland and other manuscript collections. I also use the evidence in the scientific literature to place science more centrally in respect of the Expedition’s purpose and justification, a story obscured in many extant analyses.

**Talking about Scientific Practice**

In order to recover a ‘history of science’ in the Zambesi Expedition, it is necessary to say something about how we examine science and its role in such projects. In this section, I address ideas proposed by scholars in the history of science, particularly in the sociology of scientific knowledge (SSK) and in historical geography. Taken together, these ideas promote a view of science as a product of human culture that has a temporal and geographical extension. I use this outlook—for which I accept the term ‘constructivist’—to frame my discussion of the Expedition.

As this thesis examines British scientific practice in the decade around 1860 and uses the Expedition as a focal point for that examination, it is important to understand what is meant by ‘scientific practice’. The working definition employed here follows Pickering’s: scientific practice is the work of extending and transforming scientific culture both temporally and geographically. Scientific culture is understood to include all those ‘made things’ that come to mind when we think of science: the skills, social relations, instruments, institutes, facts and theories. These aspects of scientific culture are always changing and it is the mapping of these changes that occupy much research. Establishing a dynamic definition of scientific practice and culture is important for this discussion of the Zambesi Expedition for two reasons. First, the definition prompts us to focus on the activities of scientists and not their theories. That is the approach I take here and theories are discussed in terms of how they support practice (as part of scientific culture). Secondly, static definitions work to prescribe the boundaries delimiting which activities are ‘scientific’ and prevent us from considering those

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activities which historical actors themselves included as such. The question is not ‘What was scientific practice?’ which instead must always remain open and contingent, but, rather, ‘What did John Kirk think was scientific practice?’ and ‘How did he come to have those ideas?’ Only once these questions have been discussed can we begin to think about how such ideas about scientific practice contributed to the representation of African nature in Britain through the work of the Zambesi Expedition.

Pickering provides definitions which centre on science as an open-ended process. He then asks how is new scientific knowledge produced and how can we understand the continual transformations of the material and social dimensions of scientific culture? The heuristic he provides is to study scientific practice ‘as it happens’, thus paying attention to the temporally emergent qualities of research and the ways in which human actors interact with the natural world. He called his model of temporally-emergent scientific practice ‘the mangle’ because of the contingency it represented. Scientific practice continually transforms scientific culture in ways that cannot be predicted, just like the wrinkles found in clothes fed through a mangle. Moreover, Pickering hoped that his metaphor of the mangle would allow for a more balanced treatment of human and material agency within scientific practice, though most critics consider his model to have failed in this regard. This final point is an important issue, as debates concerning the description of human and non-human agency contribute to the interdisciplinary links between the history, philosophy, sociology and geography of science. These debates require a brief explanation.

The consequences of Pickering’s definitions present some difficulties. Breslau indicates the interesting but fundamentally challenging position in which studies of scientific knowledge put researchers. Since Durkheim, he argues, the social world has been considered pure. Social facts have social causes and historians and sociologists have been happy to pursue these. It is clear that studies of scientific knowledge do not have this ‘privilege’. He writes ‘The claim that scientific facts are social facts, and the

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48 Ibid.: 24.
49 These critiques are discussed shortly
claim that they are natural facts, are in principle on exactly the same footing’. STS, and constructivist accounts of science in general, thus become the ‘ontological conscience’ of sociology and other disciplines through their necessary engagement with human accounts of the natural world. Through STS we are uncomfortably reminded that there is a transcendental real-world beyond the socio-centric universe we were happy to investigate.\footnote{Breslau, “Sociology after Humanism”, 290-91.}

This material, non-human world must be allowed to influence the content of human descriptions of it. The theoretical process of developing a method of accounting for the influence that the transcendental world has upon ‘the social’ (or denying the effect can ever be described) has caused intense debates in STS in recent years.\footnote{Most notably the recent ‘Bloor vs. Latour’ discussion which I use in my argument: D. Bloor, “Anti-Latour”, Studies in the History and Philosophy of Science 30, no. 1 (1999), 81-112; B. Latour, “For David Bloor. And Beyond: A Reply to David Bloor’s ‘Anti-Latour’”, Studies in the History and Philosophy of Science 30, no. 1 (1999), 113-29; D. Bloor, “Reply to Bruno Latour”, Studies in the History and Philosophy of Science 30, no. 1 (1999), 131-36.} As Breslau shows, STS forces us (once again) to justify social facts.\footnote{Breslau, “Sociology after Humanism”, 290.}

The introduction of any method of discussing material agency continues to be resisted —for reasons that will be shown—by proponents of SSK, who seek to provide a naturalistic account of the social causes for scientific beliefs: true or false. A main premise of SSK is that the same kinds of social causes will contribute to an explanation of scientific beliefs, irrespective of a community’s acceptance of such beliefs as ‘true’ or ‘false’.\footnote{The project of what has been called the ‘Strong Programme’ in the SSK has been outlined in D. Bloor, Knowledge and Social Imagery (London: 1976). A further account is provided in B. Barnes, D. Bloor, and J. Henry, Scientific Knowledge: A Sociological Analysis (Chicago & London: 1996).} The material causes of scientific knowledge are acknowledged within SSK, but it is unclear how they could be accounted for sociologically. Collins and Yearley are concerned with critcising moves towards a symmetry between material and human agency in accounts of scientific practice.\footnote{H.M. Collins and S. Yearley, “Epistemological Chicken”, in Science as Practice and Culture, ed. A. Pickering (Chicago & London: 1992).} Endorsing any form of ‘radical symmetrism’, as Collins and Yearley call it, leads us to the following paradox:

[Radical symmetrism] must rest on routine methods of scientific research for that part of the evidence concerned with non-human actants. There is no reason to suppose that sociologists are particularly good at gathering such evidence.\footnote{Ibid.: 317.}

In other words, unless we do the scientific fieldwork or experiments ourselves, analysts of scientific practice must depend upon scientists’ accounts in order to learn about the
non-human world. This means we are then only able to study reports of material agency, never that agency itself. We therefore cannot endorse material agency without losing the authority to determine its nature.

Pickering was following the work of Bruno Latour and other proponents of Actor-Network Theory (ANT) in his attempt to account for material agency.\(^5\) Latour proposed that in accounts of scientific research, all actors, human or otherwise—'actants'—are equally important to the construction of the world. Unlike Pickering, who gave some primacy to the human-as-tinker in the experimental process, Latour wanted to 'provide things themselves with agitation, uncertainty and passion, that is, with historicity.'\(^8\) In a sense Latour is calling for a complete reworking of our place in relation to the rest of the world and sought to remove subject/object dichotomies. This radical decentring explains why Latour is considered one of the more post-modern theorists within STS.\(^9\) Once decentred we could understand scientific practice as a network of actors and actants interacting over time; moving from peripheries to centres of calculation and contributing equally to the continual reconstruction of their world.\(^6\) This model has not been accepted by all. Pickering, who began his career with the Edinburgh School of SSK, found Latour’s (and his colleagues’) approach to be overly interested in the semiotics of agency, and thus too focused upon representations. Pickering prefers to speak about performances. He was also uncomfortable with allowing non-human objects a strength of agency equal to humans.\(^61\)

Pickering answered the challenge of ‘Epistemological Chicken’ concerning accounts of material agency in The Mangle by arguing that if we ignore retrospective descriptions of scientific practice and focus instead upon day-to-day activities, then we may see what the scientist sees on a given day and describe the performances of practice

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\(^6\) The process of moving from periphery to centre was analysed in B. Latour, “Circulating Reference: Sampling the Soil in the Amazon Forest”, in *Pandora’s Hope: Essays on the Reality of Science Studies* (Cambridge, Mass.: 1999).
in real-time, observing the mingling of human and non-human in a ‘dance of agency’.\textsuperscript{62} Unfortunately for Pickering, this sidestep did nothing for his evasion of the ‘Epistemological Chicken’ critique. It still holds as far as we only learn about the non-human world through the scientist’s account.\textsuperscript{63} No matter how personal a lab journal, field book or quick note made on a scrap of paper may be, the material world remains the object of a human subject and those studying scientific practice remain removed from that world.

Pickering further proposed that his model transcends problems in accounting for our knowledge of the material world by offering a non-sceptical ‘pragmatic realism’ that ‘specifies non-trivial links between knowledge and the world that are quite independent of relations of correspondence’.\textsuperscript{64} The real thrust of Pickering’s account of pragmatic realism relies on his mode of discussing scientific practice using a performative idiom in which representation becomes less important. Gingras, in his review of The Mangle, concludes that Pickering’s entire framework is faulty.\textsuperscript{65} Pickering, according to Gingras, is a pure phenomenalist who allows us to watch what ‘just happens’: everything else remains obscure. In this reading Pickering resembles a follower of Auguste Comte, moving into the final, positive state.

The human mind, recognizing the impossibility of obtaining absolute truth, gives up the search after the origin and hidden causes of the universe and a knowledge of the final causes of phenomena. It endeavours now only to discover, by a well-combined use of reasoning and observation, the actual laws of phenomena—that is to say, their invariable relations of succession and likeness.\textsuperscript{66}

Read this way, Pickering’s statements about material agency begin to lose coherence. He is trying to be a phenomenalist and a realist and as his critics have determined, this is


\textsuperscript{63} It can be noted here that Pickering’s careful analysis of Giacomo Morpugo’s hunt for free quarks was rejected by Morpugo himself on the grounds that he did not agree with Pickering’s interpretation of the connection between theory and experiment.

\textsuperscript{64} Pickering, The Mangle: 183. It should be noted that Pickering would rather avoid this whole discussion, considering it too abstract. (p. 185)

\textsuperscript{65} Pickering is not consistent with his descriptions of material agency and Gingras is quick to notice a slip towards a stronger type of realism. When Pickering states, ‘how the world is leaks into and infects our representations of it in a nontrivial and consequential fashion’, Gingras hears the realist argument and replies, ‘If one admits a certain realism about material agency, one can hardly avoid a certain realism about the entities that are at the origin of the agency.’ Ibid.; Y. Gingras, “The New Dialectics of Nature”, Social Studies of Science 27 (1997), 317-34.

a fatal flaw.\textsuperscript{67} Nevertheless, to fault Pickering for failing to offer a satisfactory account of non-human agency would by extension find fault in the entire STS community. As Bloor recently argued concerning this issue, ‘…it still remains wholly unclear how to connect this metaphysical talk to historical and everyday reality’.\textsuperscript{68}

Taking this debate one step further leads to a discussion of social constructivist historiographies of science. For Golinski, the constructivist agenda is generally concerned with determining ‘how understandings of “nature” are products of human labour with the resources that local cultures make available’.\textsuperscript{69} It should be clear from the preceding discussion that important questions remain about the ‘social role of material artefacts’ and their influence upon these understandings.\textsuperscript{70} For Bloor, given the difficulty in sustaining an unproblematic discussion of the role of these artefacts, maintaining a naturalistic approach appears to be the most prudent strategy.\textsuperscript{71} This is the standpoint of SSK. Numerous case studies performed over the last twenty-five years lead Bloor to conclude that ‘society is implicated at the most fundamental level in our understanding of the natural world’ and it is to an historical investigation of this understanding that we must turn.\textsuperscript{72}

In this thesis, therefore, my focus is necessarily upon the accounts of the Zambezi Basin provided by the historical actors. There is no intention here to determine whether or not their accounts were ‘correct’ in that they corresponded accurately to the ‘real’ Zambezi Basin: for the reasons noted above this would be futile. Any consideration of the correspondence between theory and ‘reality’ will only be considered, as Bloor has written, ‘as a relation which actors themselves assert or impugn or accept’.\textsuperscript{73} Thus, many of the sources for the Expedition discussed in the previous section fall into the category of ‘Whig’ history—science portrayed as a heroic journey towards truth.\textsuperscript{74} It is only by adopting a constructivist historiography influenced by SSK


\textsuperscript{68} Bloor, “Anti-Latour”, 97.

\textsuperscript{69} J. Golinski, Making Natural Knowledge: Constructivism and the History of Science (Cambridge: 1998): 47.

\textsuperscript{70} Ibid.: 46.

\textsuperscript{71} Bloor, “Anti-Latour”, 91-94.

\textsuperscript{72} Bloor, “Reply to Bruno Latour”, 136.

\textsuperscript{73} Bloor, “Anti-Latour”, 89.

\textsuperscript{74} A description of Whig history and the origin of the term in relation to Whig political historians is given in Golinski, Making Natural Knowledge.
that we can move away from such interpretations towards an account more sensitive to the social interests that shaped Victorian science. The goal then becomes not to investigate the accuracy of the science performed on the Expedition but rather to investigate, as Shapin has written, ‘a range of social interests, including those usually considered “internal” and “external” to scientific culture’, and how they contributed to a Victorian understanding of south-eastern Africa.  

A ‘Seamless Web’: Victorian Science in Context  

In order to perform an analysis of the Zambesi Expedition requires that we investigate the character of scientific culture at the time. Two considerations arise. First, it is important we understand something of the general themes in the history of Victorian natural history: institutions, professionalisation, credibility in scientific authority and the role of expeditions. Secondly, we must refine the analysis and identify the specific issues dominating scientific discourse in particular places in particular ways at particular times. This section outlines relevant research which examines these themes in a mid-nineteenth century context in an attempt to place the Expedition within its milieu. As Lightman argues, the practice of Victorian science was embedded in the social and economic changes occurring in Britain during the nineteenth century:

Whereas modern scholars find it necessary to isolate a particular context in order to study the complex interaction with science, Victorian scientists, and those intellectuals and members of the popular reading audience who were influenced by science, may have seen all of these contexts as part of a single, seamless web.

Key scientific advisors to the Government concerning the Expedition—Murchison, the Hookers, Owen, and Sabine—were directors of important scientific institutions. The Expedition was formed by the government with the support of these institutions and the advice of their staff. Studies of the role of these institutions demonstrate the social and empirical control they held over particular disciplines: botany (Kew), zoology (British Museum), geophysics (Kew Observatory) and geology (Geological Survey and the School of Mines). The leaders of these institutions

75 Shapin, “History of Science.”
constituted an unofficial scientific ‘cabinet’ which advised the government. Biographical studies of their lives support the investigation of the roles they played in the formation of the Expedition and how the interests of their institutions were translated into its guidelines.\textsuperscript{78}

Large institutions at the centre were vital to the scientific enterprise. The British Museum, under the leadership of Richard Owen, was the centre for the metropolitan side of the zoological work of the Expedition. The role of the British Museum in centralising taxonomy in zoology during this period is discussed by McOu-at in connection to taxonomy and the stabilisation of the species concept.\textsuperscript{79} Taxonomy, McOu-at shows, was a discipline that continually experienced internecine struggles over the rights to assign species’ names.

The links between museums and expeditions in the formation of collections during the Victorian era has been explored from a variety of perspectives. The Expedition was essentially a collection-forming project closely linked to institutional desires for specimens. Canizzo examines the ideological factors that influenced how Livingstone collected in the field, noting that he tended to avoid objects of Portuguese and Swahili origin.\textsuperscript{80} Livingstone disliked both groups, but also desired to present an image of an unspoilt continent far removed from the rest of the world. Other research has looked more specifically at collections from an institutional perspective, and again noting the influence of personal and institutional politics.\textsuperscript{81} These studies provide

\begin{itemize}
\item British Museum”, \textit{British Journal for the History of Science} 34, no. 1 (2001), 1-28; Stafford, “Geological Surveys, Mineral Discoveries, and British Expansion.”
\end{itemize}
important models for understanding the flow of materials from the Zambesi Expedition and the institutional politics of collecting.

Support for the Expedition also came from scientific societies which, with the exception of the Royal Society, were relatively new professional organisations, formed in the early decades of the century. Within geography, zoology, botany, astronomy or geology, they provided a space for the discussion of findings, standards and methodologies. Indeed, Victorian science has been characterised as ‘club science’ and it is important to remember the social aspects of scientific societies along with the empirical. As spaces where research was presented, these societies set the standards by which the Expedition would be judged. Research which examines their internal rhetoric links metropolitan scientific discourse to the field by revealing the normative pressure upon fieldworkers to uphold metropolitan standards. The RGS, an important metropolitan location for the organisation of the Expedition, is examined by Barnett as a space for discussing specifically African issues. As discussion spaces, scientific societies like the RGS brought together “Africanists” whom Helly finds were both small in number and had little sense of community. These studies reaffirm Lightman’s warning to not compartmentalise a discussion of African exploration: it was always part of the wider Victorian context.

The theme of institutions, including societies, relates closely to that of the professionalisation of science during this period. It was often through institutions that individuals gained the notoriety and patronage necessary to move forward in a scientific career. Natural history as an amateur pursuit has been contrasted with the careers of a growing body of professionals in the second half of the century. Mapping the

Victorian scientific community and its shifting boundaries is also performed in Secord’s study of how scientific knowledge was consumed through the middle decades of the nineteenth century.\textsuperscript{88} He provides a sketch of the delicate connections between the producers of scientific knowledge and the members of ‘polite society’. His description of young geologists, ‘barely middle-class bachelors’, emerging from their cheap accommodation to attend soirées on Pall Mall indicates vividly the boundary-crossing opportunities a scientific life offered to the young members of the Expedition who were all in the early stages of their scientific careers.\textsuperscript{89} A key point made here and elsewhere is that scientific knowledge, from the early nineteenth century, was presented as a form of knowledge that transcended class.\textsuperscript{90}

As appointees to scientific posts, the members of the Expedition were enrolled into a group of ‘professional scientists’ although at the low rank of field collectors. Such positions were known to be potential starting points for a career in science. Many respected natural historians at the time had often become initially successful through collections made in a little-studied region, not through their later theoretical work. Charles Darwin, Joseph Hooker, Thomas Huxley and Alfred Wallace all started out this way.\textsuperscript{91} The issue of professionalisation is critical if we are to understand why Kirk, Meller and Thornton were so driven to succeed in their field work on the Zambesi. Paying positions in science were extremely limited though a transition of science from a gentleman’s pursuit to a paid vocation was ongoing.\textsuperscript{92} The chance to collect in a new field was thus a tremendous opportunity.

Projects such as the Expedition required government support, especially funding, in order to provide salaries for the collectors. Leaders of the scientific community justified these expenses by linking them to benefits for commerce and the nation. ‘Utility’ was a powerful argument, but challenged the independence of science as a disinterested pursuit. Studies of the formation of the X-Club in 1864 are useful here as it was a body of ‘professionalisers’ whose activities dealt with these themes—

\textsuperscript{89} Ibid.: 473-75.
\textsuperscript{90} See also Yeo, “Scientific Method and the Rhetoric of Science in Britain, 1830-1917”, 265-65.
\textsuperscript{92} Issues surrounding this transition run through the analyses of the X-Club discussed here.
though we need to be cautious about the teleological implications of this term. It should be emphasised that mid-Victorians perceptions of the professional/amateur distinction are the subject of current historiographical discussion. Here, I use rhetoric promoting the scientific ‘profession’ to indicate that men of science were challenged by ideals of empiricism, disinterestedness and gentility. Members of the X-Club, exemplified by Joseph Hooker, sought to expand the sphere of publicly-funded science though without subordinating research to utilitarian thinking and damaging the status of science. They lobbied for more publicly-funded jobs for scientists while retaining independence for the community.

More specific examples demonstrate the role of professionalisation and the efforts made to secure funding for the Expedition. Drayton links developments in botany (including the discovery of new plants by Expeditions and the foundation of colonial botanic gardens) to the policies and strategies the Hookers at Kew used to ‘secure their personal and professional ends through identifying themselves with the public interest’. The potential commercial benefits of botanical research were continually highlighted while the idea of “botany for botany’s sake” was strategically downplayed when communicating with non-scientists. The rhetoric used to create (or possibly obscure) links between personal, professional and public utility can indicate the interests that were important within these spheres and highlight the precarious nature of financial and political support for Victorian scientific research.

While in the field the members of the Expedition, seeing themselves as members of a professional community, strove to produce knowledge that was considered credible. Their knowledge could not be double-checked and therefore, above all else, had to be trusted. As discussed, the standards of credibility were a product of the institutions of the metropolitan scientific community. Other studies analyse similar links. Burnett examines Robert Schomburgk’s traverse surveys of the frontiers of British Guiana in the 1830s and 1840s and links field practices to settler

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93 Desmond, “Redefining the X Axis”.
politics, his career aspirations and the political power of maps. 97 The dependence of such expeditions upon local informants and assistants is also examined in the book and in Burnett’s later work.98 In this thesis the role of local informants will be considered in connection to themes of credibility and the methods by which local knowledge became universal. Withers has examined the expeditions sent to the Niger in the early nineteenth century and highlights in particular the role of ‘trust, testimony and direct observation in the making of maps’.99 Testimony is an important, though problematic route by which knowledge is gained on expeditions. 100 Credibility, and the means by which it is maintained must be considered because only then do we uncover fundamental aspects of Victorian scientific practice: how knowledge is made, transmitted and received. Livingstone has shown that this required the evaluation of facts and the individuals who presented them. ‘Knowledge of nature and knowledge of people were joined at the hip because the processes of achieving warranted credibility have always been resolutely social.’101 A case study of what happens when credibility is lost is found in McCook’s study of the rise and fall of the explorer Paul du Chaillu.102

As Withers reveals throughout his recent work, the negotiation of testimony, and thus credibility, while social, is also both a local and a distributed activity. These negotiations occur in different locations and at different scales: between individuals in the field, between explorers and their sponsors and between knowledge-making institutions and the public.103 The scientists of the Zambesi Expedition sought to credibly ‘report’ from the field using methods that reflected the long history of negotiations over testimony that Outram (and Withers) has examined at length in the

context of the Enlightenment. Much of this work points back to Shapin’s discussion of credibility and identity in the seventeenth century. His treatment of the identity of Boyle’s laboratory assistants supports the discussion of field assistants here.

In an African context, themes of identity and recognition figure largely in the knowledge-making field encounters between explorers and their informants. Here the work of Fabian offers insights into the effect the field has upon explorers. To understand how the members of the Expedition learned to trust local informants and find them to be credible, we must explore the European preconceptions of Africa and Africans. Adas examines how western attitudes towards the rest of the world in the nineteenth century were conceived through a cultural self-identification with science and technology. He argues that ‘In the industrial era, scientific and technological measures of human worth and potential dominated European thinking on issues ranging from racism to colonial education.’

Connected to Adas’s argument is Brantlinger’s important discussion of the foundation for the Victorian image of Africa as a ‘dark continent’. He investigates the paradox that the Victorian image of Africa grew more negative in inverse proportion to the availability of detailed information concerning the continent—a direct result of projects like the Zambesi Expedition. He concludes that the ‘myth of the Dark Continent’ was a Victorian invention that still carries weight today. Hence, the Expedition was approaching the field experience with strong preconceptions that moulded the reporting of it. Elsewhere, it is shown that when explorers wrote travel narratives of ‘newly discovered’ regions, publishers did not hesitate to edit the narratives to fit popular preconceptions and thus make them ‘credible’. While the styles of reporting in ethnography were possibly more ‘laden’ with cultural preconceptions than botany or zoology, it is sufficient to remember that the standards of credibility were brought from the metropolis to the field.

108 Ibid.: 3.
The studies discussed so far demonstrate that the contexts of science and empire were closely linked. This outlook has been further supported by research which finds the role of science in imperial encounters to be more complex than traditional images of ‘science in the service of empire’ allow for.\textsuperscript{111} Flows of information operated from the metropolis to the colony and from colony to colony, rendering centre-periphery or diffusionist models incomplete and do not fit the discoveries of recent research.\textsuperscript{112} Chambers and Gillespie in particular mention the necessity of discussing ‘indigenous knowledge systems’ and European perceptions of them when researching the history of western science outside of Europe.\textsuperscript{113} They call for the need to think more carefully about processes and the constructed physical and social frameworks for science in colonial locations. The authors in \textit{Science and Society in Southern Africa} perform similar work by emphasizing that ‘science, considered as an ideological discourse, affected rulers as well as ruled’.\textsuperscript{114} Harries’s analysis of Junod’s fieldwork in Mozambique in the later nineteenth century is an important study of the incorporation into western science of local systems of biological classification.\textsuperscript{115} Likewise, Storey’s research on cane production in Mauritius connects the colonial political climate to the internal politics of agricultural research institutes.\textsuperscript{116} Such studies assist in placing the Expedition within its imperial contexts.

The field, the metropolis and the empire are all spaces within which the Expedition worked. How might these different spaces within which the members of the Expedition worked have affected scientific practice and, more importantly here, how were the spaces linked to one other through the Expedition? In his review of SSK, Shapin argues that the investigation of the social interests which are part of scientific practice has led to the identification of four ways of understanding science: science is a ‘mundane’ activity; credibility is a process; scientific knowledge is ‘embodied’ in people

and things; and scientific knowledge-making is a physically situated activity. Overall, the impression has emerged that science is an intensely ‘local’ activity. This leads to further questions, as Shapin later asked, ‘If science is indeed a local product, how does it—or rather some versions of it—travel with what seems to be unique efficiency?’ For Harris, ‘How science travels has as much to do with the problem of travel in the making of science as it does with the problem of making science travel’. These questions succinctly raise methodological issues that confront historians of scientific expeditions—travelling entities by definition. I argue here that without opening up our historiography to be sensitive to issues of space and place, we lose the ability to understand expeditions in their historical context.

Livingstone argues that the locations where scientific research is performed cannot be ignored as we study the factors contributing to knowledge-generating activities. Elsewhere he has thematically categorised the spaces of science by activity: manipulation, expedition, presentation, circulation. Research into these spaces in Victorian science contributes to my analysis of the Zambesi Expedition. Naylor has used Livingstone’s model in his discussion of Cornish natural history showing how different types of spaces were used to promote regional science in different ways. Anne Secord considers less conventional locations, looking at the consumption of science in ‘amateur’ settings, notably pubs in Lancashire and in books of popular botany. Here, ideas of class, professionalisation and self-improvement structured the presentation and legitimisation of scientific knowledge. Examining the use of field sites, Camerit presents an important model for how the practice of fieldwork in natural history must be examined. Accounts of fieldwork may appear very personal but in fact,

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120 S.J. Harris, “Long-Distance Corporations, Big Sciences, and the Geography of Knowledge”, Configurations 6, no. 2 (1998), 269-304: 270.

121 Livingstone, Putting Science in Its Place.

122 D.N. Livingstone, Science, Space, and Hermeneutics (Heidelberg: 2002).


she argues, ‘the pursuit of scientific understanding is a collective, cultural process’.125 She describes how the networks that connected fieldwork to the wider world also connected fieldworkers to the ‘opportunities and obligations’ of Victorian ‘colonialism and industrialisation’.126 But there are social dangers in the distant field due to its foreign and uncontrolled nature. The investigator is always a visitor to a challenging environment where, Livingstone warns, ‘The variegated nature of the field’s dynamic human geography makes for an unstable network of social relations.’127

Camerini links the local field site to larger networks, an important theme for analysing expeditions. As these studies demonstrate, paying attention to different spaces also requires a consideration of different scales. Expeditions, as a form of scientific practice, challenge analysts with their layered scales of activity that are local, regional and global. Looking closely at individual activities is important, but to understand an entire expedition we must, as Livingstone argues, ‘attend to spatial considerations at a variety of scales’.128 Examining the geography of science requires that we attend to the small spaces of science such as laboratories, ships, tents or conference rooms while at the same time thinking about the long-distance connections necessary for the science to proceed and function.129 In other words, there is a community dimension to knowledge-making that extends beyond any one place: ‘Universality, objectivity, and accumulation are not characteristic of technoscientific knowledge itself, rather they are produced by the collective work of the technoscientific community.’130 The Zambesi Expedition will be considered similarly here.

In an eighteenth-century French context natural history is described by Spary as ‘a science of networks’.131 Latour also emphasises the ‘circulating’ nature of knowledge and the translations that must occur as facts and objects move between different spaces

126 Ibid.: 355.
127 Livingstone, Putting Science in Its Place: 42.
of scientific practice. Specimens can act as ‘boundary objects’ in these situations, remaining identifiable to all groups, but employed to fill different requirements by each. Specimens, and their role as boundary objects are considered throughout this thesis.

**Conclusion: Writing the Zambesi Expedition**

The sources discussed above point to a spatialised historiography of scientific practice. As a historical geography linked with SSK, the thesis examines a particular ‘incident’ in the temporal and geographical extension of British scientific culture: the Zambesi Expedition. The intention here is, arguably, phenomenological, but only superficially so. **Pace** Pickering, scientific practice will be examined as it occurs, noting contingencies and readjustments, but there will be no attempt to account for material agency within a ‘dialectic of resistance and accommodation’. Rather, a series of human dialogues will be examined: between local informants and assistants; between scientists in the field and scientists in the metropolis and between the scientific community and Government. The image of African nature which the Expedition ‘produced’ arises from these dialogues.

In the light of Shapin’s work and that of others, the rhetoric recovered from the primary sources is assessed for evidence of the social interests structuring scientific practice. By comparing the grandiose claims made at public speeches to the grumblings of private journals the sometimes extreme conflicts of interest will be revealed and explanations sought. Expeditions depart home shores full of expectations and these place very real pressures on practices in the field. Other pressures rise from standards of objectivity, accuracy and methodological rigour. In sum, expeditions are goal-oriented and these goals must be uncovered to determine how they compete with or support one another.

In tracking the results of the expedition the representation of African nature in various locations will be examined. Differences between the private and public writing of the Expedition will be considered. At this stage, too, we must also examine how spoken statements about African nature were reported at the RGS. The mediation of

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132 Latour, “Circulating Reference: Sampling the Soil in the Amazon Forest”.
134 Pickering, “Explanation and the Mangle”.
field knowledge within metropolitan ‘spaces of presentation’ is here traced. Here especially, the local voice of the African, now in a totally foreign environment, undergoes multiple reiterations that must be understood if we are to understand the role of expeditions in contributing to the public ‘image of Africa’. In order to begin, therefore, we must consider the Expedition before it departed from Britain—at a time when such results could only be hoped for. Let me turn then, to examine these hopes and the formation of the Expedition’s brief.
Chapter 3: ‘No Longer Unaided and Alone’: the Formation of the Zambesi Expedition

Introduction

In line with its regular attention to David Livingstone’s activities, readers of The Lancet in February 1858 were given notice of the forthcoming ‘Farewell Livingstone Festival’ and the approaching departure of the Zambesi Expedition. The editor declared, ‘Rarely has any expedition been dispatched more carefully provided with all that may conduce to its ultimate success. Dr. Livingstone goes forth no longer unaided and alone among the black races of Africa.’\(^1\) This was a new stage in Livingstone’s career. In the period between his return to Britain in December 1856 and the departure of the Zambesi Expedition from Liverpool in March 1858, Livingstone was transformed from a lone, wandering apostle of the London Missionary Society into a national hero, icon of Victorian manhood, HM Consul, and leader of a government expedition which included, at times, some thirty subordinates and expended nearly £30,000.\(^2\) This latest endeavour provided the famous explorer with expansive funding, new opportunities but also increased responsibility and government oversight.

This chapter examines the Expedition’s fifteen-month ‘formation’ period and charts the interests that influenced its final form. As the idea for the Expedition developed, a wide range of interest groups saw possibilities within it to forward their own causes which ranged from abolition to geomagnetism. In general, the humanitarian and scientific interest groups saw in Livingstone aspects of themselves. For the abolitionists he was a great spokesman. For the scientists he was a careful measurer. For the owners of cotton mills he was the potential developer of new resources and markets.\(^3\) As Driver found in his study of the ‘cultures of exploration and empire’ during this period, Livingstone’s enduring mythic status was in part due to his

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1 Anonymous, “The Expedition of Dr. Livingstone”, The Lancet 1 (1858), 177.
2 It is difficult to keep a running total of the Expedition’s complement, which was continually in flux. Lists of European and African members have been compiled by Clendennen. See, Clendennen, ed., David Livingstone’s Shire Journal, 1861-1864; G. Clendennen, “David Livingstone on the Zambezi: Letters to John Washington, 1861-1863”, Munger Africana Library Notes 32 (1976), 1-89.
3 Livingstone had critics as well, and these will be analysed in depth in chapter six. Here I am discussing a more popular image.
simultaneous appeal to a wide range of Victorian—and later—interests.\(^4\) The form the Zambesi Expedition took was the result of the interplay among these various interests.

As a subject for biographers and historians, the formation of the Zambesi Expedition has been widely studied from the standpoint of Livingstone’s career. Tim Jeal, in his biography of Livingstone, isolates the period in a separate section simply titled, ‘Fame’.\(^5\) Andrew Ross more recently titled his chapter on this period ‘Years of Triumph’.\(^6\) George Martelli considered how ‘The Expedition Prepares’.\(^7\) The task these authors set for themselves was to explain how Livingstone came to head the Zambesi Expedition. They widely agree that we can trace the origin of the Expedition to the relationship between Murchison and Livingstone, a friendship that began while Livingstone was still in the field. Murchison, as Director-General of the Geological Survey, received Livingstone’s information on the landforms and mineral resources of central Africa eagerly, incorporating it into his developing theories of Africa’s landforms and hydrography.\(^8\) In October 1856, after Livingstone wrote to him from the field that he was planning to leave the London Missionary Society, Murchison immediately wrote to the Foreign Secretary, Lord Clarendon (George Villiers), suggesting a future government expedition to the Zambesi Valley with Livingstone at its head in an official consular position.\(^9\) Sixteen-months later, this is what occurred, a result which attests to Murchison’s high level of influence in the Foreign Office and Downing Street and his influence upon the Expedition’s planning.

To answer questions concerning why Livingstone was accepted to head a government expedition it is enough to recall that in 1856-7 Livingstone was the acknowledged expert on southern tropical Africa and its most famous explorer.\(^10\) Burton and Speke had not yet dazzled the public with their report of Lakes Tanganyika and Victoria.\(^11\) Livingstone was drawing massive crowds wherever he went. As Stafford concluded, despite reservations in the Foreign Office, ‘Livingstone’s’ status as a national

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\(^4\) Driver, *Geography Militant*, 73.
\(^5\) Jeal, *Livingstone*.
\(^6\) Ross, *David Livingstone: Mission and Empire*.
\(^7\) Martelli, *Livingstone’s River*.
\(^10\) The speeches Livingstone gave at Cambridge are reproduced in W. Monk, ed., *Dr. Livingstone’s Cambridge Lectures* (London: 1858).
\(^11\) Burton and Speke first arrived in Zanzibar on 19 December 1856.
hero made it virtually impossible for the government to deny him support'.

This conclusion is supported by Livingstone’s contemporary, John Henry Tremenheere, who, reflecting on the Expedition in 1866, wrote, ‘The Government readily responded to the public feeling, and appointing [Livingstone] Consul for South-eastern Africa gave to his second expedition the prestige of a national enterprise.’

Though Livingstone’s leadership of an expedition to the region was a growing certainty through 1857, the nature and character of the Expedition was not finalised until early in 1858. Many different interest groups contributed to its formation. It is these contributions that will be discussed here with the following two premises. First, in order to ensure support, the idea of an expedition was pitched to the widest possible array of public and private concerns. This, I suggest, applies especially to the earlier part of 1857 when government support was not certain. Second, once government sponsorship—and control—appeared certain, the scientific community sought to use the Expedition to gain data and specimens. Representatives of various fields of research wanted someone on the Expedition trained to collect their specific desiderata. In what follows I will highlight how the practice of science in the late 1850s included maximising the opportunities offered by expeditions and will discuss this policy as it unfolds in the formation of the Expedition. To this end, along with the more popular humanitarian interests connected to the Expedition, various epistemic interests and subject positions will be examined.

This chapter examines three facets of the scientific community’s role in relation to the Zambesi Expedition: eager participant, expert advisor and justifier of expense. I begin by examining an underlying ideology for the Expedition: the notion of the ‘civilising mission’. Second, I consider the methods used to assess and train the appointees. Finally, I consider the letters of instruction written for the expedition. In particular I am interested in who wrote them and what they can reveal about how the interests of different sciences were to be realised in ‘the field’.

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Standing before the crowd that gathered to bid him Godspeed, Livingstone provided a quick summary of his intentions: to put an end to slavery by introducing alternative, legitimate commerce to south-central Africa. He described his personal role in this plan as simply to initiate the process by ‘opening up’ uncharted regions to international commerce. Africa was benighted, backward and closed to the international gaze, the continent needed to be prised open and connected to the wider world—only the work of a pioneering explorer like himself could accomplish the necessary first steps. He told the meeting, ‘What I want to do is to get in the thin edge of the wedge, and then leave it to be driven home by English energy and English spirit’.14

This was the summary of a lifelong mission that Livingstone had developed during his earlier travels. Central Africa, hidden behind an impenetrable coastline, must be ‘split open’ by the force of British civilisation. Livingstone’s message for his countrymen indicated that his proposed starting point, the Zambezi River, was a crack in the malarious armour of the continent. Through this weak point, Europeans could steam quickly through the fetid delta to salubrious highland locations he had identified. But what was this wedge? What was meant by this metaphor that was so readily accepted with ‘loud cheers’ from the audience?15 What images went through their minds when they visualised the African continent being thus violently split open? In this section I examine this ‘wedge’ and its constituent concepts. Only by deconstructing Livingstone’s metaphor can we understand the rationale for the Zambesi Expedition and the mixed goals written into its expeditionary brief.

Rather than signalling for us one purpose or policy, the ‘wedge’ represents in its widest understanding the one vital assumption underlying the entire complicated relationship the mid-Victorians had with the interior of Africa: those who thought about tropical Africa believed that the continent was backward and therefore required improvement. This belief was widespread and cut across ideological standpoints. The corollary to this was another belief of the Victorians succinctly stated by Robinson and Gallagher, ‘[The Victorians] were sure that their ability to improve the human condition

15 Ibid.
everywhere was as tremendous as their capacity to produce wealth.\textsuperscript{16} Thus, whether you were a racist polygenist or a humanitarian monogenist you believed the same thing: the historical cul-de-sac that had left Africa behind Britain at a level of development truncated somewhere in the early Iron Age was candidly escapable.\textsuperscript{17} All that was required to effect this therapeutic change was the application of Britain’s new-found industrial powers and social liberalism to Africa’s people and environment. The great differences between individuals promoting this plan lay in whether or not they thought Africans would be capable of adapting to such a change, or would simply ‘wither away’. Such differing opinions did not form simple dichotomies. It was perfectly consistent to be a fervent abolitionist while simultaneously holding the belief that Africans were biologically inferior to Europeans.\textsuperscript{18}

Livingstone represented a group of monogenist thinkers who believed that Africans were inherently capable of contributing to the industrial economy; and this ability would serve as their salvation.\textsuperscript{19} As he wrote of the locals along the Zambesi in late 1864, ‘It seemed likely that [the inhabitants’] strong propensity to trade might be easily turned to the advantage of our country as well as theirs.\textsuperscript{20} His critics opposed such ideas arguing that Africans were simply not naturally capable of such activities: ‘People in such a state of society are no more capable of furnishing, by their own unaided efforts, the great staples of tropical and warm regions, than of manufacturing time-keepers, telescopes and steam engines’.\textsuperscript{21} Moreover, experience had taught liberally-minded Victorians that only colonies of British settlers developed into valuable trading partners. Hobsbawm neatly summarises the commercial situation:

[Africa] had no very obvious economic assets for the west between the abolition of the Atlantic slave-trade and the discovery, on the one hand of precious stones and metals (in

\textsuperscript{16} Robinson, Gallagher, and Denny, \textit{Africa and the Victorians}. 1.
\textsuperscript{17} In reference to Zambesia, Livingstone commented ‘It is certainly the iron age here’ Livingstone and Livingstone, \textit{Narrative of an Expedition}; 401.
\textsuperscript{18} P. Brantlinger, \textit{Dark Vanishings: Discourse on the Extinction of Primitive Races, 1800-1930} (Ithaca and London: 2003): 71-71. It is important to recall that in the 1850s no one was describing processes of social evolution with Darwinian concepts of natural selection. As Barnard points out, this does not happen until the late-nineteenth century, A. Barnard, \textit{History and Theory in Anthropology} (Cambridge: 2000); 28.
\textsuperscript{19} At the end of the \textit{Narrative} he wrote ‘we have seen nothing to justify the notion that [Africans] are of a different “breed” or “species” from the most civilised’. He continued to argue that it had been centuries of barbarism that degraded African civilisation, like the Irish. Livingstone and Livingstone, \textit{Narrative of an Expedition}; 448.
\textsuperscript{20} D. Livingstone, “Evening Meeting: Lecture by Dr. Livingstone”, \textit{The Times}, 20 September 1864.
\textsuperscript{21} Anonymous, “Dr. Livingstone’s Africa”, \textit{The Daily Scotsman}, 29 September 1857. Originally printed in \textit{The Examiner}. 
the south), on the other of the economic value of certain primary products which could only be grown or collected in tropical climates, and were still far from synthetic production. Neither was yet of great significance or even promise until the 1870s.22

This pessimistic but practical outlook took a firm hold among investors by the late 1860s and in consequence, Africa—especially the southeast—remained a relatively minor concern as a site for investment for the next twenty years.23 Nevertheless, so little was known about the interior of the continent that it was fair to argue that wealth might be found there, if enough work was done to find it.24

In addition to the harsh reality that Africa did not offer valuable opportunities for trade expansion, there was a waning interest in abolitionist movements.25 In 1857, the aftermaths of the Crimean War and the Indian Uprising were far more important issues to most Victorians interested in world affairs. Furthermore, public patience for the grandiose claims of the potential that lay up African rivers (with limited actual results) of Thomas Fowell Buxton and the other humanitarian leaders, who used Exeter Hall in London for meetings, began to wear thin. This process of disenchantment accelerated after the tragedies of the 1841 Niger Expedition which resulted in so many fatalities.26 We can thus conclude that in 1857, when Livingstone was speaking about Africa and his plans for it, the civilising mission ideology was nothing new and was not everywhere accepted, even if it still made for powerful rhetoric aimed widely to gather support. If Africa was not yet valuable, he would make the first steps to change the situation:

As far as I am myself concerned, the opening of the new central country is a matter for congratulations only in so far as it opens up a prospect for the elevation of the inhabitants. As I have elsewhere remarked, I view the end of the geographical feat as the beginning of the missionary enterprise. I take the latter term in its most extended signification, and include every effort made for the amelioration of our race; the promotion of all those means by which God in His providence is working, and bringing all His dealings with man to a glorious consummation. Each man in his sphere, either knowingly or unwittingly, is performing the will of our Father in Heaven.

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25 Brantlinger, *Dark Vanishings*: 90.
Men of science, searching after hidden truths, which when
discovered will, like the electric telegraph, bind men more
closely together—soldiers battling for the right against
tyranny—sailors rescuing the victims of oppression from the
grap of the heartless men-stealers—merchants teaching the
nations lessons of mutual dependence—and many others, as
well as missionaries, all work in the same direction, and all
efforts are overruled for one glorious end.27

This general schema of Livingstone’s plans to spread the light of Christianity,
commerce and civilisation to central Africa, was at least twenty years old, harking back
to the 1830s.28 If some held doubts for its success in 1857, it would have been hard to
tell from the large crowds and public support Livingstone commanded that year.
Nevertheless, such short-lived periods of interest do not necessarily indicate that the
greater portion of the British public was keenly interested in civilising missions. The
research of Robinson and Gallagher into the ‘Spirit of Victorian Expansion’ indicates
that the wider public sphere at mid-century was looking away, not toward Africa; they
find that by the 1870s, ‘All the powerful processes of social expansion, except that of
philanthropy, were passing [Africa] by’.29 The excitement surrounding the departure of
the Zambesi Expedition brought south-eastern Africa temporarily into the limelight in
late 1857 and early 1858, but in general the continent only held interest for a minority of
individuals—mainly those able to support charitable works—expressing a ‘vague
benevolence’ which at any rate was almost extinct by the 1880s.30

Among all these opposing opinions about the prospects for ‘civilising Africa’
there was a shared belief that the fate of most tropical African societies was one of
either change or extinction.31 As Brantlinger has shown, European attitudes towards
Africans changed dramatically during the nineteenth century. Early Romantics ‘were
able to envisage Africans living without European interference’.32 By the late 1850s,
representations had shifted to ‘portray Africans as weak, pitiable, inferior mortals who
need to be shown the light’.33 The consequences for Africans who did not adapt were
dire. It appeared to be inevitable that many non-European races—whether you believed
they were all the same species or not—would fall extinct before the advance of

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28 Ross, David Livingstone Mission and Empire: 24-25.
29 Robinson, Gallagher, and Denny, Africa and the Victorians: 17.
31 Brantlinger, Dark Vanishing: 44.
33 Ibid.: 177-78.
European civilisation. Hoyt has referred to this mood as the ‘sepulchral air [that] lingers about the corpus of Victorian Anthropology’, though at the time of the Zambesi Expedition Livingstone’s rhetoric retained some of the optimism of the early part of the century.\textsuperscript{34} He mimicked the language of his ideological mentor, Buxton, and promoted the potential capabilities of African societies that could be tapped after paternalistic (British) tutelage pushed them in the right direction.\textsuperscript{35} The precarious position that Africans held, as the British philanthropists saw it in the late 1850s, demanded such intervention. Brantlinger sums up the position thus: ‘The melodrama of Africa called for intervention by a higher moral authority, and the Victorians increasingly saw themselves—again, with Livingstone in the lead—as the highest moral power among nations’.\textsuperscript{36} Nevertheless, however this moral position may have contributed, in the long run, to the expansion of the British Empire in Africa, in the 1850s and 1860s the political or public will pushing in that direction was not at all powerful.\textsuperscript{37}

Did many people really believe along with Livingstone that in just a few years a region of Africa that lay hundreds of uncharted miles from the coast would supplant the slavery-based cotton production of the southern United States? Did they see the Expedition as the first step towards this goal? Certainly some did. Margaret Oliphant expressed great support for the project in her laudatory discussion of Livingstone’s career to that point in the \textit{Quarterly Review} of April 1858.\textsuperscript{38} The great send-off parties also supported the wider goals of the mission. Lastly, the official government instructions for the expedition provided to Livingstone indicated this exact plan for social change, but then he wrote them himself. On the other hand, there are indications of doubt in the official mind. Enigmatically, in the draft plans for the Expedition (signed by Lord Clarendon) sent from the Foreign Office to the Treasury and copied to the Admiralty a question mark appears in the margin next to the closing phrase of the following statement of the Expedition’s main goal:

\begin{quote}
It may be hoped that by encouraging the natives to apply themselves to the development of the resources of their
\end{quote}

\textsuperscript{34} Hoyt’s paper argues for a shift to a ‘reanimated primitive’ around 1900. D.L. Hoyt, “The Reanimation of the Primitive: \textit{Fin De Siècle} Ethnographic Discourse in Western Europe”, \textit{History of Science} 39 (2001), 331-54: 331.

\textsuperscript{35} Brantlinger, \textit{Dark Vanishing}: 178.


\textsuperscript{37} The connection between the mid-century explorers and the later Partition, has been questioned by historians as an unproven and ‘whiggish’ assumption. See Bridges, “Historical Role of British Explorers”, 1.

\textsuperscript{38} [M. Oliphant], “The Missionary Explorer”, \textit{Blackwood’s Edinburgh Magazine} 83 (1858), 385-401.
Country, a considerable advance may be made towards the extinguishing of the Slave Trade, as the natives would not be long in discovering that the former is a more certain source of profit than the latter.  

Somewhere in the bureaucracy, between the Foreign Office and the Admiralty, doubts were clearly expressed, though this queried statement proceeded to appear verbatim in the final version of the official instructions.

Brantlinger finds within the rhetoric of modern development theory echoes of the Victorian concern for the extinction of primitive races, though he cautions that the hope today is that despite the inevitability of extinction only ‘backward’ cultures will die out, not actual people.  

However, while he deconstructs the rhetoric of international development agencies, the discourse is not as modern as Brantlinger suggests.  In the expressed motivation for the Zambesi Expedition the rhetoric of Buxton and other early abolitionists, as deployed by Livingstone, presents a very similar argument for the preservation of local populations through social change.  The instructions given to the Zambesi Expedition outlined a project to force the auto-extinction of backward cultures through social change, not human death.  

The ‘wedge’ that would begin this upheaval was the Expedition itself.  Once the Makololo and other target societies were exposed to international commerce and the moral influence of the British people they would, slowly and inevitably, adopt new economic activities, new social mores and eventually a new religion—‘backward’ societal structures and beliefs along with the slave trade, would wither away naturally.  This framework for social ‘evolution’ owed less in 1857 to an overt imperialism than to the solid and broadly-held belief that while all men were created equal, some cultures were better than others.  Where great debates existed concerning the validity of the former statement, a muted acquiescence existed across ideologies concerning the latter.

We are left to conclude this discussion of the civilising mission ideology with a paradox.  The Zambesi Expedition was sent out by the government, in no small part due to the positive support of the Foreign Secretary, Lord Clarendon and also the Prime Minister, Lord Palmerston.  These leaders were lobbied by Murchison to provide Livingstone with the means to continue his work, which was presented as a

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39 See Foreign Office Correspondence dated 28 December 1857, RNML, MSS 120 (Box 1/1857).
40 Brantlinger, Dark Vanishing: 191.
42 Ross, David Livingstone: Mission and Empire: 126.
humanitarian effort to eradicate the slave trade and ameliorate the living conditions of Africans. But as shown above, while the civilising mission ideology worked as powerful rhetoric for philanthropically-minded mid-Victorians, historians have found that towards the end of the 1850s, wider support for such plans had waned. Since the tide of the ‘official mind’ was moving against the implementation of the civilising mission ideology in Africa, such humanitarian thinking becomes a weaker ‘total’ explanation for the Zambesi Expedition. The solution to this problem requires looking beyond the civilising mission ideology for motivations. Murchison’s great support for Livingstone and the Zambesi Expedition demands our consideration and investigation of a less altruistic motivation—scientific discovery. The following two sections examine how Murchison and the wider scientific community influenced the formation of Zambesi Expedition and provided science as a key justification for government support.

**The Selection and Training of the Expedition’s Scientific Staff**

In order to discuss the process of selecting and training the men who would accompany Livingstone in the field, it is first necessary to examine the ‘culture of observation’ dominant at the time and the attempts made to provide fieldworkers with a sound basis for their practice. The rhetoric of method has been shown to be indicative of more broadly held ideologies concerning proper practice, credibility and the position of individuals within the hierarchy of science.43 Thus, an examination of this rhetoric and the means by which the knowledge of proper practice was transferred ‘down’ the hierarchy will inform this discussion of the position of the Expedition in relation to the scientific community. Following this discussion, the process by which the appointees were selected will be used to demonstrate both the qualities sought in those individuals and the role of the scientific community in assessing them.

Since its founding in 1830, there was a growing feeling in the RGS that untrained travellers and unsubstantiated accounts of foreign regions were causing more contention than solving problems. Bad observations led to poor conclusions. Leaders of the RGS therefore became desirous of sending skilled observers—true geographical explorers rather than simple travellers. Only accurate observations could be the basis

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for empirical knowledge.\textsuperscript{44} This mood was expressed, for example, in the presidential addresses made at the RGS meetings. Murchison noted in 1844 that when the Society sent explorers on expeditions they were ‘scientific travellers competent to explore those tracts’.\textsuperscript{45} In 1846, Lord Colchester noted that the continuing uncertainty about the source of the Nile was due to a lack of consistent observations. 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’.\textsuperscript{46}

If, then, the preferred way to solve geographical questions was the direct, methodological observation of geographical phenomena by trained Europeans, what is also true is that no one had answered the questions of exactly who was suitably trained, and which skills they should be experts of. Moreover, the RGS did not spend much time at all explaining how to observe, collect and preserve natural history specimens—an important part of many explorers’ activities. Despite the RGS’s expressed wishes to improve potential explorers’ skills, they did not initially set out to publish any sort of comprehensive guide for explorers. At first they only published articles on specific instruments useful for navigation and surveying in the field.\textsuperscript{47} Nevertheless, as time passed and calls for guidance grew, the RGS’s Expeditionary Committee decided to append a section titled ‘Hints to Travellers’ at the end of the 1854 volume of the \textit{Journal}.\textsuperscript{48} This publication has been examined in depth by Driver. He portrays the text:

\ldots less as a confident assertion of a geographical way of seeing than as an unsettled attempt to resolve some fundamental dilemmas: how was field knowledge to be trusted? What were the limits of geographical knowledge? And, above all, what attitude should the scientific community have towards the untrained traveller?\textsuperscript{49}

The Subcommittee put together the ‘Hints’ in a haphazard way, including opening remarks; three letters from Rear Admiral Smyth, Rear Admiral Beechey, and Francis Galton on celestial observations and outfitting an expedition; Sykes on boiling-point thermometers; and finally two lists titled, ‘Hints for Collecting Geographical

\begin{itemize}
  \item \textsuperscript{44} Driver, \textit{Geography Militant} 51.
  \item \textsuperscript{45} R. Murchison, “Presidential Address”, \textit{Journal of the Royal Geographical Society} 14 (1844), xlv-cxxviii: cxxvii.
  \item \textsuperscript{46} L. Colchester, “Presidential Address”, \textit{Journal of the Royal Geographical Society} 16 (1846).
  \item \textsuperscript{47} An early example of this is W.H. Sykes, “On the Use of Common Thermometers to Determine Height”, \textit{Journal of the Royal Geographical Society} 8 (1838), 435-42.
  \item \textsuperscript{49} Driver, \textit{Geography Militant} 49.
\end{itemize}
Information’ and ‘Descriptive Geography’.

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 the essays presented have been provided by ‘scientific men’ and are to be considered valuable suggestions.

The main reason offered for why a complete book would not be useful was that it would be of little use to the experienced traveller and not extensive enough for the inexperienced. This, in hindsight, seems fair. If a traveller 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, the Society would be hard-pressed to answer in brief through correspondence.

Publication of ‘Hints to Travellers’ did not preclude the RGS’s preference for explorers speaking directly with the Expeditionary Committee for personal guidance—a policy it had long followed. Baron von Müller, who travelled in the Nile Valley of Sudan from 1847-49, noted that he had received ‘scientific training’ with the help of the RGS before his journey. This training was mostly concerned with learning to determine his position by celestial navigation and taking meteorological measurements.

After ‘Hints’ was published, Paul du Chaillu consulted the Society before his trip to West Africa in 1863. Murchison described the RGS’s contribution:

M. Paul du Chaillu has announced his immediate intention of again starting for the Gaboon, [sic] 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.

Despite such instances of assistance and education for explorers, the lack of any sort of formally published guide from the Society does seem surprising. Driver proposes that the RGS did not publish a guide because this would let out the secrets of

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the trade.\textsuperscript{54} 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’s explorers? In the first half of the 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, at least for the RGS.

As the letters of instruction—to be discussed below—written for the explorers joining the Zambesi Expedition indicate, the RGS was not the only place where prospective explorers might go for guidance. Pre-empting the RGS by five years, the Admiralty produced a far more comprehensive guide to exploration, ‘for the Use of Officers in Her Majesty’s Navy; and travellers in general’.\textsuperscript{55} Published first in 1849, the second edition of the \textit{Manual of Scientific Enquiry} appeared in 1851 and the third in 1859. John Herschel was the editor. The Admiralty manuals are exceptionally comprehensive with chapters ranging from tidal observations to ethnography. Yet, despite being more than 500 pages long, the tomes are surprisingly compact, suited for cramped ships’ libraries or the baggage of a land expedition. By coincidence, in the second and third editions the chapters on Zoology and Terrestrial Magnetism are by Richard Owen and Edward Sabine respectively. These men also wrote the respective letters of instruction to members of the Zambesi Expedition. Furthermore, the relevant chapters of the Admiralty \textit{Manual} were appended to the Expedition’s instructions and referred to specifically in them. In short, the \textit{Manual} provided the most credible guidance on field techniques available at the time and its contributors were called upon to provide guidance for prospective explorers.\textsuperscript{56}

There were further books available for explorers: Jackson’s \textit{What to Observe} (1841); Galton’s \textit{Art of Travel} (1855); and Adams’s \textit{et al., Manual of Natural History} (1854).\textsuperscript{57} The imperative in all these texts is similar: the traveller must be trained in order to return with observations that have value. Implied in this were epistemic interests along with a reification of the power of the scientific gaze to collect information and transfer it accurately. In this way, ‘[The traveller] can not only do much

\textsuperscript{54} Driver, \textit{ Geography Militant}; 61.


\textsuperscript{56} For example, in January 1858 Richard Owen wrote specific instructions for zoologists accompanying expeditions to the Zambesi as well as Vancouver. See RSL, MM.14.16 and 18.

to enlarge the sphere of his own ideas, but acquire the means of communicating to
others a great mass of valuable and interesting information.” Jackson reminded
prospective travellers that they would be the source of information for many others and
to this end provided a list of headings to adhere to when abroad, ranging from
Meteorology, Agricultural Industry and Commerce to Literature, Engraving and Foreign
Relations.

The Manual of Natural History is more specific, giving its reader a survey of
biological classification, the tools to identify interesting species of flora and fauna and
importantly, how to preserve them. Above all, Botany was shown to have great utility:

Of late years, Natural History, no longer a chaotic mass of
wild theories or vague assertions, but a truly inductive science,
has proved of vast service to commercial pursuits, and now
possesses a truly national interest.

‘Economic Botanist’, the post given to Kirk on the expedition, reflects a wide interest in
this potential within Government circles.

The rhetoric of these instructive texts leads us to note, then, that proper
observation is not only good practice, it is a national, nearly cultural, duty. This
necessity to travel with skill, purpose and reason as a preoccupation was satirized by
Oliphant in Blackwood’s Edinburgh Magazine.

The merest tourist, who goes where Murray [a popular
guidebook series] bids him, is unhappy if he has not a motive
to license his wandering—a ‘pursuit’ to raise him above the
vulgar level of the travelling English. … But whatever he is, he
is obliged to be something, from a mere necessity of self-
respect.

Her piece was written in part to celebrate the departure of the Zambesi
Expedition and promote the ‘missionary explorer’ (that is Livingstone) as the best sort
of traveller, deserving even more respect than the sportsman or scientific traveller
because the missionary was the most ‘disinterested’. The overall point is clear: frivolity
is frowned upon while those who travel with a noble purpose are to be admired—one
must ‘be something’. Behind its necessity this command carries a hidden challenge. To
have a purpose implied one possessed the skills to carry it out, and as seen above there
was no straightforward method to gain those skills.

58 Jackson, What to Observe: Or, the Traveller’s Remembrancer: preface.
59 These were reprinted in the ‘Hints to Travellers’.
60 Adams, Barron, and Baikie, A Manual of Natural History: vi.
In light of this wide discourse on method and the growing influence of empiricism, selecting the members of the Zambesi Expedition involved ensuring that the appointees were capable (Figure 3.1). As seen in the attitudes surrounding the ‘Hints to Travellers’, books were important sources of information for prospective explorers but books alone would not prepare one for fieldwork. For such an important and ambitious expedition as this one, individuals with a suitable background of experience were required. Prospective members also had to be of ‘the right sort’. In order to examine this process of evaluation as it happened, and establish the criteria, we must look directly at who was making the appointments and how the decisions were made.

Officially, the responsibility for selecting the scientific members of the Expedition rested with the Scientific Branch of the Admiralty, specifically the Chief Hydrographer, Captain John Washington. He was not totally independent in his choices, as his decisions were guided by and had to satisfy the opinions of three powerful scientific institutions: the Royal Society, the British Association for the Advancement of Science and the Royal Geographical Society. William Hooker, the Director of Kew Gardens, would be consulted concerning the role and choice of the botanist.\textsuperscript{62} Early on Livingstone knew that the selection of his subordinates was partly out of his hands, writing to Joseph Hooker in October 1857, ‘I don’t suppose I shall have anything to do in the selection [of appointees] but I may have a power of veto’.\textsuperscript{63} A main concern was that Livingstone’s position as leader could not be threatened through the appointment of individuals with implied superiority to him, especially those of high military rank.\textsuperscript{64}

Unofficially, the appointees to the scientific positions were selected by William Hooker and Murchison. They each used their personal networks of leading scientists to find candidates to bring forward and they corresponded informally concerning

\textsuperscript{62} Foreign Office to Humphrey Lloyd (BAAS), 18 December 1857, RSL, MC.5.323
\textsuperscript{63} D. Livingstone to J. Hooker, 26 October 1857, Ibid.
\textsuperscript{64} R. Murchison to J. Washington, 17 December 1857, RNML, MSS 120/Box 1/1857
Figure 3.1: Leading members of the Zambesi Expedition
prospective appointees before making official moves. William Hooker kept an active correspondence in particular with John Hutton Balfour about candidates for positions opening in Botany and Horticulture. In short, if these two great leaders of science offered the candidates and Livingstone accepted—he was generally deferential and did not oppose any candidates directly—then the decision was accepted by Admiralty and Foreign Office. By examining the selection process of the scientific members, we can trace the influence of Hooker and Murchison to the staffing of the Expedition in detail.

The selection of Thornton appears straightforward: Murchison recommended him personally. Nevertheless, Thornton’s short career prior to his appointment indicates the changing face of geology and the increasing importance of the Government School of Mines (opened in 1851) in providing geologists to perform overseas research. Thornton was a recent graduate of the School (1857) who won two prizes for academic excellence. After graduation he toured coal mines with the Inspector of Crown Minerals, William Smyth, and afterwards spent the autumn of 1857 assisting in the chemistry laboratory of the School. He was ready to accept a position in Australia when Murchison, head of the School at this time, asked him to join the Zambesi Expedition as a mining geologist. His skills and reputation were impeccable, and he had the best referee possible for a geological post. At a meeting in Murchison’s office at the school, Thornton was called in to meet Livingstone, whose only interest was in Thornton’s health—aside from this query Murchison’s candidate was automatically accepted.

Thomas Baines, presents an interesting appointee as he was eventually relieved of duty by Livingstone and sent to the Cape in December 1859. Biographers and historians over the years have debated how Baines came to be fired and whether or not Livingstone was justified. What can be said without controversy is that Baines’s exploration experience was second only to Livingstone’s. Baines’s work as Artist and

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65 W. Hooker to J. Washington, 16 December 1857, RNML, MSS 120/Box 1/1857.
66 For a post in Persia Hooker asked Balfour for a ‘young medical man, very zealous in Botany’, W. Hooker to J.H. Balfour, 2 March 1857, RBGE, John Hutton Balfour Correspondence, vol 7, 233.
68 These were the Government Prize for the best examination papers and the De la Beche Medal for excellence in geological studies; he was first in his year. Tabler, ed., Papers of Richard Thornton xi.
69 Ibid.
70 For instance, compare the account in Wallis, Thomas Baines to Clendennen, ed., David Livingstone’s Shire Journal, 1861-1864. See also Ross, David Livingstone: Mission and Empire 130.
71 A summary of his earlier work along with many illustrations of his art can be found in Carruthers and Arnold, Life and Work of Thomas Baines.
Storekeeper to the North Australia Expedition was lauded, and he had already travelled far north of the Cape and published an account of the Limpopo River. On the merit of his geographical work he was elected a Fellow of the RGS on 23 November 1857. Both William Hooker and Murchison recommended him highly. Baines was in a position in late 1857 to offer his services to the Expedition and once this was known he was enthusiastically put forward and accepted. William Hooker was so supportive he recommended that Baines would be more than capable of commanding part of the expedition, ‘If Livingstone should find it necessary to go in another direction when in the interior’. In short, Baines was an obvious choice, an experienced explorer and proven fieldworker. Baines’s position further demonstrates the pivotal role that the RGS played in making explorers’ careers happen.

Kirk was less known to the unofficial group making appointments to the Expedition. William Hooker had decided to offer the position of Economic Botanist to a Dr. Nichol after Livingstone went to Kew Gardens on 14 December 1857 to ask for recommendations. Nichol was also well known to John Hutton Balfour, Professor of Botany and Dean of the Medical Faculty at the University of Edinburgh. Ten days later Nichols opted instead to accept an offer of employment from Sir John Liddell, then Director-General of the Royal Navy’s Medical Department. Nichol would still be able to serve with Livingstone, but only with Liddell’s permission. Livingstone was not willing to have ‘[his] expedition going a begging to Sir John Liddell’, and so opted for a less exciting candidate, Dr. John Kirk. Kirk’s path to the Expedition and his later diplomatic career demonstrates two facts concerning the ongoing professionalisation of careers in science in the mid-nineteenth century. Firstly, we learn how botanists gained credentials without an institution comparable to the School of Mines. Second, this analysis of Kirk’s career supports Secord’s conclusions about the new access scientists in

74 W. Hooker to J. Washington, 16 December 1857, RNML, MSS 120/Box 1/1857
75 W. Hooker to J. Washington, 16 December 1857, RNML, MSS 120/Box 1/1857
76 W. Hooker to J. Washington, 16 December 1857, RNML, MSS 120/Box 1/1857
77 Balfour (1808-1884) was also Regius Keeper of the Royal Botanical Garden in Edinburgh and Queen’s Botanist to Scotland along being one of the founders of the Botanical Society of Edinburgh in 1836. He graduated in Medicine from Edinburgh in 1831 and was Dean of its Medical Faculty from 1849-1879. DSB
78 D. Livingstone to J. Hooker, 28 December 1857, NLS, MS 10779(10a), originals in RBGK.
general had gained to polite society by the 1850s and the necessary expansion of the definition of a ‘gentleman’.  

Born as the son of a minister in Forfarshire, Kirk became interested in natural history, especially botany, while studying medicine at the University of Edinburgh. There he had been a student of Balfour and was elected a member of the Botanical Society of Edinburgh in January 1854, during his final year of University. After finishing well, Kirk did his first year residency at Edinburgh’s Royal Infirmary (1854-55). His fellow residents included Joseph Lister, John Beddoe (the ethnologist), and David Christison (the archaeologist). Beddoe, Christison and Kirk subsequently volunteered together to serve as part of the Civil Hospital Staff during the Crimean War.

Due to administrative troubles while in Asia Minor, Kirk unexpectedly found himself with free time to botanise. He also travelled to Syria and Egypt and collected there. Upon returning to Britain in mid-1857 he consulted Sir William Hooker at Kew Gardens about his specimens. Later that year, Kirk sent specimens from jute manufacturers in Dundee (near his family home in Arbroath) to the Economic Botany Museum at Kew. He also donated his specimens from the Middle East to the University of Edinburgh. By the end of the year, Kirk was offered the post of economic botanist and chief medical officer to accompany Livingstone.

Kirk was offered a post on the Zambesi Expedition because he had succeeded in medical school and proved his hand at fieldwork around the eastern Mediterranean. He was young (25) and in good health. His qualifications as a physician made him doubly useful to the Expedition. Two major figures in botany at the time, Balfour and William Hooker, recommended him. In addition, Kirk possessed appropriate travellers’ credentials. Four weeks before Kirk was first named to accompany Livingstone, Sir William Hooker recommended Kirk as a suitable candidate for the Chair in Natural History at the University of Kingston, Ontario writing, ‘He has, since he completed his

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79 Secord, Victorian Sensation.
80 The definitive biography of Kirk remains Coupland, Kirk on the Zambesi a connected work by him, The Exploitation of East Africa, was originally intended to focus on Kirk’s life after the Expedition but grew into a more general history of East Africa of which Kirk necessarily figures largely as he went on to serve as HM consul to Zanzibar. A more recent book, Liebowitz, The Physician and the Slave Trade adds little to Coupland’s work.
82 For a detailed account of Kirk’s work during the war see, Ibid.
83 Coupland, Kirk on the Zambesi: 62.
education, improved himself by travel, especially in the East’.84 Livingstone, in first mentioning Kirk, writes of the young doctor’s successful travels in Egypt and Palestine as part of his credentials.85 Another reason for his appointment lay, then, in his having ‘proved’ himself by collecting in a foreign field. His trip to Asia Minor fits in his life as a rite of passage, providing foreign experience necessary for his further career.86 Thus certified, Kirk was predetermined to be trustworthy and a credible reporter of natural phenomena.87 Others could have done the task equally well, and his appointment is also partly to do with luck and having powerful patrons, but without the proper experience and skills he might never have been given the chance.

A further case study in training the members of the Zambesi Expedition can be found in how Charles Livingstone came to join his brother and be appointed.88 At the outset of the planning period in 1857, Charles seems uniquely unqualified for service. After leaving Scotland he trained as a minister at Oberlin College, Ohio. He then went on to work as a pastor in Massachusetts. Charles Livingstone had neither scientific qualifications nor exploration experience; he had never been outside Great Britain and the United States. In late April 1857 he had left his ministry in Massachusetts and returned to Great Britain. Correspondence between the brothers during May 1857 indicates that David wanted Charles to join him on his next expedition to Africa. Charles left the ministry for reasons of poor health and wrote to David that instead of again suffering the summer heat of New England, he would go with him to Africa.89 Charles believed that the ‘Kololo uplands’ (the Batoka Plateau) would offer a climate where his health would improve, an assumption which now appears absolutely comical—but demonstrates the conviction of David Livingstone’s promotion of ‘salubrious highlands’. To get the government to appoint Charles to the expedition required, however, showing that he would contribute to the project; to this end the brothers Livingstone considered ways in which Charles could acquire the appropriate

84 W. Hooker, 23 November 1857, NLS, ACC 9942/49.
85 D. Livingstone to J. Hooker, 28 December 1857, NLS MS 10779(10a).
86 On this point more generally, see Rudwick, “Geological Travel and Theoretical Innovation: The Role of ‘Liminal’ Experience”.
87 Being appropriately known to the audience community is critical for holding credibility when reporting on distant nature, Withers, “Travel and Trust in the Eighteenth Century” and, more generally, Shapin, A Social History of Truth.
88 Much of what is presented here on Charles Livingstone is based upon Clendennen, “Charles Livingstone”.
89 He explained this decision to his wife Harriet, still in Massachusetts, ‘The climate of the region we go to in Africa will not be near so trying to the health as that of the States with the great extreme of heat and cold. Ibid.: 61.
skills. As Clendennen has shown, this was very much a conscious effort to legitimise his appointment and avoid accusations of nepotism. The choices they made say much about what general skills an explorer required and the important questions of the time in reference to African exploration.

Given David Livingstone’s promotion of the Zambesi valley as a cotton-producing region, Charles was sent to Manchester to learn about cotton production. He purchased agricultural guidebooks on the advice of cotton merchants. In the event the government would not appoint him, Charles sought out other opportunities for trading cotton in Angola. Charles also learned about photography from Lord Kinnaird and Professor Lyon Playfair in the autumn of 1857. These plans proved effective because when Charles appeared on the list of recommended members of the Expedition in early January 1858, his knowledge of cotton production and manufacture is cited as a reason. Charles’s main role was to be the head of the permanent station the Expedition would establish on the Batoka Plateau. There, as an ordained pastor, he would develop the benefits that the existence of a small but industrious European settlement would have upon ‘the public mind of the country’. They imagined that through a loosely-defined moral osmosis the surrounding communities would benefit by the mere exposure to the British lifestyle. To this end Charles was given the position of ‘moral agent’.

Once officially appointed to the expedition Charles Livingstone’s training regime matched that received by the others. He joined Baines and Bedingfeld at the Kew Observatory to receive instruction in measuring geomagnetism and the maintenance of navigational instruments such as chronometers, his two particular responsibilities. The observatory was at this time managed by the British Association for the Advancement of Science (BAAS) and was the leading centre for British geophysical research. There, during January 1858, they learned how to record the direction, inclination, and intensity of the Earth’s magnetic field utilizing a variety of instruments. Their instruction was overseen by General Edward Sabine, who had contributed a chapter on Terrestrial Magnetism to the Admiralty Manual of Scientific

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90 Ibid.
91 Ibid.: 61.
92 Ibid.: 67-68.
93 Playfair had been at the Anderson’s College in Glasgow with David in the mid-1830s. There he also became friends with James ‘Paraffin’ Young who donated camera equipment to Charles for the expedition. Ross, David Livingstone: Mission and Empire.
94 Foreign Office to the Secretary of the Admiralty, 11 January 1858, RNML, MSS 120 Box 1/1858.
Enquiry; was director of the Kew Observatory; and advised the Admiralty on scientific matters. Training of explorers at the Kew Observatory was common practice, as noted in Richard Owen’s address to the BAAS annual meeting in Leeds, September 1858:

To prepare, to adjust, to test, to verify, and rectify those instruments for the use of voyagers and travellers are labours that have grown out of the important functions of the ‘Kew Observatory.’ These labours have been cheerfully performed whenever and by whomsoever required; as, recently, at the request of the Admiralty and Royal Society in aid of the Commission for determining the Oregon Boundary, and in the Second Expedition of Livingstone to the Zambezi. Not only have philosophical instruments been prepared and constants determined, but the voyagers have received, at Kew, practical instruction in their use.96

The preparation they received was also noted by Gassiot in his ‘Report of the Kew Committee of the BAAS for 1858-59’ and indicates that the instruments were provided and instruction given at the request of the Council of the Royal Society.

Learning these technical skills was critically important to the process of forming the Expedition. As will be seen in the chapter on fieldwork, the establishment of credibility relies in part upon the demonstration of competence. If there was any doubt concerning the explorers’ abilities, the whole project was threatened. This danger was apparent during the final weeks before departure, as indicated by an incident which called into doubt Charles Livingstone’s ability to operate and maintain a chronometer. David denied charges that his brother had been lax in his duties to keep a chronometer properly wound and wrote to Washington at the Admiralty that: ‘I was very much annoyed by the idea that my brother was careless in his performance of duty…If there is not a sacred regard to truth in those to whom our observations may come the zeal of the expedition for magnetism will undoubtedly sink to zero perhaps below it.’97

Further instruction in surveying and navigation was obtained en route on board the Pearl, the availability of a sea horizon making instruction in the use of a sextant easier than on land where the use of an artificial horizon is required. The members of the expedition exchanged skills as well. Livingstone ran regular lessons in ‘Sechuana’

97 David Livingstone to John Washington, 12 February 1858, RNML, MSS 120/Box 1/1858.
(Setswana). Baines gave Kirk instruction in botanical illustration. Kirk issued medical advice to all members, especially as concerned personal hygiene and use of daily quinine prophylaxis. When the Pearl stopped at Cape Town on 21 April, Baines, Kirk, and Charles Livingstone received further instruction in geomagnetism from Thomas Maclear, Astronomer Royal at the Cape. Kirk and Baines also familiarized themselves with African flora, visiting private and public gardens whenever possible as they had also done when they stopped at Freetown, Sierra Leone.

What Charles and the others’ experiences tell us is that, by and large, the prior skills and earned reputation of appointees was relied upon to certify their appointments. Their achievements, established through letters of recommendation, provided the critical demonstrations of ability and character. Prior experience in the field helped, but was not necessary and could be quickly acquired. Manuals and guide books existed to assist the fieldworkers, and they were instructed specifically to use them, but always some prior knowledge was assumed. Where by the late 1850s specialised skills were required, but rarely found, as in the case of terrestrial magnetism, informal systems for instruction were in place that could be called upon if needed. As Barton has also found, there was, as yet, ‘no identifiable path of education and training’ for those seeking scientific jobs. The men chosen for this task knew that trust had been placed in them and their skills. They also knew that without powerful recommendations they never would have been given their appointments. This is especially true for Charles Livingstone who, in the end, was appointed by his own brother. Thornton acknowledged his gratitude on the eve of departure in a heartfelt letter to Murchison:

I was disappointed in not seeing you in London before leaving. I wished personally to thank you for all your great and continued kindness to me, in obtaining me the appointment, in helping me—often undeservedly—out of all the difficulties I got into and on every opportunity giving me advice, instruction, and encouragement, not only concerning my public duty, but private life. It shall always be my endeavour, by carefully obeying your instruction, by working diligently and reporting faithfully to justify the confidence you have placed in me, and to deserve your future countenance and help. You may be sure that I shall always have the greatest pleasure in communicating to you on every

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opportunity the results of my labours and I shall be always
glad to receive any hints or instructions from you.102

We have seen here how the subordinate scientific members of the Expedition
were appointed. They possessed the appropriate skills and experience, knew the right
people and received extra training where necessary. What is left is an examination of
their instructions—what were they supposed to do exactly? The next section takes a
closer look at how the Expedition’s brief, or letter of instruction, was developed over
the months leading up to departure.

Letters of Instruction: Scientific Desiderata and the Goals of
the Expedition

On 18 April 1858, on board the Pearl, Livingstone read out the official
 instructions for the Expedition provided by the Foreign Office. Each member was then
provided with a copy of the instructions specifically tailored to their particular
responsibilities.103 Along with these general directives, a further four letters of
instructions separately described the duties of the botanist, zoologist, geologist, and the
recorders of geomagnetic measurements. The origin of these four letters is found in a
request from the Foreign Office sent to the Royal Society, the Royal Geographical
Society and Kew Gardens:

Her Majesty’s Government are desirous that advantage should
be taken of Dr. Livingstone’s proposed expedition in Africa,
in which they take a deep interest to extend and promote
scientific researches in the countries which are to be the scene
of Dr. Livingstone’s labours.104

This letter formally expressed a request that had already been made. As early as
24 October 1857 an ad-hoc, ‘Zambesi Committee’, referred to as a ‘deputation from the
British Association’, met at the Royal Society’s rooms in London to discuss the
possibility of an expedition to the region and how science could contribute to the
project.105 The members of the committee were leaders from across the scientific
community: Humphrey Lloyd (Physicist and Chair of the Committee); Henry Rawlinson
(Antiquarian, Philologist, and Geographer); Macgregor Laird (Shipbuilder and member

102 R. Thornton to R. Murchison, March 3, 1858, EUL, Geikie Collection, 523/4/82.
103 All are reprinted in Wallis, ed., The Zambesi Expedition of David Livingstone, 1858-1863. and copies exist
also in the RNML, MSS 120.
104 Foreign Office to the Royal Society, 19 December 1857, RSL, MC.5.324
105 Only minimal information is available in the minutes of the meeting held in the Archives of the Royal
Society, there is no record of what was said.

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of the 1832-4 Niger Expedition); Thomas Robinson (Astronomer); Edward Sabine (Astronomer and Geophysicist); and Murchison. Livingstone presented his ideas to the committee which then sent its opinions on the project to Lord Clarendon at the Foreign Office. Soon after this meeting, Livingstone wrote to Joseph Hooker at Kew Gardens indicating that, ‘There is some probability of an expedition being sent up the Zambesi’.

In December, the Foreign Office again wrote to the ‘Zambesi Committee’ for its advice concerning whom to appoint and what tasks they should be set. Initially, there was wide disagreement over the scale of the operation. When first contacted, John Washington suggested a much larger detail of nearly 200 Europeans, though this was quickly turned down. In early January, Livingstone made a formal proposal which included six European specialists and ten ‘Kroomen’, sailors from Sierra Leone to act as crew onboard the Ma Robert. The response from the Royal Society came a week later, written by William Sharpey, Secretary, and highlighted the importance of directing scientific observations towards the development of the region’s ‘economic resources’. While preparing its response, the committee coordinated the preparation of instructions for the various scientific specialities to be represented on the Expedition: botany, zoology, geology and geomagnetism. Geographical exploration occupied part of the main brief of the expedition and is discussed in the main portion of instructions. The specialised letters, as they very clearly describe what was expected of particular members of the expedition, are examined here in order to discuss the role that various branches of the scientific community and their leaders played in structuring the Expedition. It is important to note that the chronology of correspondence above demonstrates that long before the final plan of the Expedition had been decided, leading members of the scientific community were preparing instructions pertaining to their particular specialty. Science was integral to the project from the outset.

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106 Livingstone also indicated in this letter that he wanted Joseph Hooker to join the expedition. The younger Hooker opted to stay home ostensibly due to family concerns and his increased responsibilities at Kew. His refusal to join the Expedition bothered Livingstone for some years. See D. Livingstone to J. Hooker, 26 October 1857 and 9 December, 1861 NLS (MS 10779/10a).
107 Foreign Office to Humphrey Lloyd, 18 December 1858, RS, MC.5.323-4.
108 D. Livingstone to Lord Clarendon, 7 January 1858, NLS MS 10780(4), and published in Coupland, Kirk on the Zambesi, 77-78.
109 A draft copy is retained in RSL, MC.17.326. A copy was also forwarded to John Washington, Foreign Office to Secretary of the Admiralty, 18 January 1858, RNML, MSS 120/Box 1/1858.
110 The process of coordinating the recommendations and instruction is made clear in a letter from Sabine to Owen dated 11 January 1858, Natural History Museum (hereafter NHM), Owen Correspondence 62.23/8-9.
Kirk received his letters of instruction at the same time as the others, on board the *Pearl*. Joseph Hooker wrote ‘The Principal Duties Expected of the Botanist’ on 13 January 1858 passing them to the Royal Society who then forwarded them to the Foreign Office with Sharpey’s letter of the 18th.¹¹¹ Hooker’s instructions reflected both the particular aims of Economic Botany and his ideas concerning the inherent public utility of all scientific research.¹¹² Kirk was directed to ‘ascertain exactly the species and varieties of plants in cultivation among the natives and colonists for all purposes’.¹¹³ The particular interests were any plants which yield ‘food, clothing, medicinal products, timber, ornamental wood, gums, resins, oils, dye stuffs, etc’—in fact, anything of potential commercial value.¹¹⁴ Kirk was ordered to assess the utility of the plants exploited locally and record local processing techniques. Where possible he should conduct simple experiments to accurately determine their true value and should ensure he has the requisite kit for these analytical tasks.

Aside from determining what new plant resources may exist in the region, Kirk was also charged with investigating the possibility of introducing plants that were already important resources elsewhere. Indigo, cotton, coffee, rice, spices, and sugars were offered as possibilities. Hooker reflects here an enduring interest in ‘acclimatisation’ and the possibilities for transplanting cash crops around the globe. Kew Gardens, now at the head of an extensive network of colonial botanic gardens, coordinated acclimatisation research worldwide.¹¹⁵ To this end, the Expedition took with them a collection of seeds to test in the region’s climate. They also brought a selection of plants with them in ‘Ward’s Cases’ (sealed crates with glass inserts to allow the transport of live plants). One case was prepared at Kew Gardens, while another was assembled at the Botanic Gardens in Cape Town and picked up en route.¹¹⁶ In the field, experiments were made into growing various types of cotton near Tete including the

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¹¹² The younger Hooker’s promotion of public support for science is examined at length in chapter six. On this point see Bellon, “Joseph Dalton Hooker’s Ideals”, 62.
¹¹⁴ Ibid.
‘Sea Isle’ variety from the United States. Thus we have a physical symbol of Livingstone’s attempts to transfer American cotton production to the Zambezi Valley.

In the instructions Joseph Hooker clearly stated that the botanist was not only collecting for himself, but for the entire scientific community. While highlighting commercially interesting plant products, Hooker implied that a full investigation of all the plants in the region should be made, not only those which were of obvious economic importance. He argued that a strictly utilitarian outlook would not produce wide-spread benefits. By way of explanation for casting the widest possible net, the instructions close with a justification for pure botany as opposed to the merely ‘economic’. Kirk’s gaze should include the observation of all aspects of the climate, soil and the ‘exuberant’ vegetation:

It is hence most important, both in this and other inquiries of the same nature, that the Botanist should make a full collection of the native plants of every kind with notes of their localities, general abundance and distribution, for an accurate investigation of these will afford to himself the surest foundation on which to base his conclusions and will enable many who cannot visit the country to suggest plans for its amelioration….Every effort should therefore be made by the expedition towards the formation of a complete herbarium for reasons quite independent of its scientific value.

These ideas were repeated a few years later, when Joseph Hooker was again called upon to write instructions; this time for Charles Meller, who joined the Expedition in February 1861. Meller was sent out to complement the scientific staff of the expedition, which with Livingstone’s expulsion of Baines and Thornton, had been effectively reduced to only Kirk who was not allowed enough time to collect systematically. Hooker instructed Meller to pay special attention to timbers and woods useful for ship-building, though his gaze might also turn towards all areas of botany as well as geology, meteorology and zoology. Concerning other interests, Hooker imagines that the field will present many opportunities:

There are a multitude of other matters that must suggest themselves to every intelligent traveller, and which require no specification; such as the climate, seasons, winds, currents, races [of men?] and of the inhabitants’ diseases, superstitions,

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118 Ibid.
119 ‘Instructions in matters relating to vegetable products, geology, zoology and meteorology: for Dr. Meller’, RNMI, MSS120/Box 2/Miscellaneous.
120 Thornton eventually returned to the Expedition. See chapter five.
etc., etc., all worthy of attention, but far too numerous for one individual to grapple with; Mr. Meller must select such as he finds he is best fitted to enquire into by nature, taste and opportunity.121

When it came to the position of the botanists within the expedition, Joseph Hooker thought it to be very important and worthy of respect. Hooker’s letter for Kirk included an indication of the demands of botanical fieldwork, ‘It is much to be desired that the Botanist should be able to devote all his time to the necessary investigations, which will certainly prove arduous, and will demand much skill and knowledge’.122 Interestingly, this sentence was absent from the copy of Hooker’s instructions which Kirk received from Livingstone. As Kirk’s chief complaint (and Meller’s) was that he did not have enough time for his botanical work, it is tempting to speculate if Livingstone, who had different priorities, purposely elided this obvious threat to his managerial authority and control over his subordinates’ work patterns.

Richard Owen wrote the ‘Instructions for the Zoologist of the Zambesi Expedition’, which were also given to Kirk. This letter focuses on three specific interests: the tsetse fly, ivory and lepidosirae.123 The tsetse fly was of especial interest because it was a barrier to the use of draft animals for transport and food. So important was this issue that an image of the fly appears on the title page of Livingstone’s first book, Missionary Travels. Due to interest in the fly generated by earlier reports, Owen instructed Kirk to perform a thorough investigation into the tsetse lifecycle and indicated that experimental testing of ‘native remedies’ for the sickness allegedly caused by the fly’s bite should be undertaken if at all possible.124 At this time the concept of insect-caused illness was not widely accepted. Although suspected in cases like the tsetse, it was not yet proven.

Ivory, for its commercial value alone, held ‘great practical importance’ and Kirk was instructed to learn all he could about the elephants of the region.125 He was also asked to retrieve a full set of elephant’s teeth and if possible a foetus, with placenta attached, ‘preserved in a keg of spirit’. Kirk attempted both requests, happily

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121 ‘Instructions in matters relating to vegetable products, geology, zoology and meteorology: for Dr. Meller’, RNML, MSS120/Box 2/Miscellaneous.
125 Owen’s instructions are reproduced in Wallis, ed., The Zambesi Expedition of David Livingstone, 1858-1863 427-28.
succeeding in the first, but failing in the second due to the difficult conditions on board the Ma Robert. After he had spent a long day partially dissecting and preparing the foetus for preservation, rainwater leaked into the cabin, diluted the preserving spirit and destroyed the specimen.\textsuperscript{126} This was unfortunate because Owen had recently published on elephant placentas and he considered the study of ‘placental characters’ invaluable to mammalian taxonomy.\textsuperscript{127} The teeth were desired specifically because the patterns on the molars would help determine if the elephants living in the Zambezi basin were of the same species as those found further south. In general, these instructions were guided by Owen’s wider research agenda, which sought the development of a ‘natural system’ of taxonomy built up from the comparative morphology of organs.\textsuperscript{128}

Like the elephants’ teeth and foetus, the Lepidosireniformes, or lungfishes, were of considerable scientific interest. Owen’s recent work on the divergence of animal forms and the increasing complexity of species through geological time, marked a recent and thrilling change in how the natural world was understood to have arrived at its present arrangement.\textsuperscript{129} Lepidosirens appeared to fill a morphological niche between fishes and reptiles and therefore warranted special attention. Owen referred to them as ‘that anomalous genus’ and the original Latin name for the first species to be described was \textit{Lepidosiren paradoxa} Fitzinger, 1837.\textsuperscript{130} In the late 1830s Owen described specimens taken from rivers in West Africa and from the Nile (i.e., \textit{Protopterus annectens}, Owen, 1839). Because these lungfish spend part of the year in a torpid state buried in the mud, there was the possibility of returning live specimens, an exceptional opportunity.\textsuperscript{131} Kirk’s first attempt to do so failed when the specimens were lost in a shipwreck. However, he was able to provide a specimen in 1864, which is still preserved at the Natural History Museum, though it is unclear if it arrived alive.\textsuperscript{132} By the end of the Zambezi Expedition the new theories of evolution through natural selection first proposed by Darwin and Wallace in 1858 made such specimens of especial interest as

\textsuperscript{126} Kirk recorded in his journal, ‘This will make a glorious specimen for anatomists and Sharpey and Owen may fight over it’. 26 March 1859; on the failed preservation, 28 March 1859, Foskett, ed., \textit{Zambezi Journal of Dr. John Kirk}; 167.
\textsuperscript{128} Camardi, “Richard Owen, Morphology and Evolution”; 482.
\textsuperscript{129} Ibid.: 494-95.
\textsuperscript{130} Reproduced in Wallis, ed., \textit{The Zambezi Expedition of David Livingstone, 1858-1863}; 427-28.
\textsuperscript{131} Living Lepidosirens were displayed as zoological curiosities in the Crystal Palace, and occasionally escaped. J.E. Gray, “On the Mud-Fish of the Nile (Lepidosiren Annectens?)”, \textit{The Annals and Magazine of Natural History} 5 (1860), 70-71.
\textsuperscript{132} Darwin Centre, Natural History Museum, \textit{Protopterus annectens} Acc 64.6.28.18.
representatives of transition species. Kirk considered the fish, locally called ‘dove’ to be as much reptile as fish, and knew they would be great curiosities in London.  

Owen’s instructions indicate that he was filling two roles as advisor to the expedition. On the one hand Owen wanted to see his own projects concerned with comparative vertebrate morphology aided by new specimens. The obvious potential for novel specimens—important to any taxonomic project—made expeditions to Africa particularly important, as so little of the continent’s fauna had been catalogued at the time. On the other hand, he represented the interests of the British Museum’s Natural History Department, an institution actively seeking specimens of high quality that would contribute to the comprehensiveness of the collection—in itself a benefit—and provide zoologists with new data in their particular specialties. Owen guided Kirk in both directions, instructing him in what to look out for and how to ensure its preservation while leaving Kirk the freedom to collect as he saw fit and was able.

The goals of the Expedition related to geology were inherent to the entire project from the moment of its conception in Murchison’s mind. By the later 1850s he did little fieldwork, relying upon others for such tasks. In his invaluable studies of Murchison’s career, Stafford concludes that ‘The Dark Continent represented an immense challenge to explorers, and for Murchison it offered the ultimate test of the power of natural science to classify and develop alien environments’. Murchison predicted in 1852 that, ‘The interior of southern Africa comprised an elevated great central trough or basin’ that was ringed with Paleozoic uplands cut through ‘by deep ravines, the chief of which serve as escapes for the periodical flood of rivers’. This image of a ‘lost geology’ meshed well with more popular images of the continent as a land socially cut off from the cosmopolitan world—the geology was seen to reflect or even contribute to Africa’s isolation. As Stafford has shown, despite the obvious differences in time scales, Murchison rhetorically extended the ancient and unchanging nature of African geology to the inhabitants of the continent—they too were relics from the past.

133 J. Kirk to A. Kirk, 30 January 1860, NLS Acc. 9942/2/20.
134 At this time Owen began his push for a separate, national museum of natural history; one of his career’s defining missions. Rupke, Richard Owen: Victorian Naturalist.
135 Murchison’s instructions for Thornton are also analysed in Stafford, Scientist of Empire: 179.
137 Quoted in Ibid.: 17. For the initial prediction, see his address to the RGS, R. Murchison, “Presidential Address”, Journal of the Royal Geographical Society 22 (1852), bxi-cxxvi: cxxi-cxxv.
138 Stafford, “Annexing the Landscapes of the Past”, 84.
The Zambesi Expedition was only one among many that Murchison used to test his grand theories of continental structure. Stafford has argued that Murchison organized the dispatch of numerous expeditions to Africa in part to test his personal theories of the geological structure of the continent and find new commercial opportunities.\textsuperscript{139} Expeditions working north of the Cape, along the Niger, the Lake Regions, Abyssinia and the Limpopo were influenced by Murchison in varying degrees.\textsuperscript{140} The instructions he wrote for Thornton reflect a dual interest in geology for geology’s sake—testing his theories—and the possibility for commercially-important mineral deposits; coal, iron, copper and lead in particular. The Royal Society agreed that a trained mining geologist was indispensable to the Expedition’s goals of developing economic resources.\textsuperscript{141} Livingstone had already reported the existence of coal near Tete, and this potential resource required investigation if steam transport along the river was to succeed.

Charles Livingstone had a more general role, working to support the Expedition. David Livingstone wrote his instructions personally. Given the training he sought prior to departure, Charles was directed to the care and maintenance of the chronometers along with the geomagnetic equipment. He was also the technician partly responsible for geomagnetic observations, and thus Sabine’s directions in this regard were directed to him.\textsuperscript{142} Charles was not considered a ‘scientific’ worker on par with the others; he had little education in natural history. He was expected however to operate the instruments properly and provide the data required by Sabine. Charles was also instructed to make use of his personal photographic equipment, though to be careful with his portraiture:

>You will endeavour to secure characteristic specimens of the different tribes residing in, or visiting Tete, for the purposes of Ethnology. Do not choose the ugliest but, (as among ourselves) the better class of natives who are believed to be characteristic of the race, companies of Banyai and other

\textsuperscript{140} Stafford, “Roderick Murchison and the Structure of Africa”, 18-35.
\textsuperscript{141} Foreign Office to Secretary of the Admiralty, 18 January 1858, covering a letter from the Royal Society to the Foreign Office dated 15 January 1858, RNML, MSS 120 Box 1/1858.
\textsuperscript{142} Copies of Sabine’s specific instructions are in RNML, MSS 120, Box 1/1858. His instructions to Naval officers were also provided, Sabine, “Terrestrial Magnetism”.

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strangers who may be induced to sit for payment; and if possible, get men, women and children grouped together.\textsuperscript{143}

Baines, as the artist, was similarly instructed by Livingstone to select the ‘comelier countenances’ of the Africans he selected for portraits. I reproduce the lengthy passage from his instructions concerning imagery to emphasize the role of imagery in recording the reality of the field for the metropolitan audience:

As Artist of the Expedition you are required to make faithful representations of the general features of the country through which we shall pass in sketches of those points to be characteristic of the scenery. You will also endeavour to make drawings of wild animals and birds, copying as closely as you can the natural attitude. ...You are expected also to delineate for the general collection of the Expedition the specimens of useful and rare plants, fossils and reptiles that may be submitted to you as means of preserving pictorial records of things which through the influence of climate may be lost. ...You are required to draw average specimens of the different tribes we may meet with, for the purposes of Ethnology and, should it be possible to give the dimensions of the heads of the individuals you may select, the measurements will be highly prized. The comelier countenances should be selected rather than the uglier, as the former are always taken as types of the European race.\textsuperscript{144}

It is interesting to note that Livingstone wanted the portraits of Africans to be as acceptable to Europeans as possible, thereby generating confidence and support for his civilising mission ideology. He desired to control the representation of Africans produced by Baines and Charles, by ordering them to leave the ‘ugly’ ones out of the frame. The adjectives used to describe natural history images also reveal Livingstone’s bias: the ‘characteristic’ representations are to be of ‘useful’ and ‘rare’ plants. Writing these instructions \textit{en route} to the Zambezi, Livingstone planned strategies to control the output of the expedition and hopefully guarantee success. The remainder of Baines’s duties pertained to storekeeping and assisting with geomagnetic and meteorological observations. In both these latter cases, Baines was instructed to duplicate all of Charles’ measurements in order to guard against human error. The failure of this system, when Baines was sick, prompted Charles to write letters of apology directly to Sabine indicating that the observations had not been replicated.\textsuperscript{145}

\textsuperscript{143} ‘D. Livingstone to C. Livingstone’ reproduced in Wallis, ed., \textit{The Zambezi Expedition of David Livingstone, 1858-1863}: 431-32.
\textsuperscript{144} ‘D. Livingstone to T. Baines’ reproduced in Ibid. 433-35.
\textsuperscript{145} See D. Livingstone to Sabine, 6 February 1860, RSL Sa.790 (copy of Charles’s letter attached).
Overall, the letters of instruction are telling in two ways. They note the potential economic benefits of the work to be carried out and indicate especially those objects that will contribute best to utilitarian goals. This falls in line with all the most public pronouncements concerning the Expedition—commerce, industry and thus Britain would benefit from these researches; it was therefore seen as good to spend public money on the expedition. Bellon recently summarised the ideals that Joseph Hooker and others promoted: ‘In pursuing research, the [scientific] community would also serve the nation by promoting its health, education, defence, sustenance, and honour. The nation in turn owed the scientific community for this ministration’.146

Underlying the rhetoric of public utility we find a wholly different intention, one still linked to utility but further detached. The subtext of the scientific instructions implored the fieldworkers to collect as widely and comprehensively as they possibly could, no matter if the object was useful or not, and to do the collecting well. This is most evident in Joseph Hooker’s letter, which begins with concerns over economic botany, but moves to a call for the creation of a comprehensive herbarium of the Zambesi basin. Hooker’s letter of instructions can be directly connected to his and his father’s petitions to the government for the funding of a project to compile colonial floras. The proposed ‘Flora of Tropical Africa’ was granted government funding only after Kirk’s botanical collection from the Zambesi was examined—indeed approval was formally delayed until the collection had been assessed.147 As Drayton has shown, the floras were meant to fulfil several objectives: accumulation of knowledge for its own sake; provision of new sources of income for botanists; contribution to colonial economic progress and support of British manufacturing by identification of new raw materials—the same rationale scientific leaders provided for the Zambesi Expedition itself.148

The letters also promoted the ideals the leaders of the mid-Victorian scientific community sought in young, rising ‘men of science’. Joseph Hooker believed firmly in the virtues of the scientific calling, though individuals who followed this career were meant to do so not for personal gain, but for the greater purpose of the advancement of science.149 This is what is meant by the compliment ‘disinterested’. As Bellon has

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149 Desmond, “Redefining the X Axis”, 9.
shown, Joseph Hooker sought men who possessed ability and character to join the hopefully growing ranks of scientific professionals.\textsuperscript{150} To be interested in personal material gain degraded research; it was a sign of poor character.\textsuperscript{151} Given his strong convictions in this regard, we may better understand why Joseph Hooker himself did not join Livingstone on the Zambesi Expedition. Livingstone only saw science from a utilitarian perspective and thus the two men did not understand each other at all: ‘Be as angry as you like with me, I repeat you ought to make yourself more known. Could you not do something in the popular line with your Museum? There is nothing mean in it. See how Playfair and Sir Roderick get on, it is all fair and above board’.\textsuperscript{152} Fame-seekers were exactly the kind of collectors that Joseph Hooker did not want on the Expedition, or in science, and here Livingstone was telling him to be one.

\textbf{Conclusion}

Driver has argued that the ‘cultures of exploration’ that were dominant at mid-century extended well beyond the RGS and the scientific community.\textsuperscript{153} This chapter supports this conclusion, although by seeking, in a sense, to look at the problem from the opposite direction. Instead of trying to see how the wider arena of Victorian attitudes in the second half of the 1850s influenced scientific exploration, it has been shown here that the interests of the scientific community were a constitutive part of an expedition touted as a ‘civilising mission’. Without its scientific component, the Zambesi Expedition would have made little sense to the public at large or to the members of Parliament who voted to support its funding. Furthermore, it would not have had any support from the scientific community. As has been demonstrated here, the Expedition was conceived in the mind of a leading scientist, Murchison, and the project relied heavily upon the expert advice of scientists for the selection of members, provisions of instructions and, as will be seen in subsequent chapters, the analysis of its results. It has also been shown that the political and commercial climate in 1857 was not particularly enthusiastic nor even interested in south-eastern Africa. It was only due to Livingstone’s great fame and strong lobbying from scientific leaders that the Expedition came into existence. Previous studies, while noting the presence of

\begin{footnotesize}
\begin{enumerate}
\item Barton, “Men of Science”, 75.
\item D. Livingstone to J. Hooker, 9 December 1861, NLS MS 10779(10a), originals RBGK.
\item Driver, \textit{Geography Militant} 25.
\end{enumerate}
\end{footnotesize}
scientific staff and Murchison’s influence, have not captured the crucial role of science
during the Expedition’s formative stage.\textsuperscript{154}

The goals of science are often not particularly humanitarian or philanthropic. It
is difficult to see how further data concerning the Earth’s magnetic field would lift the
‘veil of darkness’ from the shores of Africa, although geomagnetic observations were an
important task set for the explorers. This chapter, and indeed the entire thesis,
highlights the underlying tension between the utilitarian goals of commercial resource
identification and the empirical goals of science for science’s sake. The letters of
instruction contain elements of this tension in their structure. Moreover, Livingstone’s
general deference to leading men of science concerning these activities indicates he was
more interested in the civilising mission aspects of the project. We will see later how
Livingstone’s lack of patience for non-utilitarian science frequently thwarted the natural
historians’ fieldwork.

Despite this tension, both Livingstone and the scientific leaders were fully
prepared to pay lip service to one another’s goals in order to gain support.
Understanding their actions this way helps us to see why the Duke of Argyll could refer
to scientific research as the ‘higher ends’ of Livingstone’s work and joke about Owen’s
hopes to receive palaeontological specimens while the Royal Society informed the
Foreign Office that ‘the development of the economic resources of the country must
obviously be the first object to which the labours of the scientific staff must be
directed’.\textsuperscript{155} The language in which the Expedition was framed reflected a continual
negotiation between humanitarian and empirical interests, each side aware that the
Expedition would not be possible without the other.

This chapter has highlighted that while some of the scientific goals of the
Zambesi Expedition were conceived of without a direct philanthropic agenda, it would
have been difficult for Livingstone and his supporters to promote a civilising mission
without reference to contributions from the scientific community. Indeed, by the
middle of the nineteenth century the Victorian concept of ‘civilisation’ incorporated the
contributions of science and technical achievement. Scientific knowledge—particularly

\textsuperscript{154} An exception is the work of Robert Stafford whose work links Murchison's geological interests to the
British interests in Africa.

\textsuperscript{155} The Duke (George Douglas Campbell) was at then time Postmaster General, he served a Secretary of
State for India from 1868-74, was fervidly against Darwinism and wrote on evolution and economics.
Anonymous, “The Farewell Livingstone Festival”, 129. and Sharpey to Foreign Office, 15 January
1858, RNML, MSS 120/Box 1/1858.
that of economic botany and mining geology—would, once gathered, provide a sound foundation upon which to build the economic potential of south-eastern Africa. Such knowledge was a vital part of any ‘civilising’ project.

The next chapter will continue to examine aspects of Driver’s ‘cultures of exploration’; by looking at the role of technology. The material culture of Victorian exploration reflected the empirical drive towards objectivity through the use of instruments and structured observations.156 Included in the letters of instructions discussed above were indications on the use of appropriate instruments and methods. These technologies were as much a part of expeditions’ fieldwork as the theories used to classify and make sense of the foreign environment. I now turn to look at how this material culture contributed to scientific practice, the explorers’ self-image, the practice of science in the field and the representation of African nature in Victorian Britain.

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156 A reading of the ‘Hints to Travellers’ in this light can be found in Driver, Geography Militant: 57-58.
Chapter 4: Technologies of Expedition

Introduction

One requirement for effective exploration is effective transport. Popular images of the exploration of Africa frequently include white men moving through a foreign landscape, brush being cut back with a panga while the white explorer and his faithful bearers march on mile after mile. The early exploration of Central Africa by Europeans did require a lot of walking, but it may not have been as much a part of the daily routine as has been assumed. In Richard F. Burton and John H. Speke’s journey from Zanzibar to Lake Tanganyika in the late 1850s, time spent walking took up only 7.5% of the seven and a half months that elapsed from departure to return.\(^1\) Burton and Speke were frustrated by the slow pace of travel. Their own view of exploration included covering vast distances at breakneck speeds—reality proved otherwise.

We can find many examples where exploration was not about travelling or movement at all. The intention of the Antarctic voyages of SY \textit{Scotia} and HMS \textit{Discovery} in the early years of the twentieth century was to get ‘stuck’ in the ice and observe from this fixed point. Likewise, the Zambesi Expedition intended to set up a base on the Batoka plateau as a ‘central depot’ and conduct observations from there.\(^2\) Gaining true regional knowledge involved maintaining a particular position and performing structured observations. From such activity, reliable data could be produced. In this light we might need to reconsider what constitutes the foundation of expeditionary activity.

I focus here on the utilisation of technology and how this contributed to the scientific practice of the Expedition. Here it is argued that the explorers defined themselves by the technology they used to travel through and observe the Zambezi basin. Their attitudes towards the technology they used and the technological

\(^1\) The raw numbers are provided by Burton in R.F. Burton, “The Lake Regions of Central Africa, with Notices of the Lunar Mountains and the Sources of the White Nile”, \textit{Journal of the Royal Geographical Society} 29 (1859), 1-454. The total of 7.5% works out to an average of 1.8 hours a day walking. Of course there were lengthy stops at some locations and other days spent walking a great deal, but the figures still indicate that walking did not occupy the majority of time spent in the field. L. Dritsas, “Local Informants and British Explorers: The Search for the Source of the Nile, 1850-1875” (Unpublished MSc, Virginia Polytechnic Institute and State University, 2001): 66. (abstract available online at http://scholar.lib.vt.edu/theses/available/etd-10062001-145516/)

\(^2\) The term ‘central depot’ was used by Livingstone in his instructions to the expedition’s members. Most of these letters of instruction are published in Wallis, ed., \textit{The Zambezi Expedition of David Livingstone, 1858-1863}: 411.
capabilities of the locals will be contrasted. Before beginning this analysis it will be necessary to say a few words about technology. In order to be more inclusive of the wide array of activities occurring within the Expedition I use a wide definition of technology developed by Joseph Pitt and summed up by him as ‘humanity at work’.\(^3\) This allows for the consideration of a broad range of activities. Pitt proposes that technology is not about machines but rather about ‘use’ within a model of processes involving input/output transformations of knowledge. Technology is not applied science in Pitt’s analysis. For him, technology is epistemically prior to science because technological processes allow scientific research to be carried out. Pitt’s model may appear Heideggarian in that ‘the instrumental nature of technology is always paramount’, but Pitt would not accept this view as he finds Heidegger’s account inconsistent.\(^4\) In Pitt’s model the dynamic nature of technology is highlighted along with human agency:

Technology is now to be conceived as a complicated process of humanity at work in which knowledge gained by prior action is reconsidered in the light of new knowledge and new actions attempted by way of focusing on achieving specific goals.\(^5\)

This broader conception of ‘technology’ can include human institutions and social networks. It is indeed necessary to do so if we are to develop an understanding of how the explorers of the Zambezi Expedition differ from ‘locals’ in their observation of the region. In a general sense, the importance of science and technology to European identity became paramount during the nineteenth century. Adas argues:

In the industrial era, scientific and technological measures of human worth and potential dominated European thinking on issues ranging from racism to colonial education. They also provided the key components of the civilising mission ideology that both justified Europe’s global hegemony and vitally influenced the ways in which European power was exercised.\(^6\)

This chapter shows that the explorers believed themselves to be different from the locals because they employed different technologies to organise their expedition, their bodies and crucially, their thoughts. Understanding their own identities as the

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4 Pitt argues against Heidegger’s view of technology as a metaphysical ‘thing’ unto itself, because that leads us to lose human agency in the process of shaping technology. Ibid.: 70.
5 Ibid.: 23.
6 Adas, *Machines as the Measure of Men: 3*, and passim. I should note for clarity here that Adas’ definition of technology is more restricted than mine. He focuses the material manifestations of technology, and sees it as an emphasis on design and problem solving. Throughout, he emphasizes the role of technology as standards, not processes.
product of a scientific culture that promoted disinterested, rational thought, the
explorers possessed a feeling of technological superiority. I also explore how the use of
technology was mitigated by local circumstances. The tension and difficulties occurring
during the expedition were largely due to failure of technology to facilitate observation
complicated by conflicts between the goals set in the Expedition’s brief.

Finally, we should consider where religion re-enters the justification for the
civilising mission ideology. *Pace* Adas, for some Victorians religion continued to be the
foundation for a worldview that embraced technological advancements. The evidence
demonstrates clearly that in Livingstone’s mind Britain’s place as an industrial and moral
power was only achieved through a divine plan to link Christianity with technology. He
held an absolute conviction in the providential origin of technology akin to Man’s own
creation: ‘Mankind could not, in the first instance, have *civilised* themselves, and
therefore must have had a superhuman *Instructor*.’ But this promethean technology was
not evenly distributed, indicating further that the superiority of British industry was the
result of this same divine plan. Through this argument we see the apotheosis of
Livingstone’s justification for the civilising mission ideology:

The stagnation of the mind in certain nations which have
preceded us in the line of discovery may also have been
intended, in order that the greatest power derivable from
science and art might be associated with the religion which
proclaims peace and good will to man. Had the power given
by inventions to the nations of Christendom been awarded in
the natural course of things to the men who were first in the
race, we see no earthly reason why the Buddhists and
Mohammedans should not now have lorded it over us poor
islanders with steamers, and all the improvements in artillery,
or that the Lancashire witches and Edinburgh “bonny lasses”
should not now have been exported regularly to the harems of
the East.³

*Bringing Steam Power to the Zambezi*

Three steam ships were used by the Zambesi Expedition, the *Ma Robert*, HMS *Pioneer*
and *Lady Nyassa*. The *Ma Robert* went out initially in sections and was assembled in the
Zambezi delta in May, 1858 (Figure 4.1). She sank in the river on 21 December, 1860,
as a result of a badly corroded hull. The *Pioneer* was towed to the Zambezi from

³ Original emphasis. Livingstone and Livingstone, *Narrative of an Expedition* 381.
⁴ Ibid.: 451.
Figure 4.1: *Ma Robert* at entrance to Lupata Gorge

Figure 4.2: *HMS Pioneer* at Simonstown, 1864
Scotland and arrived 4 February 1861 (Figure 4.2). She served until the end of the expedition and was returned to the Navy in February 1864. The *Lady Nyassa* arrived in sections on 3 February 1862 to be transported by hand past the cataracts of the Shire River and launched on Lake Nyassa. Livingstone was relying on the *Lady Nyassa* to provide him with the mobility and security on the lake to begin his civilising mission. Despite spending nearly a year on this project, putting the boat together to take it to the bottom of the cataracts, the expedition was recalled before the plan could be realised (Figure 4.3a-b). As Livingstone had personally purchased *Lady Nyassa*, at the end of the expedition he sailed the boat to Bombay, a seven-week voyage and put her up for sale.

Figure 4.3a(top) and 4.3b(bottom): Construction of the *Lady Nyassa* on the banks of the Zambezi., HMS *Pioneer* is to the right in 4.3b
Using steam power on the river does not appear to have been Livingstone’s own idea, but that of Edward Sabine, who spoke to him about the issue after the Dublin meeting of the BAAS in September 1857. Members of the Manchester Chamber of Commerce also supported the idea. The plan recalled previous expeditions in 1841-42 and 1854-5 when steamers travelled up the Niger. The hopes for successful steam navigation on the Zambesi relied upon Livingstone’s assessment of the river’s navigability. Where privately he may have held doubts, his public representation of the river portrayed it as an African Mississippi, ‘God’s Highway’ offering easy access to the African interior.

Initially, the task of providing a river steamer fell to MacGregor Laird of Birkenhead (Liverpool). Laird (1808-1861) had been a member of the African Inland Commercial Company’s Niger Expedition of 1832-4 and therefore claimed some expertise in navigating African rivers. Laird proposed two options. Laird’s shipyard owned an iron screw steamer named Sunbeam and offered it for sale or charter to the Government for the purpose of exploring the Zambezi. Sunbeam drew 8 feet when loaded and was 132 feet long. The second option was a smaller side paddle ‘steam launch’ Laird was building that would draw 3’ 30” and was lightweight because it would use new steel plates for the hull.

Laird wrote to Washington in early December and it is clear he was relying on Livingstone’s reports when he proposed:

FROM A CAREFUL PERUSAL OF DR. LIVINGSTONE’S JOURNAL I AM OF THE OPINION THAT THE Zambezi will be found navigable above the Chicora rapids by a vessel the size of the Sunbeam but certainly that the Steam Launch proposed would pass them when the river is in flood.

The day before, Washington had written to Livingstone asking him about the river and its navigability with a series of questions:

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9 D. Livingstone to Lady Murchison, 14 September 1857 paraphrased in Wallis, ed., The Zambesi Expedition of David Livingstone, 1858-1863: xxv.
11 Martelli, Livingstone’s River 18.
13 M. Laird to Secretary of the Admiralty, 20 November, 1857. Box 1, MSS 120, RNML.
14 He is apparently referring to the Cahora Bassa rapids here. M. Laird to John Washington, 9 December 1857. Box 1, MSS 120, RNML.
1) How far you consider the unhealthy region extends from the coast towards the interior by the course of the river? 100 miles?

2) As what rate do you consider the current can draw in the rainy season?

3) Do you contemplate that the larger vessel should be sufficiently small to be transported above the first rapid at Tett or Niyungwhee? Or that only the launch need be so transported?

4) Have you any means of making a guess at the height and extent of the rapid?

5) Do you happen to know if Mr. Hoskins or any of the officers who were in the [Frolie?] in 1852-3 are in England?

6) Would any good be passed by the large vessel only going to Tett? It is, I conclude, beyond that point or the Portuguese territory that your work is to be done?

7) Mr. Laird’s vessel is of 400 tons, + 132 ft long and will draw 8 ft of water when loaded. Do you think there would be a chance of getting such a vessel up to Tett?

It is interesting that the fifth question has the hydrographer specifically asking for naval officers who could corroborate Livingstone’s observations. In reply we learn that Mr. Hoskins had moved to China and that no one else was available. Aside from Livingstone’s testimony, Washington had only a few sketchy reports about the lower reaches of the river from vessels that had investigated the delta and the notes left behind by the crewmen of HMS Leven who died of fever on the river in 1823. No doubt the experienced hydrographer was concerned about the accuracy of Livingstone’s untrained observations of the river, which were made without instruments. Livingstone’s responses are honest but unfounded in their optimism. He was of the opinion that the Sunbeam would make it upriver to Tete during the flood. Even so he warns, ‘For prudence sake the less she draws the better’, an ominous foreshadowing of the difficulties to come. This is a telling remark, for in it Livingstone states that he was completely willing to take a large streamer that required at least 8 feet of water into the Zambezi, he later had extreme problems with a vessel that drew half that much.

On 18 December 1865, a list of options for getting the expedition with its boat to the river was drawn up at the Hydrographer’s Office in the Admiralty. The plans include options using the Sunbeam to carry the whole party with the disassembled launch on board from Liverpool to Tete, and then 300 miles up the Zambezi. Other options

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15 D. Livingstone to J. Washington, 9 December 1857, Box 1, MSS 120, RNML.
proposed using a ship already sailing to the Cape or India to reduce costs. Livingstone preferred the first, feeling that proceeding rapidly through the unhealthy lowlands of the Zambezi delta was critical and he fully believed that the Sunbeam would make it upriver.

Even though the use of steam power was not Livingstone’s idea, he warmed to it quickly and became enamoured with its symbolic power. Pioneering the use of steam in south-eastern African would impress local communities and (as he saw it) increase his influence. Of the Portuguese, he worried that the arrival of British steam to the river would be viewed as a political threat; and in September 1857 Livingstone called for diplomatic efforts to ease Portuguese fears that he thought would specifically arise due to the use of steam power.16 The extensive correspondence between the Admiralty, Livingstone and shipbuilders concerning the boats to be used and their design indicate that the explorer was not the only one to see the iconic power of steam and decide that its use was the vital feature of a modern British expedition.17

In January 1858 a decision was finally made to get the expedition to Tete in a steamer. There, everything would be unloaded and a smaller steam launch put together. The Council of the Royal Geographical Society supported this plan by a unanimous resolution.18 By February, transport plans were finalised. The screw steamer Pearl would transport the expedition and all its cargo (including the launch) to the Zambezi and as far upstream as possible, most likely all the way to Tete. This steamer, now known to be the Pearl, would also assist HMS Hermes, based at Simon’s Bay at the Cape, in a survey of the Zambezi delta. Once finished the Pearl would continue on to Ceylon for service under the Colonial Office. The Ceylon government received £300 for the delay of their ship. This plan made use of an available government boat passing that way.19 Macgregor Laird received a commission to construct the river launch, christened Ma Robert and the Sunbeam dropped out of the plan completely. The Pearl arrived on 14 May 1858 at the Zambezi delta with HMS Hermes escorting. Within three days the Ma Robert was bolted together, it had been decided that it would be safer to proceed upriver with the launch acting as a pilot vessel. Baines made a series of pencil sketches of the process: they are detailed studies of rigging and military organisation with perhaps a hint of national pride (Figure 4.4). During this time, a hydrographic survey of the delta

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17 These are now held as MSS 120, RNML.
18 R. Murchison (Pres. of RGS) to Lord Shelburne, 15 January 1858, Box 1, MSS 120, RNML.
19 Foreign Office to Secretary of the Admiralty, 9 February 1858, Box 1, MSS 120, RNML.
commenced, to further the detail of British charts of the East African coastline and enable future ships to support the expedition more safely. This work was performed under the direction of Lieutenant Francis Skead, a Naval Hydrographer temporarily seconded to the expedition for this purpose.\textsuperscript{20} Approaching the delta was a risky operation for larger ships and always held the potential of a serious grounding.\textsuperscript{21} Extensive surveying would minimize this risk in the future.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure4.4.jpg}
\caption{Hoisting a section of the \textit{Ma Robert} on board HMS \textit{Pearl}}
\end{figure}

Unfortunately for Livingstone, the Zambezi did not turn out to be the river he claimed it to be. It was determined soon after reaching the main channel of the river that the \textit{Pearl} was unable to risk the journey to Tete due to shallow water. The decision was taken in early June 1858 to unload the expedition’s gear to a small island just upstream from the delta. This they dubbed ‘Expedition Island’. Unloading the \textit{Pearl} here was the first of a series of enormous setbacks. Instead of reaching Tete within a week or two of entering the delta, they now faced months of ferrying gear up the river. The members of the expedition began to realise that the river was not quite the open waterway they had been led to believe as groundings became frequent and they learned

\textsuperscript{20} J.R. Heaton, “Francis Skead, Hydrographer”, \textit{Africana Notes and News} 21, no. 1 (1975), 281-85.
\textsuperscript{21} For more details on this operation see, Bosazza and Martin, “Geographical Methods of Exploration Surveys in the 19C”.

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from Senhor Vienna, who owned the prazo at Shupanga, that no channel to Tete existed during the dry season.\textsuperscript{22} The expedition, with most of its equipment did not reunite in Tete until 3 November, seven months later.

After six months on the river Baines referred to it as ‘the broad labyrinth of shoals called by courtesy a river’.\textsuperscript{23} His charts demonstrate the difficulties (Figure 4.5) and his frustrations are reflected in his paintings of the Ma Robert aground in the Zambesi (Figure 4.6). Too shallow in the dry season, the river’s channel meandered wildly and thwarted all attempts at mapping. Many days were spent winching and warping their boats over shoals. Kirk wryly referred to this procedure as ‘land transport’. Instead of smoke-billowing icons of British technical superiority, the ships became symbols of failure, failed expectations and misapplied technology. Arguments between Livingstone and Macgregor Laird, the firm that built the Ma Robert, lit up the pages of the British press, and almost led to formal accusations of libel.\textsuperscript{24}

The symbolism of steam power had its pitfalls. In a note written before they left England, Livingstone had pressured Washington to ensure that the steam engines would be capable of the task at hand:

\begin{quote}
It has occurred to me that the horsepower of Mr. Laird’s vessel is too small. It would be a sorry thing for us to be unable to stem the current in the only steamer the natives ever saw.\textsuperscript{25}
\end{quote}

This is a telling note. If the ship were to fail, the embarrassment would be Livingstone’s and, by extension, Britain’s. To fail in extending the range of steam power could potentially misrepresent the technological abilities of an entire culture, threatening the entire ‘civilising mission’ project.\textsuperscript{26} In the first months of the Expedition this was exactly what was happening.

\textsuperscript{22} 24 August 1858, Foskett, ed., \textit{Zambezi Journal of Dr. John Kirk }. 69. Senhor Vienna gave the expedition much support and became a good friend to them until he died in 1862.
\textsuperscript{23} Tabler, Axelson, and Karz, eds., \textit{Baines on the Zambezi}. 166.
\textsuperscript{24} John Washington apportioned blame equally to the builder (Laird), Livingstone, and the engineer, George Rae. See draft letter dated 11 November 1859. Box 4, MSS 120, RNML.
\textsuperscript{25} Box One, MSS 120, RNML.
\textsuperscript{26} Adas, \textit{Machines as the Measure of Men.}
Figure 4.5: Section of Zambezi River, by Baines

Figure 4.6: Baines arround in the pinnace
The explorers’ self-identification was strongly linked to the use of steam and they delighted in their command of technology when subjected to the ‘native’ gaze. Deploying technology also laid the foundation for their recognition of the locals.27 In June of 1862, the third steamer employed by the expedition, Lady Nyassa, was launched. In the Narrative, the impact of iron ship construction upon ‘native’ sensibilities is highlighted in a tone that simultaneously emphasises British industrial superiority and ‘native’ naïveté:

Natives from all parts of the country came to see the launch, most of them quite certain that, being made of iron she must go to the bottom as soon as she entered the water. Earnest discussions had taken place among them with regard to the propriety of using iron for ship-building. The majority affirmed that it would never answer. They said, “If we put a hoe into the water, or the smallest bit of iron, it sinks immediately. How then can such a mass of iron float? It must go to the bottom.” The minority answered that this must be true with them, but white men had medicine for everything. The unbelievers were astonished, and could hardly believe their eyes, when they saw the ship float lightly and gracefully on the river, instead of going to the bottom, as they so confidently predicted. “Truly,” they said, “these men have powerful medicine.”28

This scene is given to readers of the Narrative so that they may see both how the location of the scene and the area’s inhabitants differ from home, while those commanding the ship (and writing the narrative) were properly British. The explorer watching the natives is the readers’ gaze by proxy. In this sense, Livingstone capitalises on the feelings of sameness and remoteness to one’s home society, a narrative device common in travel literature of the period.29

Despite such successful impressions, the repeated failures of the steamboats led to widespread depression among the members of the expedition and to the questioning of their leader. During a particularly bad grounding of the Pioneer on 15 November 1861, the expedition remained nearly motionless for over a month in the Shire River. Journal entries almost cease during this period—there was little new to tell. Each day was spent trying to free the ship from the sands and dragging her a few more yards. By the end of this struggle, nerves were frayed and Kirk wrote of ‘The want of nautical

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27 'The narrative device describing ‘natives’ incapable of understanding western technology, is looked at through texts and images in Fabian, Out of Our Minds: 256-70.
28 Livingstone and Livingstone, Narrative of an Expedition 318.
knowledge of our commander’. On the same day the commander in question (Livingstone) recorded that ‘The ship is quite too deep and too long for exploration’.

In Baines’s images, views of the Ma Robert steaming gloriously up the Zambezi, fully in control and drawing the attention of the locals (Figure 4.7), are in marked contrast to those of her floundering in swamps (Figure 4.8). Elsewhere (Figure 4.9) the Ma Robert appears with steam up but stuck on a sand bar. A clearly flummoxed Livingstone, recently out of his deck chair behind, is shown barking orders from the roof of the cabin barely escaping entanglement in the sails and rigging. The Africans in the water push the Europeans and their boat to safety. In another pencil sketch (Figure 1.3) the Pearl rests aground, incongruously large in water far too shallow while her crew try to pry her out. It is not a majestic scene and implies the inadequacy of the river and possibly those who touted its virtues.

The boats were a part of the expedition and symbols of its success or failure. The explorers pinned their hopes on the ability to steam quickly through unhealthy swamps in order to unravel the mysteries beyond. They hoped to blaze a trail for merchant ships, developing a new area for trade and to uplift the local population from their benighted condition. In fact, the use of steam was not successful. The ships threatened the image of the British as commanders of modern technology, threatened the relations between the members of the Expedition and also threatened the performance of natural history and the careers of those who performed the work as will be seen in the next section.

**Natural History and Steam: Working on the Zambezi**

When the Pearl stopped in Freetown, Sierra Leone, before steaming on to the Cape, Kirk was anxious to begin collecting. In the vicinity of Sierra Leone he made some botanical and zoological collections, but despaired of not being able to do much collecting while under way, ‘In a steamer, there is little chance for the study of Natural History’. The speed of the Pearl prohibited the use of sampling nets and the unsteady and damp conditions limited his ability to work up botanical collections and dry them sufficiently. Barely one month into service, Kirk foreshadowed a problem that plagued

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32 This image is described as depicting ‘the victory of African nature over British technology’ in Carruthers and Arnold, *Life and Work of Thomas Baines*: 130.
Figure 4.8: *Ma Robert* aground in the Luabo

Figure 4.9: *Ma Robert* aground in the Zambezi
him throughout his time on the expedition—rapid modes of transport are often incompatible with scientific investigation.

On first arriving in the Zambezi delta, the Pearl initially followed the course of the West Luabo to its eventual disappearance in marshes. The Ma Robert had pushed ahead, seeking a channel and found none. The whole expedition was forced back to the ocean. For Kirk this was the farthest inland he had ever been in Africa and it offered a tantalizing glimpse of the interior and its flora. While understanding the need to keep the ships unstacked and pressing forward, the conflict between steamer pilot and naturalist began to be noted in his journal. On May 26th, the day of turning back, he wrote:

I often wish I could get onshore to different things but unless under great temptation, could not think of wasting time, which was precious; and Bedingfeld, who was in command, being no lover of science in any of its branches, it was not easy to go persuade him that there was much good to get by it.34

Later, when the Ma Robert ran out of coal, the situation changed and Kirk was immediately called upon to identify trees suitable for burning in the boiler. At such moments, natural history was secondary to the business of simply moving forward.

Some of the urgency was related to a distinct fear of the delta as an unhealthy locale, rife with malarious exhalations. Livingstone’s plan and his acceptance of steam technology was influenced by the potential for moving through the lowlands as quickly as possible. Earlier, when nearing the coast of Natal, the captain of the Pearl permitted a ten-minute stop to allow Baines to sketch an exceptionally beautiful landscape scene at the mouth of the St. John’s River.35 When on the Zambezi, however, haste mitigated against such opportunities.

Movement, though often thwarted by a shallow river, continued to take precedence over observation throughout the expedition. Upon seeing the Pandanus palm in fruit and flower on 16 September 1858, Kirk eagerly wanted to stop, but their schedule prevented it. For a botanist the fruit and flower are crucial for taxonomic purposes: passing these by was a great personal and professional loss. A few months later, the onset of the first rainy season found Kirk and Livingstone exploring the Shire River. Kirk records on 22 December 1858 that previously dry river banks were now lush with vegetation but other duties precluded a stop: ‘I wish I had the chance to

34 Ibid.: 31.
botanise, but this is regular transport work." These and many other potential specimens were no more than the fruits of Tantalus.

Charles Meller, who had arrived in February 1861 with high hopes of assisting Kirk in collecting specimens representative of the region, recognised the botanical opportunities afforded by the great onrush of vegetation with the start of the rainy season. Unfortunately his collecting activities were likewise thwarted. He later wrote to Joseph Hooker at Kew Gardens that ‘it was cruel to have to pass by such unlimited botany as teemed in Manganja land after being so long unable to move from the ship’.

The pace of moving the tons of cargo up and down the shallow Zambezi and Shire rivers prevented systematic botanical work. Steam could not be wasted idling by the riverside. Adapting to this pattern of movement, Kirk ‘botanised’ when the steamer had to stop for wood. His journals note many ‘walks’ taken while wood was collected and these became short collecting excursions. ‘Wooding’, as they called it, could take up to two days as the Kru sailors cut down trees and sawed them into boiler-sized pieces. Thus, the pace of botany was linked directly to the pace of the boat and indeed the efficiency of its engine. Whether or not these sites were the most suitable for botanical work was not a consideration—fuel was the paramount concern. On more than one occasion the natural scientists were stranded on shore when steam was got up and Livingstone steamed away. Then, Kirk or Meller were left to run along the bank to eventually rejoin the group. After four years of these types of experiences, Kirk confided in William Hooker that:

As far as I am concerned I may say that the expedition having turned out one offering very few opportunities for Botany and being simply heavy work transporting the gear from place to place I feel it rather a waste of time and shall probably soon find my way home.

Kirk remained fourteen months longer out of a sense of duty.

Things might have been different had a smaller boat been available for exclusive botanical work. Fourteen months into the expedition (26 May 1859), while at the coast waiting for a supply ship, Kirk pondered the necessities for proper botanical exploration:

I wish I had a boat to go work up the Mangroves, *Pandanus* etc. When under steam it is impossible to stop and gather. It

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37 7 January 1862, RBGK, Director's Correspondence, reel 60, #253.
38 15 March 1862, RBGK, Director's Correspondence, reel 60, #171.
could only be managed by a botanical skipper. Other people
don’t think a mud plant worth much.  

The clash between botany and the ‘civilising mission’ did not only arise from the
necessity of using steam to cover distance. The collectors believed there was a distinct
lack of understanding of purpose among the non-scientific members of the expedition.
In late May 1858 Kirk realised that the cabin of the Ma Robert was too damp for his
collections and the crew less than interested in his whole project. His dried plants were
going mouldy. Yet getting the importance of specimen preservation across to the rest
of the expedition was nearly impossible as the following example demonstrates.

On 13 June 1858, Kirk and Baines were both excited about the acquisition of a
unique fish purchased from a fisherman who had pulled along side the Ma Robert.
Locally named shywyesi, they revived the fish in a tub of water on deck and discovered it
to be capable of delivering powerful electric shocks. Baines sketched the fish and
produced a watercolour. Kirk attempted to preserve it. Unfortunately, the reality of life
on the little steamer hampered Kirk’s success at bringing this specimen home. While
Kirk remains silent on the event, Baines records the fate of the fish:

Dr. Kirk attempted to preserve the fish, but it soon went the
way of all specimens, which are generally called trash, stinking
things, lumber, &c. and thrown overboard at the first chance
so that we are almost getting tired of collecting.

Entries like this raise important questions about power and hierarchy within the
expedition. The Ma Robert was seventy-five feet long and eight feet in the beam,
displacing thirty tons. On board in 1858 were seven Europeans and twelve Kru sailors
who had been hired at Freetown, Sierra Leone. At any point in time there were a
number of locals on board acting as guides and informants. The overcrowding never
improved. In early 1862 Meller complained to Joseph Hooker that the Pioneer, a larger
ship, was, ‘overcrowded with men and cockroaches’ and they spent two thirds of their
time in piloting and navigation.

As a site for natural history, the steam ships proved to be a miserable space
where specimens rotted or were eaten by pests. Rain leaked into the preserving jars and

40 Ibid.: 39.
41 Almost certainly Malapurtus electricus.
43 For a general discussion of the Kru and their role as sailors see G.E. Brooks, The Kru Mariner in the
Nineteenth Century: A Historical Compendium (Newark, Delaware: 1972).
44 7 January 1862. RBGK, Director’s Correspondence, reel 60, #253.
diluted the spirit—resulting in rotted specimens. Extra boats were not made available for collecting activities. And while we know that unwatched specimens were cast overboard by the crew, nowhere do we have evidence that crewmen were punished for disposing of specimens without permission. It appears that the rhetoric which had been deployed to gather support for the expedition in Britain, emphasizing the potential knowledge gains in many areas of natural history, was not transformed into support in the field in terms of appropriate technology or time allocation.

It appears that the ‘civilising mission’ ideology so powerfully motivated Livingstone that activities not directly related to this purpose lacked support. He needed to find a place for a permanent station from which civilising activities would spread. Once the barrier of the Cahora Bassa rapids was realised the main task became to find a new region for their plans to introduce the cotton trade. This involved exploring the upper Shire, Lake Nyassa and the Rovuma River. The problem was that all of the equipment and stores they had could not be transported in one trip by the steamers they used. Therefore, immense amounts of time were spent moving equipment up and down the rivers while checking on caches left at Portuguese settlements, often with a senior member of the Expedition left to watch over them. When the UMCA arrived more time was lost in transport work and the failed attempt to move the *Lady Nyassa* to the lake was the given priority from early February 1862.

For those trying to achieve other goals and answer to experts back home, the lack of support for their collecting activities brought on professional crises. The patterns of movement that centred on fuel depots in combination with limited space on board, altered the ways in which natural history was performed. As the natural historians on board began to realise their jobs could not be performed properly, their letters and journal entries reflect the personal stress and feelings of inadequacy this situation generated. The naturalists did produce impressive collections, as will be seen in Chapter 6, and these are physical examples of their skill at overcoming obstacles from within the Expedition as well as the environment.

*Imaging Zambesia I: Photography*

Few of the artefacts brought back by the explorers held more widespread appeal than images. Pictures of the environment conveyed an immediate sense to viewers of the reality, as perceived by the explorers, of the Zambezi basin. Florid descriptions,
preserved flora and fauna, mineralogical specimens and sheaves of data held much more potential for study by natural historians, but images made on site held explanatory and decorative value—applicable for science and useful for popularizing science.45 In this section I will consider photography first, and then other images.

The Zambesi Expedition was the very first with government funding to take photographs in Africa—although this is an informal ‘first’ as there was neither an official position of photographer on the expedition nor did the government provide any of the equipment.46 Nevertheless, this was a novel experiment in deploying new technology in a distant, foreign field. Kirk and Charles Livingstone took photographs using their personal equipment.

Most of the photos taken by Charles Livingstone have been lost.47 Included in these were at least 40 stereoscopic photographs of the ‘natives in their various occupations and amusements’.48 The closest we may get to the lost photos are engravings that appear in an adaptation of Henry Rowley’s journal of his time with the UMCA mission to the Shire Highlands (February 1861-December 1853), and in the Narrative. Two portraits of children in Rowley’s journal are described in the list of illustrations as being ‘from a photograph’ though the photographer remains unidentified (Figures 4.10a-b). In the Narrative, Charles’s photographs are cited as contributing to some of the illustrations, though sadly they are not specifically attributed. From these, we may get some notion of how Charles’ portraits may have been posed and conclude that his heroic sufferings inside a stifling darkroom tent were not in vain. An engraving (Figure 4.11) from the Narrative bears similarity to Charles’s description: ‘One [photograph] shows how they carry their babies and their mode of hoeing’.49 Though there can be no certainty in attributing these images precisely. Charles’s letters to his wife reveal that he had produced images intended to demonstrate local industry (e.g., goldsmiths, corn grinding, house construction, agriculture) and a special interest in musical instruments.50 He also took landscape scenes. Two of these are possibly

45 Secord has discussed the role of images to draw non-scientists to appreciate scientific pursuits: Secord, “Botany on a Plate: Pleasure and the Power of Pictures in Promoting Early Nineteenth-Century Scientific Knowledge”.
46 Ryan makes the claim this was the ‘first’, but does not qualify this statement with the lack of official financial support. Ryan, Picturing Empire: 30.
47 Clendennen, “Charles Livingstone”: of which Chapter 8 examines photography.
49 C. Livingstone to his wife, 5 February 1859 cited in Ibid.: 253.
50 Ibid.: 260.
Figure 4.10a

Figure 4.10b

Females Hoeing.

Figure 4.11
misattributed to Kirk and may therefore be in the NLS collection of Kirk’s photographs. A much smaller set of unusual images are those the Expedition members made of hand-drawn maps in order to create reference copies for themselves before sending the originals home. These have not survived.

Kirk’s photographic interests began during his years at Edinburgh University (1848-54) and he maintained this hobby throughout his life. In the field, Kirk used a variation of the calotype process called the wax-paper process in preference to the collodion photography. In 1858, Kirk had had nearly a decade of experience in photography and was confident with his skills. He thought the ‘wet process’, by which he meant wet collodion, too complicated for field applications. Recording Charles Livingstone’s first failed attempt at wet collodion photography in the field, Kirk wrote ‘I certainly believe, as I said in London, that the paper process is the only one which at present is worth taking on an expedition such as this.’ Kirk’s general opinion of Charles and his cumbersome equipment was further damaged when on their first journey to Lake Nyassa it was realised that Charles had left behind some of the necessary chemicals, requiring them to transport the rest of the ‘useless apparatus’ for weeks over rough terrain to no purpose. Kirk wrote to his brother ‘A photographer without his nitrate (in the present state of the art) might as well have remained—so we have neither photographs nor sketches.

Though Kirk held strong opinions on the subject of which processes were appropriate for fieldwork, he experimented with a newly-available and more convenient process: dry collodion plates pre-sensitised in Britain and sealed in a lightproof sleeve. Whilst they provided excellent definition, dry collodion plates had the disadvantage of

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51 I make this claim as the dates and descriptions of the photographs given in Clendennen very closely match those in the NLS Ace 9942/40-41, specifically images 17 and 24.
52 This use is not mentioned anywhere in their instructions and so appears to be a contingent invention. The practice is only mentioned by Thornton on 12 July 1863. See Tabler, ed., Papers of Richard Thornton 253.
53 Coupland, Kirk on the Zambesi: 54.
54 Further research may uncover that Kirk learned his photography, especially the wax-paper variant of calotype from Thomas Keith (1827-1895), who was resident at the Old Edinburgh Infirmary until 1853 when Kirk began working there. See J. Hannavy, Thomas Keith’s Scotland: The Work of a Victorian Amateur Photographer 1852-57 (Edinburgh: 1981): 2.
55 8 July 1858, Foskett, ed., Zambezi Journal of Dr. John Kirk: 50. Pace Clendennen, his thesis misinterprets this comment by not noting the difference between calotype and collodion photography nor realising that Kirk used calotype preferentially. See, Clendennen, “Charles Livingstone”: 249.
57 Baines had remained at Tete to oversee the stores, and intending to travel light they brought only the camera for collecting images. Ibid.: 535.
requiring a longer exposure than wet plates—again favouring inanimate subjects. In sum Kirk favoured photographic processes for fieldwork that required exposures of many minutes, whereas wet collodion, used by Charles Livingstone required a few seconds but was extremely complicated.58

Kirk continually experimented with the wax-paper calotype process while in the field. He substituted the clear water of the Zambesi for distilled water with perfect success.59 Kirk had strong disdain for acetic acid, a chemical he found to be ‘a nuisance and unhealthy’, and thus he endeavoured to find a substitute acid that would ‘facilitate the paper process.’60 Citric acid was found to be a good replacement, ‘especially for travellers’.61 These experiments were partly necessitated by dwindling supplies but were also partly an attempt to make field photography easier—hence his experiments with dry collodion plates and general avoidance of the wet collodion process in the field.

In 1864 the Royal Geographical Society revised and republished its ‘Hints to Travellers’.62 Notably, a section on field photography was added and Kirk’s experience on the Zambesi was published in the form of a letter.63 His thoughts on photography we find in his personal journals were summarised succinctly for the public:

‘Photography is little suited for distant and wild countries, yet where it can be employed is of the greatest service.’64 In these suggestions he reconfirmed his use of the wax-paper calotype process in the field for reasons of simplicity, easy storage of paper negatives and the all-important absence of noxious chemicals. His experiments with dry collodion plates led him to predict that they will eventually ‘supersede’ all other processes with further progress.

Kirk’s images have generated a great deal of discussion among historians. Researchers have noted that the extant photos contain no humans. Ryan recently concluded that Kirk ‘does not seem to have been interested in making photographs of

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58 Contemporary descriptions of all these processes may be found in J. Towler, The Silver Sunbeam: A Practical and Theoretical Textbook (New York: 1864). For the waxed paper process in particular see Hannavy, Thomas Keith’s Scotland: Appendix I.
60 15 July 1859, Ibid.: 218.
61 28 July 1859, Ibid.: 223.
64 Ibid.: 291.
Figure 4.12: Baobab Tree near Shupanga, by Kirk.

Figure 4.13: Fig tree and canoes under construction, by Kirk.
the indigenous inhabitants’. Instead, they record landscapes or botanical scenes such as a baobab tree (*Kigelia Africana*) (Figure 4.12). Local industry is depicted in the momentarily abandoned site of a canoe-builder’s workshop (Figure 4.13). The image of the *Ma Robert* at the Lupata gorge is also eerily devoid of humans (Figure 4.2). Only an image of the Mary Livingstone’s lonely grave at Sena possesses a personal, sentimental quality (Figure 4.14). It is tempting to conclude that this focus was intentional and that it reveals much about the photographer, his perception of this new medium and of his surrounding environment.

Here we need to be cautious. As discussed above, photographs *were* successfully taken with human subjects by Charles Livingstone. It must be remembered, as shown here, that Kirk preferred processes that required long exposures. Animate subjects would have blurred and avoiding this result necessitated removing people from his camera’s gaze. This does not indicate that his image of Africa did not include Africans or he was not interested in ethnography. Because of his stated technical preferences, Kirk tried to control nature as much as possible in order to capture its likeness. He knew that this control could not extend to human subjects. This link between process, exposure times and subject is reiterated in the ‘Hints for Travellers’ in a article following

Figure 4.14: Mary Livingstone’s grave at Sena

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65 Ryan, *Picturing Empire*. 41.
Kirk’s: ‘[The wet process] is always employed for portraits…requiring only a few seconds’ exposure in the camera’, while with dry collodion ‘The only price we pay for this advantage is the necessity for a little longer exposure in the camera; which, for landscapes, is of no moment at all’. 66 Had Kirk been willing to undertake the wet collodion process he might have found exposure times conducive to portraiture, but he did not. Kirk’s Africa is empty by necessity, not by design.

Kirk’s purposes must also be kept in mind when interpreting his work. Where Ryan finds Kirk’s photograph (Figure 4.15) of vegetation near Lupata gorge a depiction of ‘the visual iconography of darkest Africa’ dominating Victorian thought about the continent, I suggest a more mundane analysis. 67 Kirk intended the image for botanical representation, with the composition as a whole not as issue. His journal records the exact event: ‘[I] took photographs of vegetation with the curiously fleshy twinners which their stems like huge serpents twist up the trees and form circles on the grounds’. 68 Kirk saw that botanical photography could provide an accurate depiction of plants in situ and

Figure 4.15: ‘curious fleshy twinners’, by Kirk

67 Ryan, Picturing Empire: 38.
68 It is notable that Ryan does not cite Kirk’s journal at all in his text. 13 July 1859, Foskett, ed., Zambesi Journal of Dr. John Kirk: 216.
thereby complement preserved specimens and field notes. Other images of large trees perform the same task, they are intended as botanical illustration. In these cases, Kirk used photography as another preservation technique, like drying paper and jars of spirit

**Imaging Zambesia II: Thomas Baines**

Thomas Baines’s work has been the subject of some attention by art historians, particularly in South Africa.⁶⁹ His enduring fame there has, however, not been matched in the UK until recently.⁷⁰ Baines produced a vast number of oils, watercolours, and sketches depicting an eclectic mix of landscapes, natural history illustrations, portraiture, and action scenes.⁷¹ As a professional artist, Baines knew his job well and began recording images immediately. He captured the assembly of the *Ma Robert* in the delta, as it happened, in pencil sketches. Considering these images in conjunction with the accounts in Livingstone’s journal one gets a sense of group self-satisfaction as British discipline and ingenuity come together successfully in the most remote of places. Many images of the *Ma Robert* steaming majestically up the Zambezi were produced. Such images are more than action photos; they are iconic. For an expedition that was many places at once these images falsely provided a symbol that could be identified as ‘the expedition’. The *Ma Robert* was a small outpost of the British Isles that had sailed into the Zambezi. Baines’s images and Kirk’s photographs reinforce this view. The launch appears small but sturdy in a vast foreign landscape.

Baines’s method was to capture a scene quickly in sketch or watercolour and take detailed notes about activities. Later, these ‘studies’ could become larger oils. Because Baines was interested in recording events, his notes offer more ethnographic detail than the other explorers. He also sought to record the activities of the expedition itself. We can thus gain some insight into his image of the expedition in the field. In a pencil sketch done on 25 May 1858, Baines shows the *Ma Robert* performing as planned, with channel-mapping activities ongoing while the Union Jack flies from the mast

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⁶⁹ Recent examples include: Stevenson, Thomas Baines; Carruthers and Arnold, *Life and Work of Thomas Baines*; Tabler, Axelson, and Katz, eds., *Baines on the Zambezi*.

⁷⁰ Some historians attribute this to the fact that Baines’s reputation was tarnished in the UK by Livingstone’s accusations of theft and the consequent dismissal of Baines in late 1859. Despite numerous protestations, Baines never received a formal hearing of the charges against him. The Cape Town public tended not to agree with the dismissal, made clear by a series of editorials in the South African Advertiser and Mail. Wallis, *Thomas Baines*: 181; Tabler, Axelson, and Katz, eds., *Baines on the Zambezi* 227-36 and appendix. and a recent revisionist analysis Clendennen, ed., *David Livingstone’s Shire Journal, 1861-1864*: Appendix IV.

⁷¹ Carruthers and Arnold, *Life and Work of Thomas Baines*: 47.
(Figure 4.16). The image reflects his journal entry from the same day that they had 'great hope' that they would soon enter the main stream of the Zambesi.\textsuperscript{72} This actually took ten days longer with a few setbacks.

Other images of the expedition locate the explorers in a giant, menacing landscape that is tamed by organisation and technology. The explorers, when portrayed, are almost always at work. There are only a few images of them engaged in leisure activities, when they are resting after a hard day’s walk along the banks of the Cahora Bassa rapids. Even in these, not everyone is resting, as some hunch over their instruments. When at work, the explorers deploy technology, normally appearing as the \textit{Ma Robert}, sextants, sketch pads, a camera or simply boxes of equipment. Baines’s ‘portraits’ of the expedition’s members depict what they do to show who they are.

![Figure: 4.16: Surveying the West Luabo](image)

In a watercolour from the delta, Baines places himself, with sketchpad, in the frame, walking past and examining the aerial roots of an overpowering mangrove at low tide (Figure 4.17). This is exploration and botanical assessment in action. His caption notes ‘the long drops are the seeds of the mangrove, which pierce the soft mud when

\textsuperscript{72} 25 May 1858. Tabler, Axelton, and Katz, eds., \textit{Baines on the Zambezí}: 91.
they fall.73 In an oil he produced of a Pandanus palm, Baines places himself in the frame sketching while Kirk cuts at a tree for specimens and a local guide stands in for scale (Figure 4.18). The image demonstrates the remarkable Pandanus support roots and the Convolvulus vines that almost engulf the tree. On the day the image was first recorded, Baines recalls that they were struck with the beauty of the species:

Dr. Kirk and I forced our way through reeds, grass, matted jungle, mud and the intertwining stems and roots of the mangrove and hibiscus to find our way to the most picturesque we could pick out.74

The image reflects his impressions, the humans appearing small in a tropical scene of abundant vegetation. They are crawling over and under the vegetation while ominously dark areas leave open a question as to what may lay beyond. Their control of their immediate surroundings rests upon their technologies: Baines’s sketchbook and Kirk’s hatchet. The implication is that by learning about the wilderness it is controlled. The cut tree will be a specimen soon and eventually identified, catalogued, transported and stored at Kew Gardens. The image reflects in one event the explorers’ continual efforts to establish small loci of control in a wider wilderness. The series of paintings of the expedition’s disappointing visit to the Cahora Bassa rapids in November and December of 1858 lend a similar feeling—tiny human figures deploying the instruments of survey as they move through a vast landscape (Figures 4.19a-b).

Baines’s paintings of the people of the region reflect the panoptic gaze stipulated by his instructions. From 11 July to 6 September 1859 he was the only expedition member at Tete and during this time he directed his brushes and pencils at daily life in the region. Having heard from Thornton about a local sugar mill he went to investigate sugar production methods. He later published an article about the mill in The Cape Monthly Magazine.75 A watercolour of the mill and those who work around it is instructive, but is also a studied fabrication (Figure 4.20). Instead of showing a ‘snapshot’ of village life, the image displays all the processes of sugar manufacture at once: harvesting, stripping and grinding the cane, boiling the sap down to crystals and

73 It may be significant that Baines is alone in this image, dated 22 November 1859. At this point Livingstone had already accused him of theft and relieved him of duty. He was waiting to be sent home. This image may partly be Baines showing us his skills and achievements as an explorer.
making *panellas* (storage pots). The images take us through the process from the foreground left, meandering into the middle distance—note the stockade fencing cast aside in revelation—and then firmly into the foremost right where the finished product lies. Another oil of the same village displays the sugar production in greater detail though again showing the stages of the process in a diagonal line from back left to front right: stripping, grinding, boiling. Finally, under the gaze of a well-dressed overseer, the valuable crystals are broken up (Figure 4.21). They are at once works of ethnography and economic botany where Baines has presented the process occurring in discrete stages.

Similar compound constructions occur in a watercolour of women grinding millet, where multiple stages of the process happen at once before our eyes in a crowded village scene (Figure 4.22). Baines offers himself as a compound eye, bringing together separate but linked processes so that the viewer might understand the whole process while also seeing how the village appeared. This is his power as an explorer, reflecting in imagery the same conflations of African life that we find in travel narratives, bringing years of experiences together into a small space for the metropolitan reader and viewer. As part of the travel narrative such images reinforce a text that many owners of such books may not have read.76 Baines reflects the desires of the intended viewer and is in concert with Victorian perceptions of Africans. He depicts the closeness of the locals to nature and reveals the ‘simple’ technology which facilitates this.77

His portraits of locals tell a different tale. Ostensibly ethnographic, it has been noted that his gaze is not only that of an observer motivated by Victorian racial thinking.78 Baines can allow Africans to be individuals, deserving portraits that impart personality, identity and respect to the subject. His portrait of Shibante, a skilled Chikunda boat pilot, evokes just this feeling (Figure 4.23). Shibante is depicted as possessing knowledge and pride while leisurely playing the *mbira*.79 A mooring leads

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76 ‘Dr L.’s books have a wonderful sale—the pictures did it—but I have never met with anyone who had read the book through’ G. Thornton to R. Thornton, 3 May 1861, Quoted in M. Boucher, ed., *Livingstone Letters 1843–1872: David Livingstone Correspondence in the Brethren’s Library* (Johannesburg: 1985) 55.


79 A type of thumb piano.
away to the unseen boat he commands. Baines captured the status and pride of a Chikunda male effectively.80

Baines also did portraits of many Portuguese settlers, though none appear to have survived since they were given to the subjects in gratitude for their assistance. The scenes of Roman Catholic Easter services in Tete or a gala wedding somewhat undermine the ‘wilderness’ status of the region (Figures 24a-b). It appears incongruous to find altar boys in cassocks and men sporting top hats in Livingstone’s ‘darkest Africa’. The impression of juxtaposition may have more to do with stereotypes of Africa that have increased in power since the 1860s and would not have struck the Victorian viewer as strange.81 Baines’s work cuts across Zambesian society and shows the variety of lifestyles that existed in a cosmopolitan region.

80 Shibante, of whom we know little almost certainly identified himself as a Chikunda, or slave member of a prazo’s militia. Chikunda were famed for their skills as watermen. See Isaacman and Isaacman, Slavery and Beyond.

Figure 4.18: Pandanus Palm
Figure 4.19a: Shibadda Rapids, Cahora Bassa

Figure 4.19b: Mt. Stephanie, Cahora Bassa
Figure 4.22: Women grinding millet

Figure 4.23: Shibante the pilot
Figure 4.24a: Easter Services, Tete 1859

Figure 4.24b: Wedding Party, Tete 1859
Reaching Across Technological Divides

A powerful image by Baines reveals the efforts made, early in the expedition, to gain the trust of locals. Dated 25 May 1858, the watercolour painting is captioned, ‘Tom Jumbo, the head Krooman of the Ma Robert inviting natives to come on board’ (Figure 4.25). Baines, Kirk and Livingstone record this event—they were desirous to obtain assistance in finding their way, but the locals were afraid to approach the ship in their canoes. Baines records:

We sent Tom Jumbo (in his canoe, which being only slightly different from their own was less calculated to alarm them) to open a friendly communication….Tom among other signs stripped his arms to show them he was black like themselves.82

Jumbo was the head of the team of a dozen Kru sailors engaged at Freetown, Sierra Leone to work as the crew for the Ma Robert.83 Baines shows him in front of an unfinished landscape gesturing to his skin; an act reflected by the local. Jumbo’s uniform sets him apart from the locals who appear to be assessing him. The impression made by the Ma Robert, just out of the frame here but certainly under steam, was obvious to the explorers. The fact that they were a floating spectacle hindered their ability to operate. Baines shows us their attempt to reach out across a technological gap and emphasise the unity of all Africans to each other, equating like with like, even if they cannot communicate with each other. The Europeans are trying to say, through an African proxy, ‘Our tools make us different, but we are the same’. Jumbo uses both his canoe and his body for this purpose and is successful. If he, a black man also, can be a part of the European group safely then so can they. Eventually the canoe men did come alongside the steamer, try some soup, and then led the expedition through the circuitous channels of the delta albeit to an eventual dead end. This mitigated victory in race relations was a noted first success in their ‘civilising mission’. Later, locals were convinced to board the Ma Robert and learn more of the British lifestyle:


83 The practice of Kru taking employment on sailing vessels dates to the late eighteenth century and continues throughout the nineteenth. They originate from coastal Liberia and western Côte d’Ivoire though roughly 500-1000 (mainly male job-seekers) lived in Freetown around 1858. Brooks, The Kru Mariner: 9-13.
Figure 4.25: ‘Tom Jumbo, the head Krooman of the *Ma Robert* importing natives to come on board. Noon, May 25 1859’
The natives whom we have had on board as sort of guides, have become wonderfully civilised. They make themselves generally useful in the boat and give us the names of places.  

On 19 June, Baines also records that locals came on board regularly and provided assistance and information while receiving food and medical treatment.

The technological divide between the Europeans, the Kru and the locals was further bridged through an odd event, recorded in Kirk’s journal on 30 June 1858, while the expedition was setting itself up on Expedition Island. Many of the boxes of equipment had been opened for the first time only a few days previously. Since entering the Zambezi, they had encountered a few electric eels for sale by fishermen. The novelty of these eels and indeed electricity itself underscores these events:

The Doctor gets out his galvanic magnetic machine and gives a shock to the natives…On feeling it one of them at once said, “Oh stumpyss?” (the name of the electric fish). They all recognized it as the same thing and gave the machine that name. They mentioned that it was found up at Senna and was very disagreeable when one touched them among the mud.

Kirk was impressed with the local’s instantaneous reaction and naming of the machine. On one level, he emphasised African simplicity in naming the machine after a fish; demonstrating their closer relationship to the natural world in contrast to British familiarity with the technical world. At another, Kirk was deeply interested that human-made electricity was novel for the locals, but the similarity to the fish was instantly apprehended. The locals realized they recognized ‘electricity’ (albeit on their own terms) and offered what they knew about this sensation in the way they were familiar with it. The galvanic machine is, in this sense, not producing a novel experience at all.

No one else records this event and the galvanic battery appears just this once in the expedition’s extant papers. The device appears to be Livingstone’s personal property; he was interested in galvanic batteries. While a student at Anderson’s College near Glasgow, studying under Thomas Graham and James Young, Livingstone and Lyon Playfair built a battery on their own. What exactly the battery on the expedition was used for is unknown. It is not recognizable in the equipment lists. Like Livingstone’s magic lantern, the battery may have been intended solely for display, an

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86 Kirk often uses ‘the Doctor’ to refer to David Livingstone. Secord, “Botany on a Plate: Pleasure and the Power of Pictures in Promoting Early Nineteenth-Century Scientific Knowledge.”
87 Playfair went on to be Professor of Chemistry at the University of Edinburgh (1858-69) before turning to politics: Ross, David Livingstone: Mission and Empire: 14.
example of technological mastery deployed as a spectacle, as he was doing on the boat
the first time he unpacked the device (Figure 4.26).88

In early 1859 the Ma Robert was twice taken up the Shire River in January and
again in March. Livingstone recorded that crowds gazed upon the steamer, ‘with
evident wonder’ from the banks.89 As they proceeded up river, frequent stops were
made for wood and to exchange gifts with the local leaders. As part of these
negotiations, a chief would be invited to board the steamer and shown around. This
was clearly a bold move that evoked much discussion among advisors to the chiefs.
The purpose of inviting leaders on board was twofold. First, they wanted to impress
them with their skills. Second, they wanted to normalise the experience. If the steamer
continued to invoke fear, their purpose of opening trade would be thwarted.

The first encounter with the Manganja of the Shire valley was not a total success
in this second aim. Kirk feared that the steamer was being blamed for a drought and
consequent crop failure.90 The explorers attempted to allay such concerns by
emphasising their interest in cotton and other trade goods, distributing presents and
exhibiting their steamer. On the second journey upstream the attempts to placate the
locals appear to have paid off, although Kirk recorded a curious reaction from the
locals:

[We] showed [the headmen] the steamer but if there is trade
going on or anyone getting a present, in fact as long as the
idea of Manchester [cotton trade] is in any way before their
minds, any other idea vanishes and they have neither
astonishment nor curiosity. They receive a piece of cloth as a
child would a toy, holding out their hands long before it is
ready to give them.91

The steamer lost the impact Kirk thought it should have when lucrative trade
was at hand and he finds the loss of astonishment to be a sign of childishness rather
than the normalisation of the steam launch in local perception. Livingstone insisted on
trading at every stop in the belief that this would teach the local population about the
value of their commodities and that the ‘English’ were interested in these things. A
watercolour by Baines provides an example of how these scenes may have looked
(Figure 4.27). This crucial first step in the civilising mission ideology was taken very
seriously, though here Kirk’s expectation of local awe went unfulfilled when trade was

88 The magic lantern is now on display at the David Livingstone Centre, Blantyre, Scotland.
91 26 March 1859, Ibid.: 165.
Figure 4.26: Livingstone’s Magic Lantern, with packing crate
Figure 4.27: Trading from the *Ma Robert*
the important part of an encounter.

**Conclusion**

Technology has been highlighted in this chapter in order to emphasize its contributions to scientific practice and ‘the ideology of western dominance’. As a group, the expedition rallied around cultural icons like the steam ships, basing the success of their project partly upon their mastery of this technology. When the ships failed to perform, for whatever reason, it was a technical and psychological crisis. Their self-identity was also connected to their abilities to observe, record, measure, and analyse aspects of the Zambesian environment and its inhabitants. Baines’s abilities to paint and Thornton’s knowledge of geological stratigraphy, for example, were taken together as proof that the British explorers better understood the environment than its inhabitants.

Using particular forms of technology placed restrictions upon the explorers as well. In Britain they committed themselves to transporting large pieces of equipment far into the interior: an iron house, a sugar mill, cotton gins, photographic equipment and reagents, scientific instruments, guns and ammunition. These were the physical manifestations of the civilising mission ideology and were supposed to serve as the seeds of a new economy. Moving them around was troublesome and frustrating. Many of these larger items were in time either sold to the Portuguese settlers or were lost to the river in accidents. Attempting to move the *Lady Nyassa* to the lake was such a large project that this eventually overshadowed all other activities in the final years of the Expedition.

This chapter has highlighted those situations where the interests of the explorers were revealed through their use of technology or their thoughts about technology. They approached their observation of the region with ideas and methods that were, in part, based upon the technology they employed to do their work. The use of instruments, steam ships and imaging technology influenced the scientific practices they employed.

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92 Adas, *Machines as the Measure of Men*.
93 Packing lists are found in NLS Mf. MSS. 293 Acc 7152 ‘Storekeeper’s Notebook: the Zambesi Expedition 1858-59; also invoices for equipment purchased are held in MSS 120, Box 1,1858, RNML.
94 For example, parts of the sugar mill fell overboard on 18 August 1858, Wallis, ed., *The Zambezí Expedition of David Livingstone, 1858-1863*: 35. A copy of the plans for this mill are held at the David Livingstone Centre, Blantyre “Sugar Mill and Boiling Pan (to be worked by animals) made by Mirrless and Tait, Glasgow in 1858”.

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In Kirk’s photography we see that his ideas about what kinds of technology were appropriate for fieldwork influenced the images he returned. Baines compressed time and space into single images that were both decorative and instructive.

It has also been shown that by bringing the steamers into the rivers a new space was introduced. ‘On board’ the *Ma Robert or Pioneer* was clearly a British space and the explorers were ‘at home’. Moving along the river they invited members of Zambesian communities to enter this new space and marvel at the differences. Chiefs and others were rightly hesitant, trying to foresee what new forms of power were implied in this new space and what this would mean to relationships on their own society. If they were chiefs on shore, would they still be chiefs on board?

The next chapter continues in this consideration of fieldwork. This necessarily includes a discussion of technology not only because it was always being employed in the form of tools and methods, but also because we could conceive of the entire Expedition as a technology. With the risk of being overly reductive, it is possible to step back and perceive that the Expedition was a kind of tool, constructed and used by the Victorian community to observe a region and effect change. As seen in the previous chapter this construction incorporated a range of interests and the tools they used in the field reflect these. As we continue to look at fieldwork it will be important to recall that the explorers identified themselves through the work they did and the tools they used. The struggles over representation and credibility detailed in the next chapter reflect this embodiment of the materials and methods of scientific practice.
Chapter 5: Fieldwork as Practice: Informants, Collection and Moving Knowledge

Introduction

In discussing the geography of knowledge during the early modern period, Steven Harris sets out a theme that I borrow for this chapter: ‘How science travels has as much to do with the problem of travel in the making of science as it does with the problem of making science travel’.

Prompted by his heuristic, the collecting activities of the Zambesi Expedition will be investigated along with travel and the performance of science. This theme was partially developed in the previous chapter, where the technical aspects of field collection were considered; here the focus will be upon the social.

Focusing on specimens and investigating how they move between groups provides insight, I suggest, into how we may place expeditions within the Victorian scientific endeavour. In Harris’s paper, the long-distance corporations he examined became the site of knowledge generation, with the ‘acquisition, transport, and concentration’ of knowledge as the modes through which this composite site is to be understood. ‘Situated knowledge and its means of acquisition in the context of corporations allows knowledge production to be viewed both as ‘local’ and ‘distributed’ without privileging the former over the latter or, more generally, the micro over the macro.’

The networks of naturalists analysed here were not part of one institution that could be equated with Harris’s corporations. Rather, the Zambesi Expedition in conjunction with other institutions forms the ‘site’ of knowledge generation to be considered. My concern to follow information across scientific communities entails the description of numerous spaces where knowledge was acquired, produced, received and published. These ‘spaces of production’ and ‘spaces of consumption’ and the particular modes of discourse that are internal to those spaces have been analysed by authors interested in the geographical dimensions of science making and reception, often

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1 Harris, “Long-Distance Corporations”, 271.
2 I use ‘performance’ to specifically refer to the work of Andrew Pickering, whose theories I have introduced and discussed elsewhere in the thesis.
3 Harris, “Long-Distance Corporations”, 298-99.
working within a social constructivist outlook. David N. Livingstone’s ideas of ‘spaces of expedition’ and ‘spaces of circulation’ are particularly relevant here and lead us to consider the ‘diverse places where science is made’. Here, the emphasis is on how these diverse spaces are linked through the movement of specimens and people across the globe.

The space of the expedition is the arena where field work takes place. Jane Camerini, in her study of early Victorian scientific fieldworkers concluded that ‘relationships pervade the practice of fieldwork,’ arguing that these relationships served to provide the logistical and epistemic foundations for collecting activities. Local knowledge in the form of specimens or information had to be transferred to sites where they were authoritatively analysed in order to become more widely accessible. This work of transference, mobilising teams of collectors and porters, successfully preserving specimens, locating packing materials and finding secure transportation out of the field, was, and remains, a complicated affair involving many people. The equivocal contribution of steam navigation to these activities was considered in the previous chapter.

Sites where scientific analysis is performed, often termed ‘centres of calculation’ after the work of Bruno Latour, are those social and epistemic spaces where local knowledge is assembled, recorded and unified into universal knowledge through the use of theories and methods recognized as valid by the wider scientific community. The institutions are themselves locations where the heterogeneous nature of science was played out on a day-to-day basis in the varied work of preserving, identifying, cataloguing, displaying and viewing specimens. Specimens could act as boundary

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4 Golinski, Making Natural Knowledge; Shapin, “Placing the View from Nowhere.”; Smith and Agar, “Making Space for Science.”
objects in these situations, remaining identifiable to all the groups, but employed to fill different requirements by each.9

It has been argued that the combined analytical work performed at centres of calculation cannot be done singly, but requires the work of a community as ‘Universality, objectivity, and accumulation are not characteristics of technoscientific knowledge itself, rather they are effects produced by the collective work of the technoscientific community.’10 Indeed, the Victorian scientific community was very interested in producing universal knowledge about Africa through expeditions.11 This empirical transformation from local knowledge to the universal ‘view from nowhere’ has come under increased investigation in STS. The concept of travel between scientific sites—the travel of facts, standards, techniques and materials—has been marked as an important area for study as some scholars move away from focusing on specific locales to analyses of more widely distributed scientific activity.12

In discussing this ‘spatial turn’ in the history of science, Livingstone has noted that where scientific practices are spatially distributed the issues of credibility and expertise, and the institutions that maintain them, become critically important to our understanding of how such practices are sustained.13 For example, unlike the seventeenth century natural philosophers invited to observe Robert Boyle’s air-pump demonstrations, few natural historians in the nineteenth century had the opportunity to directly observe tropical specimens in situ.14 Verifying the credibility of the collector as a reporter remained for Victorian naturalists a critical, if continually problematic, aspect of scientific analyses of the far-flung regions of the world.

Withers has described a set of general issues concerning travel and trust in the reporting of distant nature to metropolitan communities. In particular he is concerned with the criteria in use at any particular place and time to establish trust in others’ knowledge claims. He suggests that making knowledge public, making it acceptable, and making it reliable has to do with the nature of social relationships between like people in

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11 Driver, Geography Militant.
13 Livingstone, “The Spaces of Knowledge”.
different places and different people in the same place. Additionally, he proposes that
the degree to which knowledge is considered credible may be influenced by what one is
prepared to know and to accept as a fact at the time. This is a crucial point for how
we approach the knowledge produced by members of the Expedition and how is was
accepted in the metropolitan scientific communities. The various methods they
employed in consciously or unconsciously dealing with these issues will be discussed
here. With these ideas of travel and credibility in mind, this chapter approaches the
scientific work of the Zambesi Expedition by examining the practices that connect the
field and museum, the informant, the collector and the analyst. In this way, our general
understanding of Victorian science may be tested against the specific case of this
expedition and the unfolding practices of scientific collection.

This chapter will first examine the role of local informants and assistants in
collecting activities. Often written out or underplayed in the historical narrative,
assistants and informants were ubiquitous in the field, either carrying out the actual act
of collection or providing useful information. I would like to highlight their efforts here
and explore their contributions to the scientific work of the Expedition. In doing so, I
will challenge some aspects of postcolonial literary critiques of travel narratives and the
position of local knowledge in British science. Second, I will use a series of case studies
of particular collections to further examine these practices. The chapter will conclude
with a detailed mapping of the trajectory of a collection of molluscs to demonstrate how
information or specimens were transferred home and eventually published. The
molluscs serve as a model case for the large variety of collection types made on the
Expedition.

**Informants and Assistants: Local Contributors to a Foreign Project.**

Imperial historiography largely wrote out the role of local assistants and
informants in the hagiographies of the great ‘African’ explorers. In these texts,
anonymous African locals appear in passing as faithful followers, threatening enemies or
‘benighted’ souls in need of European assistance. Such representations served to justify
the colonial manifestation of the civilising mission ideology. An attempt to discern the
identity of these obscured figures in the history of the European exploration of Africa

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was made by Simpson in a study titled *Dark Companions*.\(^{16}\) In Simpson’s book, these ‘companions’ are named, their contributions detailed and their later careers investigated. He used explorer’s texts as mines for data, but did not take an extra step and critically analyse these representations. In the specific case of the Zambesi Expedition, Clendennen has provided lists of the lower ranking Europeans and Africans who worked with the Expedition.\(^{17}\) Unfortunately, lists of names do little to inform us about the intricate relationships between the people concerned as they worked together and contributed to the Expedition’s success.

In order to draw a clearer picture of these assistants’ contributions to fieldwork, I will echo the issues raised by Steven Shapin in his study of technicians in Robert Boyle’s seventeenth-century laboratory, where he (Shapin) set a twofold task: to make technicians’ work visible and to understand why they were nearly invisible in the first place.\(^ {18}\) Informants and assistants to Victorian explorers are here assumed to occupy a social position similar to those Early Modern laboratory technicians in terms of their obscurity in the scientific records. Shapin set his tasks to answer three problems he found in the historiography of technicians: their traditional exclusion from histories and sociologies of science; their invisibility in the formal documentary records produced by scientific practitioners; and the perception by persons in control of scientific workspaces that technicians’ work was irrelevant to the final knowledge ‘product’.\(^ {19}\)

Camerini has found that ‘Questions about the epistemic role of local expertise and servants, and how skills learned through relationships were incorporated into scientific discourse, await further study’.\(^ {20}\) An excellent response to this challenge is recent work by Kapil Raj, who has looked at the close collaboration between local assistants and the British officials in the great land surveys of the Indian subcontinent in the late eighteenth and nineteenth centuries. Raj found that properly-trained human travellers became instruments, measuring the landscape with their own bodies where

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\(^{18}\) Shapin, *A Social History of Truth* 360.

\(^{19}\) Ibid.

\(^{20}\) Camerini, “Remains of the Day: Early Victorians in the Field”.

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British bodies could not tread. As we will see below, the metaphor of instrument is important here: explorers, when they could not do the work themselves, used locals as instruments of observation similarly to the way that the metropolitan geographical community used explorers to view Africa from a distance.

Leading members of the Zambesi Expedition utilised assistants and informants of two general types: those brought with the expedition and those employed in the field. The former category includes men of British origin and a dozen Kru sailors from Freetown, Sierra Leone. We know little beyond the names and wages of most of these assistants. The ‘blue jackets’, a synecdoche for the sailors seconded from the Admiralty to crew the steamers, appear to have contributed little beyond their labour as stokers, cooks and ‘able seamen’. The Kru sailors, following a long tradition of Krus serving in the British Navy, formed part of steamers’ complement—often set ashore to the endless task of cutting firewood for the steamers’ hungry boilers. They also unwittingly provided data for epidemiological studies of innate and acquired immunity to the ‘Zambezi Fever’ as Africans, but not ‘local’, Zambesian Africans.

The category of ‘local’ assistants and informants incorporated the various characters living along the Zambezi River and its tributaries, as well as the Comoros Islands, specifically Anjouan. On the river, many flavours of ‘local’ were identified and a person’s origin contributed to the explorers’ recognition of them. One’s status as Arabian, Portuguese, Goanese, Landeen (Ngoni-Zulu), Makololo, Manganja, Chewa, Ajawa (Yao), colono, slave, multi-racial, born along the river or in the highlands above, figured distinctly and critically into how one was recognised by the British explorers. Portuguese settlers were further divided into two types: immigrant or locally-born. The former held the highest status as authoritative reporters in the eyes of the Britons while Mozambican-born Portuguese were often described as possessing decreased physical, mental, and moral strength. Nevertheless, a locally-born Portuguese, if literate, was potentially a more credible informant than any African. Similarly, the more ‘Portuguese’ a local appeared to the explorers the more potential credibility they possessed.

22 For a discussion of the discourse with the RGS concerning reports from Africa seeBarnett, “Impure and Worldly Geography”.
25 This occurs in Kirk’s journals especially. Foskett, ed., Zambezi Journal of Dr. John Kirk: 207,443, 47.
phenotype mattered. The knowledge of Portuguese language was also an important characteristic. Withers, in his study of geographical knowledge in the late 1600s, developed themes concerning the language and social position of local informants that apply equally here: ‘Acceptance of the reliability of others’ experience depended also upon whose experience it was’. 26

With issues of identity and recognition in mind, examinations of published and unpublished explorers’ materials can, within limits, contribute to our knowledge of these hidden assistants. Explorers’ journals are often the only source for the ethnography of regions at particular times. 27 Unfortunately, we rarely know them through their own words, as they left few written traces of their lives that have survived. We must read the travel narratives, private journals, letters, and articles available today with an eye to ‘rescuing’ hidden activities and understanding the role of assistants in the collecting activities of the expedition. As Barnett notes, this mode of reading has specific aims: ‘The aim of a deconstructive reading is to unfold alternative layers of significance from colonial discourses whose meanings are usually considered to be the singular expressions of western interests and desires’. 28

There was little space in Victorian travel writing and subsequent imperialist historiography for eighteenth-century conceptions of ‘noble savages’ living an idyllic existence unadulterated by the evils of urban life. 29 It has recently been discovered that the journals of John Hanning Speke, published in 1863, were edited by his publisher Blackwood, to the extent of hiring a ghost writer to ensure that Speke’s portrayal of Africa fitted a ‘preconceived social model’. 30 This was done without irony to an account of a vast region not much visited by Europeans. 31 Despite the declining momentum of

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26 Withers, “Reporting, Mapping, Trusting: Making Geographical Knowledge in the Late Seventeenth Century”, 503. And on p. 514, ‘Martin knew that he had to warrant both his own credibility as a traveller, author and provider of specimens to the Royal Society and that of those who were simultaneously his informants and his subjects’.

27 Historiography in this area is discussed in K. Barret-Gaines, “Travel Writing, Experiences, and Silences What Is Left out of European Travelers’ Accounts—the Case of Richard D. Mohun”, History in Africa 24 (1997), 53-70; Clendennen, “Historians Beware: You Can’t Judge a Book by Its Critics; or, Problems with a Nineteenth Century Exploration Record.”; Fabian, Out of Our Minds. A recent study that makes use of the journals of the Zambesi Expedition to uncover the history of the Chikundu is Isaacman and Isaacman, Slavery and Beyond.

28 Barnett, “Impure and Worldly Geography”.

29 Brantlinger, “Victorians and Africans: The Genealogy of the Myth of the Dark Continent”.


31 This could also be done with images, as engravers could alter the image to ‘suit’ the popular imagination. See J.M. Schwartz, “The Geography Lesson: Photographs and the Construction of Imaginative Geographies”, Journal of Historical Geography 22, no. 1 (1996), 16-45.
the abolitionist movement, many Britons in the late 1850s perceived Africans as needing help, and lots of it.\textsuperscript{32} Livingstone and other ‘progressive’ monogenist thinkers saw Africans besieged by an indigenous social ineptitude, although inherently capable of being the equals of their white brethren in the future. Popular, common-sense perceptions of the chronic weaknesses in African society provided a firm foundation for the coherence of the civilising mission ideology and partly explain the inability of European authors of the later nineteenth century to depict Africans as independent, dominant and capable individuals.\textsuperscript{33}

In the case of cartography, which may serve as an example for other sciences, research on indigenous African mapmaking is noted by its absence. Bassett explains this marginalisation as due to a number of factors. European mapmaking traditions quickly replaced African traditions during the colonial period. In addition, there has been a pejorative viewpoint that Africans did not have the cognitive ability to make such maps themselves. Finally, restricted definitions of what is a ‘map’ may have excluded a range of African map making processes and artefacts from serious study.\textsuperscript{34}

The position of disempowered peoples in their oppressors’ texts has been termed as that of ‘subalters’ in branches of literary criticism originating in India and based upon advances in Western historiography of the social.\textsuperscript{35} Subalters, it is argued, are obscured because ‘Fragmented records of subalternity register both the necessary failure of subalters to come into their own and the pressure they exerted on discursive systems that, in turn, provoked their suppression and fragmentation’.\textsuperscript{36} Forever defined by the interlopers, the role of locals as informants or assistants was created by the European presence and impossible without that presence and the subsequent European writing of it. No matter what the reaction of locals to such encounters, Prakash argues that in every case ‘Reacting to power is to be constituted by it’.\textsuperscript{37} This same power obscured subalters and left their contributions irretrievable, presenting a difficult historiographical problem. Likewise, without the Zambesi Expedition there is no local

\textsuperscript{32} Brantlinger, \textit{Dark Vanishings}; 90.


\textsuperscript{37} Ibid. 124.
reaction to it and therefore no possibility for the history of this expedition written in
denial of its central, structural role as the instigator of all the events under consideration
here.

The discourse of ‘Subaltern Studies’ theorists provides important clues to the
mindset of authors who neglected to mention the contributions of those considered to
be members of subjugated, or more appropriately in this case, ‘observed’ groups. The
outlook is most strongly explained by Barnett for whom “This routine practical
dependence on local knowledges and information is not accorded any epistemological
value.” While such postcolonial critiques can be useful, the original task of subaltern
studies, that of ‘history from below’, has shifted. Here it will be shown that by moving
away from more empirical studies to literary theory, misreadings of the exploration
narrative may result. We need to consider the requirements of scientific rhetoric.

Shapin’s analysis of why Boyle’s technicians were obscured demonstrates that
other meanings, besides colonial power relationships, are implied by the absence of
detailed information concerning informants and assistants in records of scientific
work. These layers of meaning remain unmentioned or unnoticed in literary analyses
trapped within a postcolonial mindset that remains dazzled by the institutions of the
‘oppressor’. Travel narratives and scientific papers may be justly classified as ‘singular
expressions of western interests and desires’ but they were also the expressions of a
scientific culture that was consciously striving to transcend local interests and desires of
any type, including their own, in order to produce universally accurate representations of
the natural world.

The specific requirements of the scientific goal of objectivity, well-established in
mid-Victorian scientific culture, demanded first and foremost that observations were
made directly by a trained, trusted investigator. In his research on Victorian geography
Driver states that, ‘In the world of nineteenth-century science, the credibility of claims
to empirical knowledge was said to depend on accurate observations, above all else’.
The fact that such observations were almost always produced by a European has led to
presentist assumptions of a racialist epistemology. This has been an error. Science

39 The change in focus can be seen in the titles of articles in the series Subaltern Studies, overtime they
move away from history towards literary criticism.
40 Shapin, A Social History of Truth.
41 Barnett, “Impure and Worldly Geography.”
42 Driver, Geography Militant 51.
cannot be reduced to a passive tool of colonial oppressors, rather, as Dubow has recently argued concerning colonial contexts, ‘science, considered as an ideological discourse, affected rulers as well as ruled’. The concern for first-hand observations and the suppression of the local voice was not about race per se, it was about trust, credibility and authority; and how these were earned and maintained. Therefore, Barnett is correct to highlight the subordination of non-European meanings and knowledge to the European, but he has failed to appreciate how European meanings and knowledge were moulded by the discourse of universality.

Although at first appearing distant to the topic in hand, Shapin’s study of early modern laboratories thus provides an important analogy for the written representations of the Zambesi Expedition’s collecting activities and the roles of assistants. When Kirk declares that he made collections of plants on the Zambezi, we may recall Shapin’s analysis of Boyle’s claims to experimental authority:

A plausible interpretation of what was intended by and understood by the seventeenth-century claim that one had ‘done experiments oneself’ is that the experimental work had been instigated by oneself, that the historical events reported in the resulting experimental narrative did actually occur and occurred when and as described, that they occurred in a place over which one exercised authority, that one had indeed taken responsibility for what happened, and that one now vouched for the truthfulness of what was textually related.

Similarly, if members of the Expedition employed local assistants to collect plants or animals it need not have been overtly stated because they were vouching for subordinates’ work and ultimately responsible for it. Stating that Kirk, Meller or Thornton made collections along the Zambezi was understood to imply that they had power over particular ‘spaces of collection’ and saw to it that collections were what they were supposed to be and that if instruments were used, they were used properly. This caretaker role was implied by their credible reputations.

For instance, the rapid mobility of the expedition prevented daily meteorological observations at a particular station. Therefore, Kirk made attempts early on to train Major Tito Augusto Araujo Sicard, Commandant of Tete and later (1863) Governor of Quelimane, in the recording of barometric readings and other measurements at Tete. Sicard’s register was the longest consistent meteorological record that the Expedition

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43 Dubow, ed., Science and Society in Southern Africa. 3.
44 Shapin, A Social History of Truth. 376.
produced, though it was not performed by an actual member of it. Kirk also stepped in
to oversee the measurements of geomagnetic phenomena when it was clear that his
European companions were encountering difficulties. 46 In another example, we can
plausibly suppose that Kirk felt in control of his collecting activities during an event
recorded by Richard Thornton: ‘One of the Zulus came in. He spoke a little Portuguese
and seemed a pretty sensible fellow. Kirk promised him some cloth if he would bring
him the leaves and flower of columba root.’ 47 This method of offering money for
specimens is not widely recorded by members of the Expedition. More frequent were
instances of collection by purchase of animals and plants sold as food (and often eaten
as such). In these situations specimens were not sought out at all, but fortuitously
appeared before the collectors’ eyes and their skill lay in identifying an opportunity
when it arose. Portuguese settlers also provided their local knowledge, though this was
not always acknowledged. Kirk fails to record in his journal what appears, according to
Thornton, to have been an informative tour of Sena:

[Senhor Belchior] and Kirk had a long talk about the
productions of the country. He showed [Kirk] an enormous
lump of India Rubber and gave Capt. B[edingfeld] a good
lump, then he showed us the boazy [buaze shrub] and he was
very bitter against the Portuguese Government here. Showed
us some brown sugar manufactured at Tete. It was very sweet
and good. Then went out to see the canoes. They bring him
a good deal of money. A good large canoe costs 30 [to] 50£,
some of the largest more. 48

Locals of all sorts unknowingly acted as collectors for Kirk and the others, as
will be shown below. In other cases local collectors knew their positions. Some of the
Portuguese settlers who were aware of the skills the members possessed brought
specimens for analysis—no doubt thinking of commercial potentials. 49 Once again we
have the most detail about such an incident from Thornton. He records on 6
September 1858 that Major Tito Augusto Araujo Sicard had sent some of his men to
look for gum-bearing trees, gum copal and other plants for Kirk. 50 It is less clear in the
record of the Expedition if locals were ever formally trained to collect particular
specimens under direction. Later in his life Kirk, as HM Consul to Zanzibar, did use

46 ‘They had been looking all this time through the wrong end of the spyglass.’ 6 August 1858 Ibid. 62.
47 1 September 1858, Tabler, ed., Papers of Richard Thornton: 60.
48 Belchior was a rebel. 20 August 1858, Ibid: 48.
49 For example, Kirk and Thornton were brought minerals and plants resins by two settlers on 3
50 Ibid: 63.
teams of local collectors whom he personally trained, but whether he did during this earlier period is unclear.\textsuperscript{51} It is safe to assume that paid local collectors were utilized on a \textit{ad hoc} basis, like the unnamed Zulu or Senhor Belchior above, but there is no evidence that any were given regular pay.

Reading deeply into explorers’ texts to uncover the daily practices of field science also protects us from \textit{mis}reading the significance of how specimens obtained locally were later represented in metropolitan scientific literature. Equally important to the generation of scientific knowledge was the analysis of the collected specimens and data by metropolitan analysts. Fortunately many of the specimens collected by Kirk and the others remain preserved in Natural History collections around Britain and may be examined today. Using these resources we can see the labels and hastily scrawled notes on scraps of paper for ourselves—daily practice revealed in the material culture of collection. In order to demonstrate how such investigations extend our appreciation of the relationship between explorers and locals, this discussion is intended to engage with claims made by Pratt. She has suggested that: ‘Natural History as a way of thinking interrupted existing networks of historical and material relations among people, plants, and animals wherever it applied itself’.\textsuperscript{52} Pratt finds that this interruption occurred as a consequence of removing objects of natural history physically and conceptually from the ‘tangled threads of their life surroundings,’ and their ‘places in other people’s economies, histories, social and symbolic systems’.\textsuperscript{53} While it is true that the contribution of local knowledge to scientific analyses was severely \textit{under}written, I want to suggest that the examination of debates concerning data collected in the field can reveal how local knowledge was important to both the explorer’s view of the environment and to metropolitan scientific discourse.\textsuperscript{54} While normally (and acceptably) obscured as part of field practice, in certain contexts local knowledge of the natural world was not only collected, it was important scientific evidence.

It will be argued in the next section that specimens were best understood when ‘their places in other people’s economies, histories, social and symbolic systems’, were preserved, recorded and remembered—contrary to Pratt’s assumption that these

\textsuperscript{51} 2 August 1884, John Kirk to an unidentified recipient at the British Museum (Natural History), DF200/26/192, NHM.

\textsuperscript{52} Pratt, \textit{Imperial Eyes: Travel Writing and Transculturization}, 30.

\textsuperscript{53} Ibid.

\textsuperscript{54} On the incorporation of local classification systems by European botanists, Harries, “Field Sciences in Scientific Fields”.
attributes of specimens were always ignored. The case studies that follow will provide examples of how the ‘local’ was in fact preserved in universal scientific knowledge, linking the field and metropolis.

**Field Collection in Practice**

No level of training or preparation could totally prepare a scientific field worker for a new environment. Climate, politics and the potential specimens themselves offered unforeseen challenges for collection, preservation and description. The guides to exploration discussed previously acknowledged this uncertainty, while making extensive prescriptions for how to be prepared. Expeditions proceeded with immense quantities of gear in order to be prepared for any contingency. What is clear in such guides is that local knowledge was accorded some degree of respect, if only in that it was worth recording. In a letter written just before the Expedition’s departure, Murchison advised the Foreign Office and the Admiralty that Livingstone should be instructed to record ‘native systems of weights, measures and values’ along with astronomic positions by sextant, the morphology of the river, etc.\(^{55}\) How successfully (in metropolitan estimation) an individual dealt with such varied tasks and the contingencies of the field contributed largely to their reputation as an explorer. Indeed, the contingent interaction between the scientist and observed nature has been proposed by Pickering to be one of the fundamental qualities of scientific practice and a necessary consideration in any analysis of scientific culture.\(^{56}\)

During the first few weeks the expedition was in the Zambezi delta, during May and June of 1858, Kirk began to collect as often as he could given his multiple responsibilities and the constraints of time.\(^{57}\) As the expedition wound its way through the sinuous effluent channels of the delta, a village came into view. This was Kirk’s first encounter of agriculture in the region and he was keen to see which plants were cultivated. Direct questioning of the farmers proved difficult when they all fled:

> We had seen several native canoes and now we came in sight of natives near their huts. We landed but the fellows made off. I took specimens of most of the things grown in their gardens. Among these were millet, rice, cassava, sweet

\(^{55}\) Letter, 4 March 1858, Roderick Murchison to Edmund Hammond and John Washington. RNML, Portsmouth, MSS 120 (Box 1/1858). Hammond was the Permanent Under-Secretary for Foreign Affairs from 1854-72.

\(^{56}\) Discussed in the literature review. Pickering, *The Mangles*.

\(^{57}\) See chapter four.
potatoes, castor oil, Indian hemp, pumpkins and cotton. The occupation of the people seemed to be that of fishermen. We left several things in return.\textsuperscript{58}

In Baines’s journal there is further detail:

About eleven we saw a few huts and Bedingfeld and Kirk went ashore, but returned presently calling to me for biscuit and pork....We left the pork and bread in exchange for the few specimens we brought away and proceeded on our voyage.\textsuperscript{59}

We have no idea of local opinion concerning this event. What did they make of the steamer and the strange appearance of saltpork and biscuits? The sight of the steam launch, \textit{Ma Robert}, and uncertainty over the intentions of this boatload of Europeans was clearly enough to make avoidance the only prudent reaction. We can plausibly infer from the above that Kirk was impressed by the variety of plants under cultivation and strongly desired specimens. Without any permission, but ethically concerned about ‘stealing’ the specimens, Kirk quickly organised an exchange of foodstuffs and the specimens were accumulated with a clear conscience. In this early indirect encounter with local knowledge, Kirk may have been thinking of Livingstone’s instructions concerning proper behaviour, the Europeans must always set ‘an example of consistent moral conduct’.\textsuperscript{60} The act of leaving payment for the specimens contrasts with ideas of explorers running roughshod over local property. Kirk eventually earned the trust of farmers, and acquired a large amount of information concerning agriculture: African and Portuguese. Thus he filled his role as the ‘economic botanist’ which necessarily relied heavily upon local knowledge and practices.

We can see the traces of local information elsewhere in Kirk’s work. The ‘Entry Book’ for the Museum of Economic Botany at Kew Gardens, which contains a daily record of all the objects coming into the museum, includes entries of specimens from the Zambesi Expedition. In the entries, local names and uses for plants were carefully recorded, for example: ‘Bark of \textit{Mukundukundu} (Cinchonaceae) used in fevers by the natives’; ‘Cotton as obtained from the natives’ or ‘Follicles of a Apocynaeus plant called \textit{Kombe} and used as an arrow poison’.\textsuperscript{61} Elsewhere Kirk utilised local classifications of cotton to aid his discussion of the possibilities for cotton exports from the region:

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{58} 25 May 1858, Foskett, ed., \textit{Zambesi Journal of Dr. John Kirk}: 30.
\item \textsuperscript{59} 25 May 1858, Tabler, Axelson, and Katz, eds., \textit{Baines on the Zambezi}: 91.
\item \textsuperscript{60} Wallis, ed., \textit{The Zambezi Expedition of David Livingstone, 1858-1863}: 422.
\item \textsuperscript{61} Economic Botany Collections, Entry Book, 102.1862 (16 September), RBGK.
\end{itemize}
\end{footnotesize}
Cotton—There are two species of the cotton plant cultivated in countries explored: one of these, known as the *Tonje Kaja*, has been in existence for a very long time, and may be indigenous; no trace of its introduction can be found; it is found everywhere, but is being replaced by a better sort named *Tonje Manga*, which signifies foreign cotton, and is of modern introduction, having come from the various towns on the east coast.  

Kirk (and Meller) collected raw specimens along with finished products of local refining processes. Balls of tobacco, fishing nets, cloth, blocks of caoutchouc (rubber), hair combs, flour, glues, oils and prepared fish poisons were among the materials returned for analysis. These arrived along with dried plants and fruits preserved in spirit which were sorted and sent to the Herbarium. Figure 5.1 shows examples of Kirk’s specimens from the Economic Botany Collections of Kew Gardens. On the labels, produced in the field where paper was apparently at a premium, the blending of local and European knowledge can be seen. When Kirk returned to Kew, he assisted in the more formal identification of his specimens with Latin nomenclature. At the British Museum, animals received similar treatment with local names and uses included on labels attached to the specimens. These were gathered through informants, such as the fishermen who often approached the members of the Expedition with fish for sale (Figure 5.2).

While zoological specimens were important, it was with the botanical specimens that the boundary between botany and ethnography was blurred into that uniquely nineteenth-century discipline, Economic Botany. Here the panoptic gaze of the Victorian scientist, the ‘Imperial Eye’ of Pratt, is overt. Often on the same page of Kirk’s field notes we find sketches and watercolours of a dissected flower, important for identification, alongside lists of local uses and sketches of the processes involved in utilising them. Kirk often used cards for such notes, about 4 x 6 inches, and filled both sides with information (Figure 5.3). Today, many of these cards are held in the archives at Kew Gardens, although many others remain with their dried specimens in the Kew Herbarium; jealously guarded by botanists who are loath to divulge their location, lest they be taken away to the archives.  

Thomas Baines, as seen in the previous chapter mixed botanical and ethnological illustration as well.

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62 Kirk, “Report on the Natural Products and Capabilities of the Shire and Lower Zambesi Valleys”, 29. See also Figure 6.1a.

63 Samantha Cox, librarian, RBGK, January 2004. This was confirmed by an anonymous botanist in the herbarium, ‘I know where many of Kirk’s drawings are, but I don’t want too many people to know.’ (Personal Communication, January 2004).
Figure 5.1a: ‘From near Zumbo, used as medicine’

Figure 5.1b ‘Fruit of Mopane, or Ironwood Tree’

Figure 5.1c ‘Cotton, Tonge Manga’

Figure 5.1d ‘Fedigosa seeds make best substitute for coffee’
Figure 5.2: Fisherman alongside the pinnace, offering fish for sale
Figure 5.3: Examples of Kirk’s botanical field notes.
Questions remain concerning the direct role of local informants in collecting information and making observations, both elements marking the first stages in the economy of collections. The problem of establishing the credibility of these informants was very important and also very difficult. In order for Kirk to use local information he had first to indicate that he had, in very real sense, failed to make the observation himself. Second he had to provide clear reasons for why we should believe the individuals he had interviewed. The following example, taken from a letter by Kirk demonstrates Kirk’s own struggle with some of these concerns:

Above the Victoria Falls of the Zambesi and the Murchison Rapids of the Shire a marked difference in the fish fauna is met with. During the short time I spent in the former region, many fishes with which I was not familiar in the lower part were observed, and the natives who accompanied us remarked of others met with near Tete, and still more met with in the Nyassa Lake, that to them were unknown. Without claiming for the negro any exalted place, still it cannot be denied that in such points as come under his daily observation, particularly as concerns his food, he is very accurate and discriminating…The knowledge possessed of wild game by hunters of the desert is well-known; and the different tribes depending on the produce of the waters are equally well acquainted with their inhabitants.64

The tone of the excerpt shifts dramatically at the point of Kirk admitting he has relied on local informants to confirm his suspicions that the distribution of species in the river system changed dramatically above the major cataracts. Having shifted from personal observation to local hearsay mid-sentence, he self-consciously enters into an explanation of why we should believe these informants.

The plea for credibility he gives is curious because it does not rely upon describing individual integrity, but rather upon two other arguments. The first is that people who eat fish will know what they look like. Secondly, and perhaps more interestingly, he calls up a universal ethnographical type—the knowledgeable fisherman who knows his prey, just like the desert hunter we all (apparently) know so well. Having related his companions to other ethnographic ‘type-specimens’ who possess credible knowledge, Kirk is bridging the gap between Humboldtian biogeographical thinking about mapping species distribution and indigenous knowledge using arguments he clearly expects any armchair naturalist will be prepared to understand and accept.

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Repackaging the local African fisherman’s knowledge into universal statements about human nature he has made the local informant a credible authority on fish distribution. It is a remarkable transformation. The letter also indicates further that local African fishermen could not be allowed into British scientific discourse on their own merits; they lacked the appropriate credentials to speak in that forum and their expert information was only allowed after this careful explanation. Despite the necessity for this transformation, it does not follow that the local knowledge of nature was ‘not accorded any epistemological value’ or ignored. Kirk’s explanation indicates that local knowledge was permissible after systematic modulation and retained value throughout analysis in the metropolis as local knowledge.

A failed attempt to use local information occurred in attempts to determine the hydrology of the region. In relation to the simultaneous journeys of Burton, Speke and Grant to the north along Lakes Tanganyika and Victoria, the existence of a river at the north end of Lake Nyassa was a very important piece of information. Burton insisted that Lake Tanganyika was the source of the Nile, Speke insisted it was Lake Victoria. If a large river flowed into the northern end of Lake Nyassa then Speke’s argument ran that it must flow from Lake Tanganyika and thus the latter lake could not have enough water to give rise to two rivers. Loosely connected to this was whether or not the Rovuma River flowed from Lake Nyassa, a question that spawned two trips up this river by the Zambesi Expedition and the death of at least one local in a skirmish. Livingstone had pushed hard up the Rovuma because he knew that for diplomatic and navigational reasons the Zambezi was turning out to be a personal embarrassment. Long after his colleagues had realised the Rovuma was not a viable alternative, Livingstone dragged them and their boats up the shallow stream praying that it would lead into lake Nyassa.

In both cases, members of the Expedition failed to produce direct observations—they did not reach the north end of Lake Malawi and they did not reach

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the source of the Rovuma, wherever it was. They interviewed many locals concerning
the two points of geography, but could draw no firm conclusions. Concerning their
attempts to interview locals, Livingstone found that: ‘It is difficult to get at facts, or
draw out of the natives any reliable information respecting the country in front’.67
Realising the failure of their lack of direct observation and certainly aware of the
criticisms endured by Burton and Speke for their similar inabilities to observe the
northern end of Lake Tanganyika or to circumscribe Lake Victoria, Livingstone resisted
the temptation to draw any firm conclusions about the geography of the northern end
of the lake.68 This failure was made clear to them by Murchison’s reaction to their
incomplete survey of Lake Nyassa. In a letter to Livingstone, Kirk reported that:
‘Murchison looks broken up…he says it [the expedition] had only gone on to the
north end of Nyasa which people say (why I don’t know) receives a large river from the
Tanganyika we would have done something’.69 In the end, the best claim they could
make concerning the lake was based upon their most reliable informant in that area,
whose knowledge was weakly argued to agree with what they were already thinking:

[Chief] Mankambira had never heard of any large river in the
north, and even denied its existence altogether; giving us at the
same time the names of the different halting-places round the
head of the lake, and the number of days required to reach the
coast opposite his village; which corresponded, as nearly as we
could judge, with the distance at which we have placed the
end.70

The case studies above support and challenge postcolonial literary criticisms of
Victorian exploration accounts. They support Barnett’s conclusion that ‘A labour of
transformation is undertaken upon local information before it is allowed to appear as
knowledge open to scientific verification and refutation.’71 However, the transformation
was not total, and it was not in the interests of scientific authority to completely sever or
silence the local voice. At times debates were only solved by reference to the words of
local informants and in the case of Economic Botany local knowledge was often exactly
what was desired. The agency of non-Europeans in these encounters was challenged,
but a closer look at the internal discourses of science and the material cultures of

67 Livingstone and Livingstone, Narrative of an Expedition; 291.
68 Problems in determining the course of rivers through local testimony and the potential strength of
‘armchair geography’ have been discussed by Withers, “Mapping the Niger.”
69 20 October 1863, NLS Acc 9942/55.
70 Livingstone and Livingstone, Narrative of an Expedition; 291.
collections indicates that there are cases where local knowledge’s power extended to the metropolis.

**From Field to Publication: a Case Study of Molluscs and the Geography of the Zambesi Expedition**

Malacology, the study of molluscs, attracted scientists as well as those enthralled with shells as decorative objects. The mussels considered here—collected by Kirk and described by Isaac Lea in Philadelphia—are all part of the Unionidae, a large family of freshwater molluscs containing around 1000 species. Although most widely distributed in North America, hence the name, Unionids are found all over the world.

The path of the mussels is best followed by beginning at the end, with their description. In 1865 some of the mussel specimens Kirk collected were described by Heinrich Dohrn in the *Proceedings of the Zoological Society of London*. Heinrich (1838-1913) was a noted zoologist who had taken his PhD from Berlin in 1861. He was the brother of the more famous pioneer of marine biology, Anton Dohrn (1840-1909). Their father, Carl Augustus Dohrn (1806-1892), was a successful entomologist. Although most of Heinrich’s papers and collections were destroyed in the bombings of Stettin (now Szczecin, Poland) during World War II, it is likely that Dohrn had seen shells from the Zambezi while studying in Berlin, where Wilhelm Peters, who had collected along that river in the 1840s, was Professor of Zoology. In his description of Kirk’s specimens, Dohrn lamented the absence of certain shells that he knew were originally part of the collection sent to him for description:

I regret very much that there are no Unionidae in the collection which I got for examination. All I can state from the above list [of species] is, that the conchological fauna of

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74 This case study has also been published as L. Dritzas, “From Lake Nyassa to Philadelphia: A Geography of the Zambesi Expedition, 1858-64”, *British Journal for the History of Science* 38, no. 1 (2005), 35-52. A smaller study of the Buaze fibre was published in a popular article as L. Dritzas, “Treasures of Kew”, *Kew Autumn* (2004), 41. Both are reproduced in the appendices.

75 The importance of Heinrich’s collections is discussed in Dance, *A History of Shell Collecting*. Thanks are due to Dr. Christiane Groeben, archivist at the Stazione Zoolologica ‘Anton Dohrn’ in Naples, Italy (founded by Anton in 1874) for her assistance over this ‘forgotten’ naturalist of the Dohrn family. C. Groeben, ed., *Correspondence: Karl Ernst von Baer, Anton Dohrn* (Philadelphia: 1993).

Lake Nyassa seems to belong to the same region with Natal; but most of the freshwater species from the lake having turned out to be hitherto unknown, and some of the other species having been found by Captain Speke and others far more northwards, it is rather difficult to come to any conclusion from the present collection.⁷⁷

Elsewhere in the article Dohrn quoted a letter from Kirk, which explains the absence:

The Unionidae of the lake having previously been described and figured by Isaac Lea, in a paper read before the Academy of Natural Sciences of Philadelphia, April 12th, 1864, are not here included. They number six species, and one still remains undescribed.⁷⁸

Why would six shells out of the Lake Nyasa collection have been removed in this way, especially since their removal hindered Dohrn’s task of drawing conclusions about their geographic distribution in respect to other African collections? The unique Unionid specimens, most likely new species, were specifically separated from the main collection and sent to Philadelphia, Pennsylvania for description by Isaac Lea while Dohrn received the remainder. Lea was a leading member of Philadelphia’s scientific community, and an expert malacologist. Earlier in his life he twice toured the important scientific centres of Europe, developing especially strong relations with the British Museum.⁷⁹

Kirk collected the mussels on Lake Nyassa in September or October 1861, though he does not record the exact date. During this period Kirk, David and Charles Livingstone, John Neil, an able seaman, and ‘a score of attendants’ travelled nearly the whole length of the lake in a small sailboat with a following shore party.⁸⁰ It was a difficult trip and offered limited opportunities for collecting due to the speed of their travel and a lack of porters to carry specimens. Their main intention was to record the dimensions of the lake and determine its place in the region’s hydrography. It may be that Kirk did not collect the specimens himself but utilized local assistants, was presented the shells or even that he purchased them at a market; these are all methods of acquiring specimens he describes elsewhere in his journals.⁸¹

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⁷⁸ Ibid.


⁸⁰ Livingstone and Livingstone, Narrative of an Expedition: 274.

The small group returned to the main body of the Expedition, who were waiting for them at the first cataracts of the Shire River, on 8 November 1861. Their boat, HMS *Pioneer*, was readied and everyone started downstream in the hopes of meeting an Admiralty ship at the delta of the Zambezi. Unfortunately, *Pioneer* ran aground in the shallow river and remained stuck for over a month waiting for the river to come into flood. While idle, Kirk wrote letters to Joseph Hooker and William Hooker describing the flora and fauna along the western shore of Lake Nyassa. The first letter was written on 6 December 1861 to William Hooker and mentions the Lake Nyassa shells specifically. Kirk had packaged up a number of crates and he requested that a small tin box of shells, packed inside a larger case, be forwarded to ‘Professor Owen’. The next letter to William Hooker, written nearly two weeks later indicates that Kirk removed the tin of shells from the larger box along with some cotton samples and oil nuts. It appears that there was a chance to send a small amount of packages ahead to the coast by canoe, and Kirk thought to send the small tin box of shells ahead instead of keeping them with the bulk of his collection, stuck on the sandbank. In the letter he again indicated that the shells should be forwarded to Owen and requested, ‘if he sends me the names of them I should be much obliged’. By mid-January, the chance to send some correspondence ahead had not materialised and the tin box of shells was back in its original crate marked, ‘for Prof. Owen’. The river rose and the *Pioneer* finally reached the coast on 20 January. HMS *Gorgon* met them there on 31 January to transfer correspondence and supply provisions.

Confident the shells were finally on their way, Kirk wrote to Richard Owen on 15 March 1862 to alert him of the new specimens. The Expedition was busy transporting pieces of their third steamer, *Lady Nyassa*, upriver from the mouth of the Zambezi as they unloaded them from HMS *Gorgon*. The letter opens with Kirk writing:

I send through Sir W. J. Hooker a collection of shells from the borders of Lake Nyassa. Among them I doubt not you will find several new ones. They will at least be interesting as I

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82 John Kirk to William Hooker, 6 December 1861, Royal Botanic Gardens, Kew Library (hereafter RGBK) (Zambezi Expedition Book, pp. 18-23).
83 John Kirk to William Hooker, 19 December 1861, RGBK (Director’s Correspondence v.42/163).
84 A letter to Joseph Hooker the previous day (18 December, 1861) indicates this. RGBK (Director’s Correspondence v.42/162).
85 Kirk to W. Hooker, op. cit. (footnote 79, this chapter).
86 John Kirk to Joseph Hooker, 9 January 1861, RGBK (Director’s Correspondence v.42/167).
think it contains more species than any other collection from the Lake Regions.\textsuperscript{87}

In the last part of the quote here, Kirk is alluding to the mussel shells collected by Burton and Speke on their East African Expedition.\textsuperscript{88} Although Kirk was located somewhat remotely in the field, developments elsewhere reached him through correspondence and influenced the way he saw his own specimens and their relative importance. If the mussels he collected were of the same species as those found by Burton and Speke, then a strong argument could be made that Lakes Nyassa and Tanganyika were connected by a river. This revelation would have provided further evidence in the ongoing efforts to determine the sources of the Nile. At the time Kirk was sending the shells to England, Speke was crossing into the Kingdom of Uganda, trying to prove that Lake Victoria was the source of the Nile.\textsuperscript{89} Knowing this must have highlighted for Kirk the importance of the Lake Nyassa specimens and helps explain why he was keen to get them home and described as quickly as possible.

The shells, with other mails and specimens, went with HMS Gorgon when it left the Mozambique Channel for Cape Town on 4 April 1862. The cases were taken to Simon’s Bay and then transported to Sheerness Yard, at the mouth of the Medway on the Thames estuary, by HMS Cossack and were addressed ‘through the Secretary of State for Foreign Affairs to Kew Gardens’. The Admiralty notified William Hooker on 9 September of their arrival and a few days later the specimens were sent by train to Kew.\textsuperscript{90}

The case holding the shells was opened along with ten others at the Kew Museum for Economic Botany on 16 September 1862.\textsuperscript{91} The shells were forwarded to, ‘Prof. Owen, Brit. Museum’.\textsuperscript{92} The rest of the material remained at Kew because Kirk specifically requested this of William Hooker in the letter of 6 December, 1861.\textsuperscript{93} It was understood that the context necessary to fully understand and classify the specimens would be lost if they were dispersed before his return home. In a letter to John

\textsuperscript{87} Natural History Museum of London (hereafter, NHML), (Owen Correspondence, 62.16/437-440).

\textsuperscript{88} Sponsored by the RGS, Burton and Speke travelled from Zanzibar to Lake Tanganyika from 1857-9 and made preliminary observations of the southern shores of Lake Victoria. Kirk may have seen S. Woodward, ‘On some new Freshwater Shells from Central Africa’, Proceedings of the Zoological Society of London (1859), 348; and Burton, “The Lake Regions of Central Africa.”


\textsuperscript{90} Letters from the Admiralty to William Hooker, RGBK (Zambezi Expedition Book, pp. 32-5).

\textsuperscript{91} The entry book listing for the day reads ‘one small tin box of shells'. RBGK (Economic Botany Collections, Museum Entry Book, 102.1862).

\textsuperscript{92} Ibid.

\textsuperscript{93} Kirk to W. Hooker, op. cit. (footnote 79, this chapter).
Washington, Livingstone instructs that botanical and zoological specimens must remain with Joseph Hooker at Kew, ‘till the arrival of the collector, whose knowledge…will be most advantageous in classification’. Aside from the mussel shells and a few other specimens, the bulk of the zoological materials remained packed in crates at the herbarium for two years waiting for Kirk. It would appear that moving from local to universal knowledge here required the physical presence of the collector, who stood as proxy for the Zambezi basin, confirming the natural habitat of specimens. Without his presence, the specimens could lose their local meanings and were in danger of becoming dislocated curios. Though Kirk would not be the author of the descriptions of most of his collection, zoological and botanical, he still held control over their fate. This indicates his credibility as a collector and the importance of his field knowledge to the final description.

Kirk’s credible reputation in London’s scientific community may be understood through contrast to the controversy surrounding Paul du Chaillu and his description of gorillas in the wild. Published in May 1861, Du Chaillu’s narrative was fiercely criticised by some members of the zoological profession, notably John Edward Gray, Keeper of Zoology at the British Museum. Du Chaillu attempted to cross the line from mere collector to scientist without possessing the necessary credentials and thus brought controversy upon himself and his defenders. Many of the details of his account fell under doubt. McCook’s analysis of the Du Chaillu affair demonstrates that collectors who lacked scientific authority were meant to remain relatively invisible, trusted to collect but not to conclude, much like the earlier technicians of Robert Boyle. Kirk, on the other hand, authored his own scientific papers where he felt capable, bowing to others’ authority where he did not. He was commonly mentioned and cited in papers where his specimens were described. Neither his credibility as a field worker nor authority as a scientist were ever called into doubt—he smoothly operated in both capacities and approached the Victorian ideal of a fieldworker: reserved, daring and scientific. Keeping most of the Zambezi collections sealed until Kirk returned and

96 McCook, “‘It May Be Truth, but It Is Not Evidence’: Paul Du Chaillu and the Legitimisation of Evidence in Field Science.”, Shapin, A Social History of Truth.
97 Exposure to danger in the field could lend the collector more authority in the metropolis: B. Hevly, “The Heroic Science of Glacial Motion”, Osiris 11 (1996), 66-86.
opened them himself allowed the chain of credibility from the field to the published
description to remain tightly linked. The mussels, however, were particularly interesting.
Their description could not wait, thus they were sent ahead.

At the British Museum the specific donation entry for the mussels reads, ‘1862
October 8th, a collection of shells, collected during Dr. Livingstone’s Expedition and
presented by Dr. Kirk. Post Office, Cape of Good Hope.’98 Although this entry would
appear to indicate the shells in question, it is not clear why they are listed as coming
through the Cape Post Office and this form of registration does not match the
information found at Kew Gardens. This can be interpreted as a clerical mistake, for
the other evidence presented above suggests conclusively that the shells went to the
Museum via Kew; their dates of arrival at Kew and the British Museum correspond to
the parcel’s description.

In tracing the movement of specimens from Kirk’s hands via Admiralty ships to
Kew and then the British Museum, we are tracing lines of authority that linked field
collectors to metropolitan research centres. Trust was placed in those who transported
the specimens and those who took responsibility for them. Kirk does not indicate in his
letters that he had an analyst for his specimens in mind. Instead, Richard Owen, as
superintendent of the natural history departments of the British Museum, was expected
to deal with the collection appropriately. In this role, Owen acts as an integral part of a
network upon which the expedition’s scientific credibility and significance would depend.

The shells next appear in the Proceedings of the Academy of Natural Sciences of
Philadelphia on 12 April 1864. In his, ‘Descriptions of Six New Species of
UNIONIDAE from Lake Nyassa, Central Africa, &c.’ Lea writes:

The specimens herein described are of unusual interest. They
are the first which I have seen from Central Africa, and I am
greatly indebted for them to the liberality of John Kirk, M.D.,
of Edinburgh, who accompanied the Zambezi Expedition,
under the British Government, as Medical Officer and
Botanist. There are six in number, all of which I believe to be
undescribed. ... The three Uniones differ from any type I
have heretofore seen from Africa. ... It is greatly to be
regretted that none of the soft parts were preserved, that we
might compare their anatomy with those from America. Lake
Nyassa is one of the three great central lakes of Africa, and
has a southern drainage in the Zambezi River. It is, in extent,
as Dr. Kirk informs me by letter, ‘exceeding two hundred miles north and south, and from fifteen to sixty miles wide, and is fifteen hundred feet above the sea. It lies between the parallels of 14° and 18° south latitude.”

Lea described the specimens and, with acknowledgment to their home environment and collector, named them: *Unio kirkii, Unio nyassaensis, Unio aferula, Spatha alata, Spatha modesta, Spatha nyassaensis*. This article was collected together with others and republished with plates in the Academy’s Journal a few years later (Figure 5.4). Tracing in detail the shells’ movement from Kirk to Lea via Owen as intermediary is not easy. Letters from Kirk to Lea appear to have not survived and it is unclear if the letter to which Lea refers above was personally written to Lea by Kirk or if it was a general letter accompanying the specimens. Kirk never had an opportunity to meet Lea and they do not appear to have known each other personally. Lea was, however, a close personal acquaintance of Owen and others working at the British Museum.

Given what we know from Dohrn’s article, it is clear that the Unionid shells were selectively removed from the main collection and specifically sent to Lea for analysis. Others were qualified to do this work. Dohrn certainly implies that he could have done the job and did not approve of splitting the collection in the first place. According to Dohrn, splitting up the collection between analysts diminished its value as evidence for the biogeography of mussels in southern Africa. Despite these issues, instead of keeping the shells together and using a more local specialist, the *Unio* specimens were separated out and sent to Lea. Possibly to avoid any priority dispute or confusion in naming, when the remainder of the shells were sent to Dohrn for description, no Unionids were included, so if there were duplicates retained at the British Museum, Dohrn was clearly not allowed to see them, hence his ‘regret’. Dohrn was very much acknowledged as an expert in malacology, but Lea was the established expert on Unionids. In 1863, Lea had been sent Unionid molluscs recently collected in South America by Patricia María Paz y Membiela, former director of the Spanish Comisión Científica del Pacífico, demonstrating that Lea’s expertise was widely

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99 I. Lea, “Descriptions of Six New Species of Unionidae from Lake Nyassa, Central Africa, &c.”, *Proceedings of the Academy of Natural Sciences of Philadelphia* 16 (1864), 108-09. Lea errs here as he recorded in his diary previously seeing Zambesian Unio specimens when he was in Berlin in 1853. Scudder, Isaac Lea; xxix.

100 No correspondence between Kirk and Lea is preserved in the NHM, NLS, American Philosophical Society, Academy of Natural Sciences of Philadelphia, and the Smithsonian Institute.


102 Ibid.
Figure 5.4: Unionid mussels collected by Kirk and described by Lea
acknowledged in the early 1860s and he was receiving specimens of this family from government-sponsored expeditions worldwide.\textsuperscript{103}

Described, named and published in Lea’s articles, the mussels were then fully incorporated into western scientific knowledge. They have been moved from the farthest empirical and geographical peripheries into the metropolitan knowledge system epitomised by London’s scientific institutions. In following the mussels to their final destination we find, however, that the metropolis relocated itself along lines of credibility and authority leading to Lea in Philadelphia, where the journey ends.

If we think of the British Museum as a Latourian ‘centre of calculation’ in this case, where further work is done to ‘mop up the inscriptions’, then this centre must occupy a space stretching from Philadelphia, across London, to Berlin—an unwieldy image that is overly reductive.\textsuperscript{104} By following the mussels through society, the centre of calculation proves to be a fictitious place if we assume it to be the end of the line where all the further analytical work was performed. Here, the metropolitan centres of science acted to propel the specimens further along their epistemic journeys as material collected on the expedition was dealt with, literally, on a case-by-case basis. The work at the museum involved receiving specimens, evaluating them briefly and then sending them on to an appropriate expert for proper analysis, wherever they may be.\textsuperscript{105} This taxonomic triage may be reviewed today in the rough identifications given to specimens in museum accessions registers and donation books. The point of the exercise was to get a quick idea of what was arriving so that a specialist could be assigned to identify them.

Differences in the quality of initial classifications can be attributed to the skills of whichever individual was responsible for opening the box.\textsuperscript{106} In this role, the British Museum functioned less as a ‘centre of calculation’ and more as an entrepôt for natural history.

\begin{footnotesize}
\begin{enumerate}
\item[104] Latour, \textit{Science in Action}; 233.
\item[105] The expert could very likely be located at the museum, or perform the work there. In this case, the ‘sending on’ is an operation internal to the institution, nevertheless the type of decisions made about the fate of specimens remain the same.
\item[106] Thanks are due to Dr Colin MacArthy, Collections Manager for Reptiles, Amphibians and Fishes at the Natural History Museum, London. Our discussion of the accessions registers and his assistance in locating examples of Kirk’s specimens was invaluable.
\end{enumerate}
\end{footnotesize}
Conclusion

This chapter examined the activities of collection and in particular the epistemic and physical spaces where practices that resulted in the attachment of new meanings to objects and information were performed. Following Harris and Livingstone, those spaces may be classified as those where collection, production, and consumption of scientific information take place.\(^{107}\) The links between these spaces, forged by the movement of theories, specimens, instruments and people between them, has been described through the use of examples from published and unpublished sources.

In this chapter, the role of local assistants and their contribution to the field-based practices of the Expedition were examined in detail. Their obscurity in narratives of expeditions and scientific literature is found to have a twofold origin: Western egotism and the stylistic norms of scientific argument. In contrast to some findings of postcolonial literary critics, the latter is argued to have the larger influence upon the obscuring of local assistants and informants in the various texts produced by scientific expeditions. Indeed, the role of the explorers themselves was obscured, ignored or deliberately marginalised in some arenas of scientific discourse; in these cases the epistemic contribution of local assistants had very little chance of being acknowledged. Thus, while explorers downgraded the role of local informants and assistants in fieldwork, the contributions of explorers could also be downgraded in metropolitan accounts of knowledge gathered in the field. This gives us reason to revisit our assumptions concerning the power relations between locals, explorers and metropolitan analysts of expeditionary data.

Although racialist and nationalist preconceptions certainly had a role to play in these relationships, it must be kept in mind that the Europeans involved were overtly concerned with upholding rigid standards of scientific logic and practices of professional scrutiny. For example, it was for these latter reasons that in the years around 1860 the three great African lakes—Tanganyika, Malawi, and Victoria—were considered inadequately understood and the stage was set for a further decade of uncertainty now known as ‘the Nile controversy’. The explorers’ conclusions about the hydrology of each lake was determined to be based solely upon local testimony rather than direct observation and hence, incomplete. This was despite the fact that Burton,  

\(^{107}\) Harris, “Long-Distance Corporations.”; Livingstone, Science, Space, and Hermeneutics.
Speke, Livingstone and Kirk all wanted their local informants to be authoritative and did everything they could to corroborate their evidence. In practice it appears that the veracity of ‘native testimony’ was an unsolved epistemological problem in geography and natural history and a problem that was continually revisited with each new conclusion arising from an explorer’s fieldwork.\(^{108}\)

In other examples provided here the role of the explorer as interlocutor and the voice of the local were purposefully mobilised to support or attack scientific conclusions. In these cases it became necessary to open the ‘black box’ of scientific practice and demonstrate the methods of knowledge acquisition and appropriation. Moreover, in the case of a famous figure such as David Livingstone, intervening historiography, initially imperial or hagiographic followed by psychoanalytic biography, has been either unwilling, theoretically unable, or uninterested in analysing the social construction of scientific knowledge.\(^{109}\) This has resulted in the continued invisibility of the local contributions. The examples above show that where the explorer was found to be a competent field worker and offered careful conclusions, then the local voice as modulated through the explorer was in fact perfectly admissible, credible and above all necessary information. This corroborates Bassett’s conclusion that African knowledge significantly influenced European maps of Africa.\(^{110}\)

In the case of the Zambesi Expedition, we find the incorporation of African knowledge into European knowledge systems via the recording of local names for animals and plants along with geographic information. As demonstrated, these names later became potential pieces of evidence for further scientific identification and analysis in laboratory or herbarium settings. Peters indicates in the introduction to his study of Zambesian fishes that he strictly collected local names in order ‘thereby to have rendered the recovery of the species considerably easier for my successors’.\(^{111}\) Along with names, local knowledge of plant and animal distribution, habits, and uses were also incorporated into scientific descriptions of the region. In the case of Economic Botany, finding sources for key Victorian raw materials such as coal, gutta percha, gum copal, cotton and other fibres was almost entirely reliant upon determining local knowledge and practices. In the case of gum copal, the investigation of local collecting practices

\(^{108}\) Withers, “Mapping the Niger”, 186.
\(^{111}\) Thanks again to Dr. Alison Hiley for this translation. Peters, \textit{Reise Nach Mosambique}.
contributed to the determination of its origin as fossilised tree resins. A further example involves commercial information, where systems of weights, measures and currency were critical information that had to be accurate if trade were to succeed. Connected to this was information on local fashion trends in cloth and beads, the wrong trade items were worthless and would purchase little in local markets.

Specimens, properly catalogued, served as boundary objects between knowledge systems and spaces. As objects or facts move between communities new meanings were attached to them as they filled different purposes. The dramatic modulation of a plant from agricultural produce to herbarium specimen to potential item of trade is the canonical example of how expeditions alter the natural worlds they visit. Explorers who were found to erroneously record local names or insufficiently catalogue specimens were challenged and could lose credibility as a field worker. Thus, local classifications of the natural world, made real by their attachment to physical objects, provided part of the foundation for imperial descriptions of the Zambezi basin.

A wealth of manuscript and published evidence has allowed for this analysis of the Zambesi Expedition. The links between local African knowledge and European science has been examined here and contributes further evidence for Turnbull’s recent conclusions concerning the comparative sociology of scientific and indigenous knowledge:

Recognising that all knowledge systems create their own space in which knowledge, trust and place are made, allows for just such an interrogation and working together [between alternative systems] by making visible the spatial and moral components of knowledge production.112

The following chapter continues the examination of collecting activities, but from a metropolitan perspective. Here we will be looking closer at the ways in which Britain’s scientific community talked about and influenced the expedition through the analysis of its results. Many of the themes developed here will remain important as we look at the ultimate destinations for the knowledge produced within the spaces of collection: the metropolitan institutions which received, analysed and published the results.

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Chapter 6: The Expedition at Home: African Nature in the Scientific Metropolis

Introduction

Representing Africa to the metropolitan scientific community required the physical movement of people and equipment to the field and the reciprocal movement of people, data and specimens to the metropolis. Collections constituted a major portion of this latter movement and their appearance brought African nature before the metropolitan gaze. They also served to lend credibility to an explorer’s verbal report, as Joseph Hooker instructed Meller, ‘Dried specimens afford the means of knowing the products of a country, they alone can authenticate the information the traveller produces; they are the warrants of his industry and intelligence’. This movement and re-placing was very much part of the expedition and of its post-fieldwork validation. Despite the image we have of expeditions ending with the return of the explorers, the expedition in fact continued through an open-ended period of analysis and dissemination. This chapter examines the story of the expedition in the metropolis and how the explorers and their specimens navigated the wider scientific community. The trajectories of the specimens are mapped and the statements of the Expedition’s harshest critics are used to identify the epistemic standards which challenged fieldworkers in metropolitan locations. The years 1863 and 1864 saw the slow return of the Expedition’s members. Kirk first reached London on 9 October 1863 with Charles Livingstone; Meller a few months later. Livingstone, remaining briefly to examine the areas west of Lake Nyassa returned on 23 July 1864 via Bombay. During these years the ‘unpacking’ took place and the explorers presented the bulk of their findings to the metropolitan scientific community. But what else was going on in that community at the time? The early 1860s marks a time of great changes in science and examining the context in which data from the Zambesi were presented may help us to understand the experience the explorers underwent. First and foremost, the controversy surrounding Darwin’s *On the Origin of Species* (1859) was part of the wider context. There remained at this time a variety of opinions on the subject. Natural selection was bigger than

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1 Original emphasis. ‘Instructions in matters relating to vegetable products, geology, zoology and meteorology: for Dr. Meller’, RNML, MSS120/Box 2/Miscellaneous.
anything the members of the expedition were going to produce; the Expedition added to the store of empirical knowledge but did not change its character, that was happening elsewhere.

1864 also saw the exciting high point of the Nile Controversy, with its acrimonious debate between Richard Burton and John Hanning Speke. A formal debate was planned to take place at the September 1864 BAAS meeting in Bath. Had Kirk and Livingstone made it to the northern tip of Lake Nyassa and determined if a river connected it to Lake Tanganyika they would have contributed critical facts to this debate. But they did not complete their survey and were thus pushed to the background. Instead, we find that Livingstone, as an expert on things ‘African’ and a still popular figure, was called in to chair the Geography session of that annual meeting where Burton and Speke would debate their conflicting theories. Tragically, Speke’s death the evening before the debate forestalled the encounter forever.  

Thus while Speke was eulogised as the discoverer of the source of the Nile, Livingstone was the discoverer of very little. The Zambesi Expedition was only mentioned in passing during Murchison’s address to the Geography & Ethnography Section of the meeting. Livingstone’s fame was such that he did lecture before a general ‘Evening Meeting’, and, as recorded in The Times, he gave a general account of the region and more plans for the future abolition of the slave trade through the introduction of lawful commerce. It was a standard speech and very similar to those he gave before the Zambesi Expedition; it was not printed in that year’s BAAS Report.

The year 1864 also saw the foundation of the X-Club, an exclusive dining club within the Royal Society founded to promote the position of science in British society and secure steady public funding for scientific workers. Members of the club such as Joseph Hooker believed that science deserved to be publicly funded and he and others lobbied to this end for most of the latter half of the nineteenth century. No doubt he would have been sympathetic to Kirk’s failure to find funding for writing up his collections in the winter of 1863-64 despite multiple applications to the Foreign Office. Kirk, who never overtly sought to make easy profit from science was exactly the kind of

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3 His death while hunting was ruled an accident, but many still suspect suicide. A. Maitland, Speke (London: 1971).
4 A good summary of contemporary opinion of Speke can be found in L. Oliphant, “Nile Basins and Nile Explorers”, Blackwood’s Edinburgh Magazine 97, no. 1 (1865), 100-17.
5 Livingstone, “Evening Meeting: Lecture by Dr. Livingstone”.
6 Bellon, “Joseph Dalton Hooker’s Ideals”.

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professional that the younger Hooker wished to see supported—Kirk’s situation would have contributed to Joseph’s sense of crisis in the scientific profession. 7 In the end, Kirk never found a financial reward or career in science. Members of the X-Club were also involved in the debates over natural selection, which were vibrant in 1864. The rhetoric began to take shape as a war of Science versus Scripture. 8 Fearing a resurgence of orthodoxy and the possible loss of nature to theology, the X-Club formed partly to counter this movement and to act as advocates for scientific naturalism and liberal reform. 9 Promoting an independent (read as ‘agnostc’) scientific profession working for the public good with public support was their strategy for realising a complex set of goals.

In terms of the Expedition’s audience, the notion of an ‘Africanist’ community needs to be investigated in terms of whether it could be said to exist in Great Britain around 1860. Was there an acknowledged group of experts on ‘Africa’ waiting to be informed and provide comment? The Royal African Society was not founded until 1901. Before then, Africanists met and debated within the varied discursive spaces of geographical, scientific, ethnological or anthropological, commercial, philanthropic or missionary societies. 10 Few of these around 1864 made any special provision for discussions of African topics in general: they mixed them freely with discussions of other areas of the globe. 11 In specific circumstances ideological divides would keep the discourse fragmented. The Anthropological Society, founded in 1863, was instituted on strict polygenetic ideas about man that were at odds with monogeneticists within the Ethnological Society. 12 Abolitionist and anti-slavery groups had long been arenas for discussing Africa’s problems and promoting solutions, although by 1864, the heyday of these groups had passed along with wide acceptance of their optimistic Rousseau-esque representations of African society as romantic idyll. 13 From the early 1830s these groups tended to use Exeter Hall in London for their meetings, bringing together those

7 Ibid.: 64.
8 Barton, “Formation of the X Club”, 411.
10 This list is altered from Helly, “Informed’ Opinion on Tropical Africa”.
11 The Society of Arts, a commercial development organisation, did not designate a section for African topics until 1874, and the RGS often scheduled the papers to be read at their Monday night meetings with a geographical theme but there was no further specialisation in their regular publications. The Royal Colonial Institute was not formed until 1868 Ibid.: 197-202.
13 Brantlinger, Dark Vanishings: 90.
interested in humanitarian and missionary work in Africa under one roof.\textsuperscript{14} It was to many such groups that Livingstone spoke during 1857, seeking support for his return to the Zambezi in order to assuage the evils of the East African slave trade.\textsuperscript{15} These spaces were not the place for specialist scientific discussion.

In geographical circles, specialist interest in Africa had long centred on the Royal Geographical Society (RGS) founded in 1830 and its precursor, the African Association, both of which promoted exploration of the continent. The RGS provided a central discussion space for the expedition, and its role in critically examining the expedition’s work is examined here. Looking to botany, neither Kirk nor Meller were acting as specialist ‘African botanists’, but, rather, as botanists applying themselves to African plants. Even were they such focused experts, none of the British natural history societies specialised on particular overseas areas at this time. The real connection between botany and the exploration of Africa was made through the discipline of economic botany and via Kew where significant finds could result in commercial exploitation of important cash crops. Riding on the possibility of commercial, and hence wider benefits, interest in the useful plants of specific overseas areas grew during the 1850s and 1860s.\textsuperscript{16} The Museum of Economic Botany at Kew Gardens opened in 1847 and steadily became an important resource for industrialists seeking new raw materials: indeed, ‘all botanical collections made at government expense went after 1854 first to Kew’\textsuperscript{17}. The early 1860s were also the years when the great colonial floras would be proposed and begun, leading slowly over the next few decades to published \textit{Flora of the British West Indies}, Tropical Africa and the Cape.\textsuperscript{18}

Related to this discussion of useful plants was a popular topic for the early 1860s, acclimatisation.\textsuperscript{19} The establishment of societies devoted to the promotion of acclimatisation in the 1850s and early 1860s gave renewed impetus to the idea of

\textsuperscript{14} Driver, \textit{Geography Militant}: 75.
\textsuperscript{15} Ross, \textit{David Livingstone: Mission and Empire}: 117.
\textsuperscript{17} Ibid.: 201.
\textsuperscript{18} R. Drayton, “Science and the European Empires”, \textit{The Journal of Imperial and Commonwealth History} 23, no. 4 (1995), 503-10: 201-06. Much later (1960) the \textit{Flora Zambesiaca} began compiling a taxonomy of plants found throughout the basin. Kirk is acknowledged as the starting point of that work.
generating wealth and industry through the skilful transfer of species to new locales.\textsuperscript{20} While these schemes normally failed, the overt symbolism of European hegemony through metropolitan displays of colonial nature reinforced imperial ideologies of dominance through science.

Zoology and the earth sciences were similar in their lack of formal overseas regional specialisation and the main journals included articles looking at material from around the globe. Indeed, Murchison was himself interested in Africa because so little was known about its past and present geological structure but this did not make it a unique place.\textsuperscript{21} Africa was yet another wilderness beyond the edges of the empire, soon to be known and dominated.\textsuperscript{22} Medicine similarly knew little of Africa, but did not think of it as a different kind of place. Conceptions of the causal factors of disease, especially fever, were not specific to Africa or anywhere else in the tropics. “Tropical diseases” as we conceptualise them today were not so understood until the 1890s, and as such were not an area for special discourse.\textsuperscript{23} Where hygiene and sanitation were being promoted for improving the health of expeditions in Africa, the same techniques could equally apply to the denizens of London. Livingstone promoted the highlands adjacent to the River Shire as healthier than the banks of the Thames.\textsuperscript{24} The accelerating rise of the metropolitan, professional scientist possessing a global view during the 1860s entailed a devaluing of the local outlook of parochial, and now amateur, investigators.\textsuperscript{20} So at a basic level, interest in the findings of the Zambesi Expedition would be formulated through an expectation that the general rules of natural history would apply. No ‘paradigm shift’ would be caused by or was expected of the data and specimens. Discussion of the findings of the Expedition would take place in the context of a global discourse, not an African one.

Given the lack of a dedicated professional specialisation, if there was anything like a community of ‘Africanists’ before the partition of Africa by the colonial powers in 1885, it was extremely small in nature and scattered in its geography. Helly finds only

\textsuperscript{20} Acclimatisation discourse was also interested in the introduction of foreign species for zoological and gardens as well as, at time primarily for, sport. France led the way in this area with the founding in 1854 of Société Zoologique d’Acclimatation in Paris. Ibid.: 143.
\textsuperscript{22} Stafford, “Annexing the Landscapes of the Past”, 71.
\textsuperscript{24} D. Livingstone, “The Health of the African Missions”, \textit{The Lancet}, no. 2 (1863), 137.
\textsuperscript{25} Desmond, “Redefining the X Axis”, 14-15.
150 men in England ‘consistently concerned’ with African topics appearing at the meetings of professional and philanthropic societies between 1860-1890. She finds no indication that these people imagined themselves as members of a specialist group concerned with Africa.\(^{26}\) Thus, when Kirk, Meller and the other members of the expedition returned home to report on the natural resources of the Zambezi valley, their audiences within the scientific community would have been diverse, but, with the exception of the geographers, probably not interested in south-eastern Africa in particular. Whilst the more popular press focused its reporting on the incomplete discovery of Lake Nyassa, the remainder of the Expedition’s findings were accommodated within specialist literature.\(^{27}\)

The scientists of the Zambesi Expedition were returning to a community that was keenly interested in learning about new and unusual areas of the globe. They presented their data and specimens to experts that would analyse and critique them according to universal scientific standards of truth and evidence. Methodologically speaking, there was nothing special about Africa, its nature would be examined in exactly the same way as the Pentlands—the whole world needed to be understood according to one set of rules and standards of evidence. As William Hopkins succinctly put it in 1860, “It is impossible to admit laxity of reasoning to the naturalist while we insist on rigorous proof in the physicist. He who appeals to Caesar must be judged by Caesar’s laws”.\(^{28}\) It was into those critical arenas that the Expedition would deliver its results and be judged by them. This chapter will further examine the discourse of these arenas by examining the publications which resulted from the expedition. The reaction to the results in public and private spaces will also be examined where the evidence allows. In general the spaces of presentation, dissemination and circulation will queried in order to reveal the interests that construct scientific practice in these spaces.

**Publication Patterns**

The Zambesi Expedition produced considerable data and specimens that were used by metropolitan specialists in a number of fields. The rhetoric used to muster

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\(^{26}\) She find 44% in government, 20% business related, 16% active philanthropists or missionaries, 20% anthropologists, geographers, explorers, and writers. 25% of the government group were retired. Helly, “‘Informed’ Opinion on Tropical Africa”, 215-16.


\(^{28}\) quoted in Yeo, “Scientific Method and the Rhetoric of Science in Britain, 1830-1917”, 282.
support for the Expedition appealed to the great benefits for the resulting science. The situation was different at the close of the Expedition when harsh criticism of its failure to open new trade routes or make any conclusive geographical discoveries, combined with a general lack of interest in the press, obscured the numerous empirical results.  

The scientific aspects of the expedition have been hitherto neglected in published historiography. With these issues in mind this section outlines a preliminary analysis of the written scientific product of the Zambesi Expedition as it was published in Victorian scientific periodicals and stored in natural history collections.  

The spread of scientific knowledge around 1860 relied heavily upon the print media. The great proliferation of periodicals, specialist and popular, itself the result of falling printing costs in the second quarter of the nineteenth century, provided an arena for the dissemination of findings. The “imagined community” of mid-Victorian scientific society was maintained through its publications. Beyond the societies, and their more exclusive reading publics, popular science journals were also present in the third quarter of the nineteenth century and were present alongside the incorporation of scientific material into non-scientific publications. Science was also discussed in the spaces of pubs and increasingly in local societies which promoted science as a civic interest. Popular science journals, often inspired by self-improvement ideologies, linked the arenas of scientific production to those of scientific consumption through the simultaneous revelation of the knowledge-making process and the dissemination of findings; they sought to take science to the people.

How far all this popularisation actually reached members of the working classes is subject to debate, as organisations such as the Royal Institution—dedicated to the

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29 As one commentator in The Examiner put it, the whole Expedition was a “hopeless enterprise”. Reprinted in Anonymous, “The East African Mission (Reprinted from the Examiner)”, The Times, 20 January 1863.

30 The amateur historian V.L. Bosazza has published an analysis of the survey techniques probably used by the Expedition Bosazza and Martin, “Geographical Methods of Exploration Surveys in the 19c.”. The remainder of his work on Thornton’s geological findings remains unpublished, though copies can be found with the Livingstone papers at the National Library of Scotland.


popularisation of science—failed to reach the ‘depths’ of the working classes through lectures and demonstrations.35 Ongoing research into science in the Victorian periodical, may help answer questions concerning the content and message of ‘popular science’ in this era.36 In terms of scientific descriptions of the Empire it is possible that the majority of the population of Great Britain received very little beyond the most sensational stories.37 Moreover, Riffenburgh, in his study of the representation of explorers in the Victorian press, finds that ‘Most people did not really want to know about scientific data or results.’38 These data and results remained confined to specialist literature, which is examined here.

Table I is a tally of scientific publications related to the Zambesi Expedition’s work. It includes any articles, reprinted letters or papers read aloud at meetings that utilised or discussed data and specimens produced by the Expedition. Shorter notices or mentions in annual addresses that merely inform the reader of the Expedition’s progress have been excluded from the count. With the exception of The Technologist, all of the journals listed here are associated with scientific societies or institutions.39 Though not catalogued here, newspapers such as the Times, Illustrated London News, The Scotsman and The Examiner, along with periodicals such as the Quarterly Review, Blackwood’s Edinburgh Journal, Home and Foreign Review, North British Review, and Edinburgh Review provided their readers with updates of the Expedition’s progress or reviews of its publications. The quarterlies usually discussed the Expedition in relation to the exploration of Africa at large or in connection with issues such as slavery, cotton supply, emigration or missionary work; those issues of interest to the elites of the day.

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36 The first instalment of the Science in the Nineteenth Century Periodical: An Electronic Index project database (SciPer) has gone online as of February 2005 and provides an invaluable resource. http://www.sciper.org
38 Riffenburgh, The Myth of the Explorer 198.
39 The Technologista monthly record of science applied to art, manufature, and culture was a short-lived popular science magazine (1860-67) edited by Peter Lund Simmonds (1814-1897), a popular science journalist who also published books of economic botany such as The Commercial Products of the Vegetable Kingdom (1854); A Dictionary of Trade Products (1858); The Curiosities of Food (1859); The Cotton Manufacture of Great Britain (1861) and Tropical Agriculture (1877). He was elected a Fellow of the Statistical Society in 1857.
Table I: Number of articles which cite data or specimens collected by members of the Zambesi Expedition, 1858-1877. Totals assessed by year and by journal.

<table>
<thead>
<tr>
<th>Journal</th>
<th>Date of First Issue</th>
<th>1858</th>
<th>1859</th>
<th>1860</th>
<th>1861</th>
<th>1862</th>
<th>1863</th>
<th>1864</th>
<th>1865</th>
<th>1866</th>
<th>1867</th>
<th>1877</th>
<th>Journal Total</th>
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<td>Annals and Magazine of Natural History</td>
<td>1828</td>
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<tr>
<td>British Medical Journal</td>
<td>1857</td>
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<td>Journal of the Linnean Society: Botany</td>
<td>1857</td>
<td>2</td>
<td>1</td>
<td>6</td>
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<td>Journal of the Linnean Society: Zoology</td>
<td>1857</td>
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<td>1</td>
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<tr>
<td>Medical Times and Gazette</td>
<td>1852</td>
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<td>4</td>
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<tr>
<td>Philosophical Transactions of the Royal Society</td>
<td>1776</td>
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<tr>
<td>Proceedings of the Academy of Natural Sciences</td>
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<td>Proceedings of the Royal Geographical Society</td>
<td>1855</td>
<td>1</td>
<td>2</td>
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<td>2</td>
<td>1</td>
<td>1</td>
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<td>Proceedings of the Royal Society of Edinburgh</td>
<td>1832</td>
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<tr>
<td>Proceedings of the Zoological Society</td>
<td>1831</td>
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<td>11</td>
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<td>Report of the BAAS Annual Meeting</td>
<td>1831</td>
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<td>2</td>
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<tr>
<td>The Ibis</td>
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<td>The Lancet*</td>
<td>1823</td>
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<td>The Technologist</td>
<td>1860</td>
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<tr>
<td>Transactions of the Botanical Society</td>
<td>1844</td>
<td>2</td>
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<td>2</td>
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<tr>
<td>Transactions of the Epidemiological Society</td>
<td>1859</td>
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<tr>
<td>Transactions of the Linnean Society</td>
<td>1791</td>
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<td><strong>98</strong></td>
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</tbody>
</table>

*The 1861 article in the Lancet is a reprint from the Transactions of the Epidemiological Society.
The greatest number of articles appeared in 1864. This is to be explained by the fact that Kirk returned to London in October 1863.\(^{40}\) His presence allowed the bulk of the natural history collections, those sent ahead and those Kirk had just arrived with, to be identified by experts at Kew, the British Museum and other locations. The two ‘outliers’ here in 1871 and 1877 are an article on cholera epidemics in East Africa and one on geomagnetism.\(^{41}\) For the former, James Christie was preparing an epidemiological study of cholera and sought Kirk’s knowledge concerning to what extent it spread southwards. The latter was a product of Sabine’s ‘magnetic crusade’, which took decades to complete.

Evidence for the official nature of the expedition is made apparent by the publication patterns. Kirk had close ties to the Botanical Society of Edinburgh and he published with them before joining the Expedition. From the Zambezi, Kirk regularly corresponded with the Botanical Society’s head and his botanical mentor, John Hutton Balfour. Balfour published these letters in the society’s *Transactions* after removing any personal or sensitive comments.\(^{42}\) When Kirk returned to Scotland, he made a presentation to the society about the Zambezi, and this was published as well.\(^{43}\) Despite these close ties to the Edinburgh-based society and with the singular exception of Lindsay’s 1866 article on dye-yielding lichens from the Zambezi, no analyses or identifications of Kirk’s specimens were published in the Botanical Society’s *Transactions*.\(^{44}\) The sole vehicles for publishing the botanical specimens were the products of the Linnean Society of London, which was closely connected with Kew’s botanists. The official instructions for the Expedition indicated that Kew was the institution responsible for analysing the specimens. This was followed as was the normal route of publication out of Kew at the time—the Linnean Society. This pattern of papers also indicates the availability at Kew of sufficient expertise to identify the

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40 Meller returned a few months later but was immediately convalesced to the south of France. He asked Kirk to take control of his specimens for him. It is for this reason that Kirk is credited in Accessions Registers at Kew Gardens and the British Museum with many of Meller’s specimens.


42 Originals are held in the RBGE, Library, Balfour Correspondence vol. 7.


44 Lindsay was the physician superintendent of Murray’s Hospital in Perth and an acknowledged expert on lichens. W.L. Lindsay, “Notes on Some African Lichens and Fungi”, *Transactions of the Botanical Society* 8 (1866), 378-80. Plate V.
specimens. Likewise the desire, and ability, of Kirk to work on his own collections is apparent in the botanical articles: he wrote five of the fourteen botanical articles.\(^{45}\)

The treatment of the botanical specimens offers a contrast to that of the zoological specimens. They were discussed across six separate publications written by ten different analysts. As noted in Chapter 5, some of the zoological specimens were shipped abroad to specialists for identification. This pattern reflects the break-up of the Linnean Society’s control over zoology in the 1820s, and the continuing preoccupation of the Linnean Society with botany.\(^{46}\) This may indicate that zoology was a less ‘imperial’ science than botany and its findings were not, in a sense, ‘national trade secrets’ requiring protection, though this requires further research. With limited exceptions, animal products held less potential for industrial exploitation than vegetable products, though recent research has looked at a specific case of ‘economic zoology’ relating to coastal fisheries.\(^{47}\) It was simply not as important to protect zoological findings, whereas sources of quinine, gum copal, plant fibres, gutta percha (suddenly of immense importance for insulating telegraph wires) and dyestuffs were critical to the British economy.\(^{48}\) While the importance of economic botany to the nation was clearly promoted by the Hookers and others, the idea of “economic zoology” appears to have been far less coherent outside of animal husbandry and game keeping. Thus while we can definitely point to Kew as the site where the botanical specimens were analysed, the analysis of the zoological collections followed a somewhat more dispersed pattern.

In geological research, the identification of coal deposits was self-evidently important to national interests, though an inconvenient location could render any discovery worthless. It was for this reason that Thornton was specifically identified as holding expertise in mining geology and sent with the Expedition.\(^{49}\) Despite Thornton’s considerable efforts at the coalface, physical and diplomatic barriers rendered the deposits unavailable to British industry for some decades. The rest of Thornton’s work

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\(^{45}\) Kirk was not paid for this work, as we shall see below.

\(^{46}\) Desmond, “The Making of Institutional Zoology”.

\(^{47}\) Ivory, silk and animal dyestuffs such as cochineal (produced from insects) are the obvious exceptions.


focused on finding evidence to support Murchison’s predictions concerning the large-scale structure of continent, and during his period of detachment from the expedition exploring Mount Kilimanjaro with Baron von der Decken. The young geologist’s premature death in the field left behind a mass of indecipherable field notes and a few published letters. Thornton’s geological observations remain scattered and imprecise; lacking any conclusion and failing to provide the basis for a geological map of the region. Nevertheless, his more general observations, and those of the other members proved important. For instance, the position of large mountains to the west of Lake Nyassa proved Murchison’s prediction (which he had made in 1852), that the southern portion of the continent consisted of a large watery plateau subtended or enclosed by higher mountain ranges themselves punctuated by fissures through which Africa’s great rivers emerged. Therefore we see no strictly ‘geological’ publications, and those that tend in that direction are published by the RGS, under Murchison’s control.

The results of the geomagnetic ‘product’ of the expedition appeared in 1877. The measurements taken in 1858-9 were not published as part of Sabine’s global geomagnetic survey for twenty-one years (Figure 6.1). Three points are indicated: Tete, Dakanamoio Island and Expedition Island. It is interesting to notice that the ‘Observer’ lists only ‘Livingstone’, obscuring the fact that Charles Livingstone was largely responsible for the measurements with the help of Baines, Thornton and Kirk (Figure 6.2). David Livingstone, in fact, was not trained to use the instruments. The investigators of terrestrial magnetism appear to have had little interest in contextual details. The data sought and where it is corroborated by the rest of the samples, allow for the maps to be drawn. Of importance here are the accuracy of the particular instruments and the capabilities of the instrument operators. Pyenson’s argument that the ‘Exact Sciences’ were not affected by being located in colonial locations appears to apply here

52 First promulgated by Murchison in 1852, see Murchison, “Presidential Address”, cxxi-cxxv. The role of this theory in directing exploration is analysed in Stafford, “Roderick Murchison and the Structure of Africa”, 29.
53 The fourth data point in the region dates to 1825 and were taken by William Owen of HMS Leven.
### General Sir Edward Sabine on Terrestrial Magnetism

**South Equatorial Zone II.---Lat. 19° to 20° S.**

<table>
<thead>
<tr>
<th>Station</th>
<th>Lat. E.</th>
<th>Long. E.</th>
<th>Date</th>
<th>Observed</th>
<th>Cartesian</th>
<th>Distillation</th>
<th>Force in British units</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
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<td>Aitana Island</td>
<td>10 29</td>
<td>29 30</td>
<td>1868</td>
<td>29 45 w</td>
<td>19 5 w.</td>
<td>18 44 w.</td>
<td>17 22 s.</td>
<td>H.M.S. Fly</td>
</tr>
<tr>
<td>Cape Bojador</td>
<td>11 13</td>
<td>13 03</td>
<td>1858</td>
<td>13 30 w</td>
<td>12 10 w.</td>
<td>10 30 w.</td>
<td>8 30 w.</td>
<td></td>
</tr>
<tr>
<td>Cape Frio</td>
<td>12 29</td>
<td>14 03</td>
<td>1858</td>
<td>14 29 w</td>
<td>12 50 w.</td>
<td>11 00 w.</td>
<td>9 40 w.</td>
<td></td>
</tr>
<tr>
<td>Cape Verde</td>
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<td>16 03</td>
<td>1858</td>
<td>16 29 w</td>
<td>14 30 w.</td>
<td>12 40 w.</td>
<td>10 30 w.</td>
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</tr>
<tr>
<td>Ceylon</td>
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<td>18 03</td>
<td>1858</td>
<td>18 29 w</td>
<td>16 30 w.</td>
<td>14 40 w.</td>
<td>12 30 w.</td>
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<tr>
<td>Chusan</td>
<td>15 29</td>
<td>20 03</td>
<td>1858</td>
<td>20 29 w</td>
<td>18 30 w.</td>
<td>16 40 w.</td>
<td>14 30 w.</td>
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<tr>
<td>Delaware</td>
<td>16 29</td>
<td>22 03</td>
<td>1858</td>
<td>22 29 w</td>
<td>20 30 w.</td>
<td>18 40 w.</td>
<td>16 30 w.</td>
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</tr>
<tr>
<td>Dominica</td>
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<td>24 03</td>
<td>1858</td>
<td>24 29 w</td>
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**Figure 6.1: Observations of Terrestrial Magnetism**
Figure 6.2: Observations of the declination of the Earth’s magnetic field
Continuing the Work of Collecting Specimens

Kirk first arrived in London from the Zambesi on Friday 9 October 1863, travelling via the ‘overland route’ which involved a land crossing in Egypt from the Red Sea to the Mediterranean. On his arrival he went to the Geological Society, possibly to look for (and failing to find) Murchison. The next day he reported to the Foreign Office in order to organise the outstanding salaries for the subordinates who had accompanied him. The following Tuesday, Kirk made the rounds of scientific London listing his activities in the briefest prose:

October 13th. Call on Prof. Owen at British Museum, give Dr. Gunther the small tortoise—Call on Dr. Sclater, Zoolog: Soc:

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55 He left the Expedition on 19 May 1863 along Charles Livingstone, and some crew members. Their journey included stops at Mozambique Island, the Comoros, Zanzibar, the Seychelles, Aden, Suez, Alexandria, Malta and finally Southampton. Meller left on 17 July the same year.
hand over to him the Lepidosiren. Call on Sir R.
Murchison—he is down death on the Expedition. I can see.\footnote{As discussed in the previous chapter, Murchison was upset over the lack of a great geographical discovery that could be used to create a spectacle. Foskett, ed., \textit{Zambezi Journal of Dr. John Kirk}: 530.}

Kirk’s journal reveals that he was beginning the most crucial stage of the expedition, meeting the leaders of the scientific community and presenting specimens for analysis. The following week Kirk met Sir William Hooker at Kew to discuss the placement of the various specimens being stored there. He was particularly offended because letters sent by Livingstone to the elder Hooker via the Foreign Office indicated that Kirk and Meller had large amounts of specimens with them and that they were to ensure that collections did not fall into private hands.\footnote{Kirk thought Livingstone’s letter to be ‘ungentlemanly’. Ibid.} The botanists had no intention of misappropriating the specimens and to learn of Livingstone’s mistrust was particularly upsetting. Probably unknown to Livingstone, the Hookers had been confidantes of Kirk and Meller. The leaders of Kew Gardens were told repeatedly that Livingstone’s leadership had consistently hindered their investigations into natural history and to see their leader now trying to ensure the collections were protected must have held some dark irony.

Once the specimens were delivered to the appropriate institutions, Kirk hoped to see his Expedition salary extended to include the period he assisted in their analysis. Livingstone and others hoped that Kirk would spend three or four years working on the specimens and then publish a book-length account of ‘the botany and natural history of the Expedition in a separate work’.\footnote{Livingstone and Livingstone, \textit{Narrative of an Expedition}: 7-8.} Kirk’s salary was never extended and he never published a popular book, preferring articles in specialist journals.

Another aspect of metropolitan scientific life revolved around the societies. Kirk attended numerous scientific meetings in the Autumn and Spring seasons while suffering through recurrent (probably malarial) fevers.\footnote{For example, between 7 April 1864 to 16 March 1865 Kirk presented six papers to the Linnean Society. He was elected a Fellow there on 5 May 1864.} He worked on the specimens that he could, but he was also beginning to see that because he was not the owner of the collections, his access was subject to continual negotiation. Kirk lost control of his zoological specimens and they quickly became lost in the ‘Great Sea’ of the British Museum. He had little chance of even getting lists of his specimens.\footnote{Kirk to D. Livingstone 25 July 1864, NLS Acc 9942/55.} At Kew the situation was better for access and his work on specimens there resulted in a series of
publications. The Zambesi Expedition specimens were left to be dealt with as part of the day-to-day work of the British Museum and Kew while Kirk left alone, unpaid and unsure of his future, worked solely for the good of botany. Meller, who left the Expedition in July 1863, did not visit Kew until after he spent many months in the south of France convalescing. He had asked Kirk to take care of his specimens for him. Meller, who joined the expedition in early 1861, had always felt that his work in the Zambesi no more than complemented Kirk’s earlier work and published nothing concerning those specimens. Meller restricted his publications to statistical investigations concerning the incidence of fever among members of the expedition.

Once located at appropriate institutions, specimens came under analysis by a variety of experts. Not all of the analysts were located at the British Museum or Kew Gardens. Distributing specimens for analysis was an important part of the work done in connection to the expedition, and it was work that relied heavily upon established professional networks. Specialists were identified through their reputation in publication and via personal acquaintance. Geographical location or ‘in-house’ status may have also been important when assigning workers to identify specimens, but in this case no one at the British Museum was considered capable. The evidence here suggests that these networks were not always planned in advance but, rather, were established contingently, depending upon the types of specimens produced. The minimal prior planning given to this aspect of the expedition demonstrates further the authority that the British Museum and Kew Gardens possessed as sites where the identification of specimens would be facilitated, but not necessarily undertaken. Sending specimens there was a necessary stage of the route to their full analysis. The ‘normal’ and unremarkable nature of these networks then is one reason why it is now so difficult to retrace such movements; records of these activities were not diligently kept.

The example of the six Unionid mussels that were sent to Philadelphia illustrates how field workers possessed varying control over the later representation of their specimens. For example, in Dohrn’s article on the Unio specimens, Kirk was only

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61 The 1864 volume of the Report on the Progress and Condition of the Royal Gardens at Kew mentions Kirk hard at work on his collections.
62 Kirk to JH Balfour 13 December 1863, RBGE, John Hutton Balfour Correspondence, vol.8, n.103. In April 1866 Kirk accepted an appointment as Agency Physician and Vice-Cousl to Zanzibar under GE Seward. He and Helen, his wife, spent twenty years in Zanzibar.
63 In June, 1865 he left England for Madagascar as HM Consul to that country, a career course Kirk and Charles Livingstone would follow as well, Kirk to Zanzibar and Charles to Fernando Po.
quoted to provide information concerning local context and regional distribution. Likewise, others cited Kirk in their articles naming specimens from the Zambezi collections, adding his first-hand knowledge of context (e.g., location, habit and uses) to desiccated taxonomic descriptions. But the degree to which Kirk’s field information was incorporated into the descriptions was entirely up to the analysts and their necessarily synthetic works. The articles in Table I often discussed specimens from many different regions, as the focus was taxonomic and not strictly geographical. George Bentham offers varying consistency in using Kirk’s contextual information when describing specimens of African Anonaceae (custard apples):

*Artabotrys brachypetala* at Tete on the Zambesi. The fruit is said to be pleasant eating. Kirk.

*Unona obovata* hot springs at the foot of Moramballa on the Zambesi. Kirk.

*Popowia ? kirkii* on the Zambesi at the foot of Moramballa and opposite Senna (Kirk, who reports the fruit to be pleasant eating.)

*Monodora sp.* from Shiramba on the Zambesi (Kirk). Fruits only known, which are globular, about 1 inch diameter, and with a thin pericarp as in the last but marked outside by 8 to 10 longitudinal raised costae. Dr. Kirk describes it as a bush which, at the time he gathered the fruits (July, 1859), had neither leaves nor flowers.

*Anona arenaria* Widely spread over tropical Africa; described as growing in great abundance over vast tracts of country in Senegambia and Sierra Leone by Leprieur, Barter, and others, in Bornou by Edward Vogel, and on the Zambesi by Kirk.55

In many of the publications in Appendix A are found similarly brief allowances of contextual information concerning the local use of particular plants and animals. Often the specimens were included in papers that dealt with a particular genus or family of organisms. The fact that the Zambesi Expedition was involved or that the specimens originated in Africa may not have been highlighted at all.66 This indicates that the way in which specimens were used depends upon particular disciplinary styles of knowing. The industrial analysis of fibres from the buaze bush represents a utilitarian interest.67 In malacology or ornithology there were empirical and aesthetic interests involved.68

66 See the titles of the articles listed in Appendix A.
68 Spary, “Scientific Symmetries".
As a fully-trusted collector assisting the analyst, Kirk acted as a dislocated avatar for the Zambezi basin. Bringing the foreign space with him into these texts, Kirk repositioned the specimens back in the field. From a reader’s perspective, Kirk lifted the specimens from the lake and handed them to the analyst. The distance between cabinet and field was rendered minimal—despite the long and convoluted journeys they took—a necessary rhetorical consequence if local specimens were to have universal scientific significance. This supports Barnett’s conclusion that such abstracted knowledge was necessary because:

Signifiers of embodiment or interest are markers of particularity and run counter to the required self-abstraction, which is the condition of being recognised as a subject of nineteenth-century scientific discourse.

Equally necessary was the downplaying of any contributions made to our knowledge of such specimens by local informants or assistants as any more than subservient and anonymous informants. In the extract above they are completely invisible—it is Kirk’s assessment of flavour that is reported. However, in Kirk’s journals we find that this kind of information was often acquired through informants. In reading the large number of disparaging remarks about African cuisine throughout the published and private papers of the Expedition one point rings clear: Africans taste in food varies widely from our European explorers and locals’ statements about flavour were not valid testimony.

In his own articles, Kirk freely used his own impressions of the environment he observed. He tended to mix in gleanings from his own field notes with the detailed examinations made later at Kew. Switching rapidly between ethnographic and botanical information Kirk provides a view of plants ranging from the microscopic to the regional, as in this article on a new banana which Kirk named *Musa livingstoniana*:

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71 European food was not necessarily safe either, as demonstrated by the great mulligatawny incident in September 1859, when an overdose of the soup (or possibly poison) caused Kirk to sleep restlessly amongst his colleagues because ‘Heavy artillery had been at work all night on both sides of me’.

Hab[tit]. The mountains of Equatorial Africa. Gorongoza, south latitude 19°; Manganja, south latitude 14°; Maravi country, south latitude 12°, and the Niger region.

In habitat this banana is indistinguishable from Musa Ensete, Gmel. Syst., and Hook. Journ. Bot. And Bot. Mag. Vol. lxxxvii. tab. 5. 223, 224 (M. Ensete, Bruce), which is also a native of the same region.

Where found several grew together, and the natives had built huts under their shade. Possibly it is cultivated in some parts.

It is 18 feet high; the stem thick, conical, and bulged at the base, where it is of a purple colour.

The leaf is nearly sessile, the midrib thick, and the blade broad. In these respects it resembles M. Ensete; but the seed is very different. All we know of the fruit is from fallen and withered specimens. There is a pendant group of many leathery capsules, each 4 inches long, with several seeds; these are the size of a pea, 5" long, 4" broad, tuberculated on the surface, rounded, with flattened facets: at one extremity is a deep hilum with raised prominent edges; at the other a disk shaped elevation.

The testa is black, but not glossy as in M. Ensete, hard and brittle. The albumen is white and mealy, deeply convex at both ends, where the hilum and the disk-shaped elevation project inwards.

The natives ascribe virtues to these seeds, as fetish; and wear them in the purification of women. The seeds of M. Ensete are used in a similar way, but for another purpose.

I find in the Museum of the Royal Gardens, Kew, seeds sent from the Niger Expedition by Mr. Barter, undistinguishable form those brought home by myself.

The common banana (M. sapientum) is grown in the country, but has been introduced as its distribution shows.72

Articles in the publications of botanical or zoological societies concerning particular specimens were tightly focused, allowing little room for wide regional description. Kirk’s article on Musa livingstoniana included details about the banana, and how it is used locally but did not expand to included discussion of trade opportunities. Articles with a wider gaze and more economic interests were published in the interdisciplinary space of the RGS. Kirk wrote his first lengthy report on the region late in 1860 and it was included with Livingstone’s despatches to the Foreign Office before being passed to the RGS. In the report, he detailed agricultural productions and trading

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72 This classification has since been changed, J. Kirk, “On Musa Livingstoniana, a New Banana from Tropical Africa”, Journal of the Linnean Society: Botany 9 (1867), 128.
patterns while discussing topography and hydrography.\textsuperscript{73} He also examined the success of foreign plants, such as cotton, and reports on their own experiments at Tete in planting different varieties. By the time of this report, the original plan of setting up a station on the Batoka Highlands had been completely forgotten and Kirk swung his attention towards the Shire Highlands, which held some potential. During the cold season he proposed that ‘European vegetables and fruits, also wheat could be raised’. At that time he also believed that it was an area that could be settled by Europeans. The second half of the report dealt with economic botany. Kirk focused his attention upon the, ‘more important vegetable productions’, namely: cotton, sugar cane, oils, Indian rubber, coffee, wood and timber, dye stuffs and cereals. The report is guarded, listing possibilities without extensive detail and overall it appears to be influenced by Livingstone’s optimism.\textsuperscript{74} The report was not a finished product and Kirk had to explain to Livingstone that one could not be produced until he could work at Kew with all his specimens and references in one place; a methodological requirement that the leader of the expedition had little respect for.\textsuperscript{75} Four years later Kirk made a short report to the Botanical Society of Edinburgh but concluded then that due to the climate ‘Europeans may rule the country [eastern Africa], but will never colonise it’.\textsuperscript{76} He held this position firmly until the end of his life.\textsuperscript{77}

A comical aside to this story of collections and their treatment is the twenty-two-year delay of four crates of specimens from the expedition. They had been assumed lost by everyone until a terse letter to Joseph Hooker as Director of Kew Gardens) from the government dockyards in Portsmouth sent on 26 September 1883 requested that he please collect the items. Upon inquiry the dockyard manager denied any responsibility previous to his desire to be rid of them. It appeared that they had been put into a private section of the warehouse and forgotten. The crates were opened at Kew and the specimens examined properly. While none were particularly exciting, there were in remarkably good condition. Not surprisingly, Kirk was rather annoyed at the whole strange incident and at the lack of care given to ‘collections of great scientific

\textsuperscript{73} Kirk, “Report on the Natural Products and Capabilities of the Shire and Lower Zambesi Valleys”.

\textsuperscript{74} At the time Kirk was deciding whether or not to stay with the expedition as he had the option to leave after two years. He decided to stay, though somewhat perplexed by the appearance of a second botanist, Meller. Foskett, ed., Zambezi Journal of Dr. John Kirk.

\textsuperscript{75} No such report ever appeared. Ibid.: 326.

\textsuperscript{76} Kirk, “Account of the Zambesi District”, 200.

importance made by an expedition under the auspices of HM Government and
conveyed to this country in a man-of-war*.78

As noted above, the RGS was the place where the region as a whole was
discussed and a variety of issues could be discussed in reference to reports from the
Expedition. Unlike the more discrete boundaries of botany and zoology, the intricate
diplomatic and political problems encountered by the expedition were pertinent issues
in conjunction with the geology, hydrography and climatic discussions. The following
section looks more closely at the internal discourse of the RGS and how it received
information from the Expedition.

‘Critical Geography’ vs. ‘Actual Observation’: The Royal
Geographical Society and the Zambesi Expedition

At the time of the Zambesi Expedition the Royal Geographical Society, under
the leadership of Murchison, was actively courting a connection between itself and
African exploration in the British public imagination.79 Using the monthly meetings
known as its ‘African Nights’, the most recent information concerning the exploits of
explorers on the continent were spectacularly revealed before giant maps dominated by
white spaces.80 Livingstone’s great fame during the run-up to the Zambesi Expedition
was in part due to this opportune linkage between the one of London’s most popular
scientific societies and his uncanny ability to survive great hardship while crossing large
swaths of Africa on foot. The millworker-turned-missionary’s first journeys were lauded
by the public as a great feat of endurance and by geographers as an exemplary instance
of precision in providing accurate astronomical positions:

Great as are the deserts [sic] of Dr. Livingstone as a discoverer
of new lands, or as a missionary and philanthropist, his real
title to the high estimation of the Geographical Society is, that
by astronomical observations he has determined the longitude
as well as latitude of so many sites, hitherto entirely unknown
to us, and has constructed detailed maps of those regions.81

Though Livingstone did know how to use a sextant, not everyone was as
supportive of Livingstone’s work. The focus of this section is on the results of the

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78 Letter, Thistleton-Dyer to Portsmouth Dockyards, 9 October 1883 RBGK Library, Zambesi
Expedition Book p.44b.
80 Driver, Geography Militant, 78-83.
Zambesi Expedition and their evaluation by members of the RGS.\textsuperscript{82} Following a look at debates concerning the work of the expedition, the epistemic and theoretical considerations that helped to structure those debates will be examined. We begin with an anonymous author who attacked the plans being made for the new expedition in late 1857. We are told that in Manchester:

[Livingstone] was subjected to an extensive examination in commerce and various branches in Natural History [of the Zambezi Valley]. This, in our opinion, was hardly fair to Dr. Livingstone, who is not, and pretends not to be, a merchant, a manufacturer, a statistician, a geologist, a mineralogist, a botanist, or a zoologist.\textsuperscript{83}

This not-so-subtle critique of Livingstone led directly to an assault on the entire plan for the Expedition on the grounds that Livingstone was unqualified to provide the information he did and that, furthermore, African societies were incapable of producing commodities fit for export to Britain. In other words, the entire plan was doomed from the start as it was based upon false precepts. Following the tradition of Charles Dicken’s damming critique of the 1841 Niger Expedition, the author called into question the rationale for the Zambesi Expedition and by extension, the entire civilising mission project as it pertained to Africa.\textsuperscript{84} The letter also raised a criticism of Livingstone that is frequently repeated: aside from his medical qualifications, he had little training as a natural historian or geographer. This stands in contrast to his supporters who utilised adjectives such as ‘scientific’, ‘rational’, ‘critical’, or ‘disinterested’ when referring to the explorer’s work.

Such critics of Livingstone during the height of his fame wrote in contrast to the rhetoric deployed to promote Livingstone and his endeavours.\textsuperscript{85} A canonical example is the “Farewell Livingstone Festival”, an RGS-led event held about four weeks before the Expedition departed and which brought more than 250 supporters together for rounds of toasts wishing the Expedition well.\textsuperscript{86} Science, in particular, was indicated as the ‘higher end’ of Livingstone’s work and speakers predicted that many fields of research

\textsuperscript{82} Fortunately, for much of this period the minutes of the meetings were published in the \textit{Proceedings} and thus the content of the discussion that took place after a paper was read can be examined.

\textsuperscript{83} Reprinted in Anonymous, “Dr. Livingstone’s Africa”.

\textsuperscript{84} “It might be laid down as a very good general rule of social and political guidance, that whatever Exeter Hall champions, is the thing by no means to be done”. C. Dickens, ‘The Niger Expedition’, \textit{Household Words} (August 1853), 45-64.

\textsuperscript{85} Likewise, a more typical depiction of Livingstone as an exemplar of all that is good about missionary work is found in Oliphant, “The Missionary Explorer”.

\textsuperscript{86} Anonymous, “The Farewell Livingstone Festival”.
would benefit from the Expedition. As discussed here in Chapter 3, science figured
strongly as a justification for public expenditure.

With the send-off parties over, it did not take long after the expedition departed
for the tone of extreme optimism to change. There was soon a sober reflection in the
RGS upon the difficulties facing a project with such loosely-defined goals. On 24 May
1858, coinciding with the Expedition’s first mistaken attempts to find its way through
the Zambezi delta, Murchison gave his yearly presidential address to the RGS. In
respect to the Expedition he asked for those present to be prepared to hear of great
difficulties to their navigation of the river.87 This comment foreshadowed critiques of
the entire project based upon arguments that the difficulties in navigating the river were
already known prior to the Expedition and that Livingstone had knowingly
misrepresented the situation in order to gain support.

Perhaps more surprisingly, the RGS’s Proceedings in June 1858 presented a
description of the Zambezi River prepared by J. Lyons MacLeod who had recently
returned from Ihla de Moçambique, where he had served as HM Consul. Based upon
the testimony of the Governor of Tete, Major Tito Augusto d’Aranjo Sicard and a
Briton living on the island, George Wilson, MacLeod’s report was a summary of a larger
study of the resources of the entire eastern coast of Africa he had given to the BAAS
that same year. He published the report as a book in 1860.88 It is surprising that such
detailed information concerning a river about to be explored under government
auspices was already available from an official British correspondent. Generally,
MacLeod shared in Livingstone’s optimism about commercial opportunities in
Mozambique offering little cause for controversy, but overall the availability of such
detailed alternative information formed the grounds for criticism of the Expedition’s
own results.

Initial reports from the Expedition were read to the RGS on 10 January 1859.
The presentation included notes from Thomas Baines, the storekeeper and artist, and
maps by Richard Thornton, the geologist.89 The extracts from Baines’s journal

88 L. McLeod, “The Resources of Eastern Africa”, Report of the British Association for the Advancement of Science
(1859), 188-91; L. McLeod, Travels in Eastern Africa: With the Narrative of a Residence in Moçambique
(London: 1860); L. McLeod, “Notes on the Zambesi, from Quillimane to Tete”, Proceedings of the Royal
Geographical Society of London 2, no. 6 (1858).
3 (1858-1859), 99-106; D. Livingstone, “Latest Accounts from Dr. Livingstone, F.R.G.S., of the
presented a grim picture of a river possessing a sinuous and shifting channel with hidden sand bars at every turn. Their steamer *Ma Robert* was reported to be underpowered and drew too much water. The first to comment on this gloomy report was MacGregor Laird, whose shipyard built the steamer. He protested against the slight on his ship, arguing that the letters made clear that Livingstone regularly ordered the boat to be dangerously overloaded and mishandled.\(^{90}\) He added that the river appeared to be far too shallow for any serious commercial operations. Consul MacLeod countered with his opinion that the Zambezi was, according to his Portuguese informants, perfectly navigable for at least eight months of the year. Comments from John Crawfurd were characteristically negative, pessimistic as he always was about the ability of Africans to contribute to an industrial economy. James MacQueen argued that little in the report was unknown to him and was already available in Portuguese travel narratives. The minutes of this meeting were soon sent to the Expedition with other correspondence and Livingstone was able to respond from the field to the negative comments.\(^{91}\)

A far more serious debate erupted after an extensive report—including allusions to members’ previous criticisms—was read to the RGS on 28 November 1859.\(^{92}\) By this point, members of the Expedition had twice viewed the crucial Kebrabassa (Cahora Bassa) rapids and the results revealed it to be an insurmountable obstacle for any ship, despite Livingstone’s continuing claims to the contrary. The published summary of the minutes included the editorial comment that ‘Mr. C. Livingstone’s opinions and Dr. Livingstone’s conclusions, appear more favourable that those of Mr. Baines’.\(^{93}\) While the provision of astronomical positions for locations along the river was widely appreciated by the RGS members—and almost worth the trip—the navigability of the river was a problem that could jeopardise the entire project. Crawfurd queried bluntly, ‘With two and three feet water only in its upper course, what sort of navigable river was

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\(^{90}\) Livingstone had begun to openly refer to the vessel as ‘the Asthmatic’.

\(^{91}\) Livingstone reported receiving them by June 1859 and thought that the negative accusations were curious. See D. Livingstone, J. Kirk, and T. Baines, “Extracts from the Despatches of Dr. David Livingstone, M.D., Gold Medallist R.G.S. (Dated December 17, 1858; February 14, May 12, July 26, and October 15, 1859) to the Right Honourable Lord Malmesbury”, *Journal of the Royal Geographical Society* 31 (1861), 256-96: 270 and 273.

\(^{92}\) Livingstone, “Latest Accounts from Dr. Livingstone, F.R.G.S., of the Central Africa Expedition”.

\(^{93}\) Ibid.: 20.
that? Present also at the meeting was Bedingfeld, who had left the Expedition in its early stages over disagreements with Livingstone, and who made a lengthy report about the river and its poor navigability.

MacQueen’s comments on the report followed his normal tack: that one may find all of the Expedition’s supposed discoveries already inscribed on Portuguese maps and in Portuguese texts—which makes one wonder if any of these texts were consulted when the Expedition was organised. On the point of the river’s navigability MacQueen was vitriolic: ‘It is useless to shut our eyes to the fact that the expedition in its great object, namely, the exploration of the Zambesi as a valuable commercial channel, has for the present completely failed’. As to Livingstone’s replacement idea of opening up cotton trade in the newly discovered Shire Highlands he added ‘[the plan is] the wildest delusion that ever entered the human brain, even were the lands ours—which they are not’. Despite such harsh comments, which again reached the expedition in the field, Livingstone consistently implied that the Shire Highlands would be a source of cotton ‘larger than the cotton-fields of the Southern States of America’.

Criticism was no less heated in face-to-face encounters. As the Expedition faded to a close during 1863-4 and its members drifted towards London, analysis of the Expedition’s geographical findings at the RGS continued. The data from the Zambesi Expedition had to be added to a map of southern Africa that was beginning to fill in, though not without difficulty. Events came dramatically to a head at an RGS meeting on 13 June 1864. William Desborough Cooley, a notorious critic of explorers’ reports who disliked Livingstone in particular, read a paper accompanied by a map that contradicted many of the Expedition’s findings. Murchison, as chair of the meeting saw a potential difficulty, given that Kirk was then sitting in the room, caused by

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94 Ibid.: 21.
95 Somewhat bizarrely, MacQueen thanks Murchison for directing him to the 1623 map of Antonio Sanches, where the entire coast of East Africa was accurately portrayed, including the interior lakes.
97 Ibid.: 28.
98 Livingstone and Livingstone, *Narrative of an Expedition* 266.
99 Kirk returned to London 9 October 1863; Livingstone was the last to return on 23 July 1864.
Cooley’s conclusions in light of recent observations. Reputations were at stake. The PRG’s reports Murchison’s request at the beginning of open discussion:

All deference should be shown to Mr. Cooley’s powers as a critical geographer, for he was sure the Society desired to do justice to every man, whatever his labours might be, whether in critical geography or actual observation.

Clemens Markham then proceeded to read out Livingstone’s most recent report which was accompanied by a map drawn by Kirk himself. The two maps differed widely in their portrayal of Lake Nyassa leading Murchison to comment that there was a ‘great discrepancy between the observations of the Portuguese who visited the country many years ago, and the de facto recent observations of Dr. Livingstone and Dr. Kirk’.

This discrepancy laid the foundation for a heated discussion about the geography of the region which included comments by explorers Kirk and John Speke, along with some of the great ‘critical geographers’ of the RGS, James MacQueen, Francis Galton, and Charles Beke. For those geographers who had staked their reputations upon the practice of textual and cartographic criticism, such discrepancies in the face of direct observations presented great challenges to their conclusions and methodologies. Nevertheless, in the end Kirk’s ‘de facto’ description of the lake’s dimensions were accepted over Cooley’s secondary analyses of Portuguese descriptions.

The victory for Kirk was not complete. Direct observation would only win those particular arguments where it indeed occurred. The fact that neither Kirk nor Livingstone actually observed the northern end of Lake Nyassa, but relied instead upon local testimony, meant that the question of a river connecting it to Lake Tanganyika remained open to critical geographers and their forms of evidence and argument. Speke now claimed that Lake Tanganyika overflowed south into Lake Nyassa based upon his interpretation of information provided by Sheikh Hamed bin Sulayyim at his island in Lake Tanganyika. MacQueen thought any such connection impossible because his Portuguese sources never mentioned anything to indicate a larger river in that area. Later that year, at the Bath meeting of the BAAS, Murchison referred again to these

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101 It is possible to imagine that Murchison orchestrated the debate in order to draw a crowd for the meeting.
102 Cooley, “On the Travels of Portuguese and Others in Inner Africa”.
103 D. Livingstone, “Letters from the Zambesi to Sir R. Murchison, and (the Late) Admiral Washington”, Proceedings of the Royal Geographical Society of London 8, no. 6 (1863-1864), 256-63.
open questions and the validity of Cooley analyses, asking: ‘Are we not at this moment most anxious to determine, by positive observation, whether there exists a great series of lakes and rivers proceeding, as Cooley has suggested, from Tanganyika on the north to Lake Nyassa on the South?’

Nevertheless, the methods of critical geographers would never provide firm answers. Murchison concluded the RGS meeting with a restatement of the Society’s ideology of exploration, indicating where the truth may lie:

> When gentlemen go into such countries, risking their lives to search out the truth and making astronomical observations which fix latitudes and longitudes it is obvious that all preceding accounts, derived from Portuguese and Arab travellers who did not make such observations, must give way to facts.

This statement of credibility clearly defines the processes of geographical fact-making—and who may perform it—while reinforcing the authority of properly constructed facts over all other forms of knowledge. The opening sentence hints at themes of ‘gentle’ status and its relation to truth that indicates here not so much a strict class barrier but rather an acknowledgement of the fluid social markers of credibility: an individual’s training, reputation and experience; emphasising character over birth.

As modern readers we may puzzle at the ability of homebound geographers to contradict field reports, especially with the recently returned explorers in the room, but two concerns allowed the discussions to proceed without irony. First, the scientific credibility of the RGS relied in part ‘upon the knowledge it produced being open to rational public scrutiny.’ Secondly, that because the geography of Africa was known to ancient authorities and more recent Portuguese settlers, RGS discussions of recent observations necessarily debated the balance of authority between what Murchison called ‘critical geography’ and actual ‘observation’.

This Victorian discussion between historical accounts of Africa and recent explorers’ reports, initiated by Portuguese discoveries made during the fifteenth century, has its origins in the ‘eternal Renaissance dialogue between ancient authority and

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103 R. Murchison, “Opening Address to Geography and Ethnography Section”, Report of the British Association for the Advancement of Science (1864).
105 Compare to the stricter class barriers to credible authority described in Shapin, A Social History of Truth.
modern experience.” Hence our explorers were permitted extensive authority only when they directly and appropriately observed geographical phenomena. Such ‘ocular demonstration’ was powerful evidence, but it was not complete in terms of regional description, as it was limited to the explorer’s line-of-sight. In any analysis beyond reporting direct observations, critical geographers of long-standing respect, such as MacQueen and Cooley, possessed authority equal to the explorers when corroborating other forms of geographical evidence. Nevertheless, such critique certainly challenged explorers who highlighted the epistemic value of ‘being there’ and the insight that experience could provide. Such debates became very personal. Explorers resented the attacks upon their credibility and as professionals resisted being treated as a nothing more that remote-sensing mechanisms for metropolitan analysts. Understanding this, we can further appreciate Richard Burton’s preface to his 1860 publication, *The Lake Regions of Central Africa*:

Modern “hints to travellers” direct the explorer and the missionary to eschew theory and opinion. 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 allowed a voice concerning his own observations, if at least his mind be sane and his stock of collateral knowledge be respectable?

In reviewing closely the treatment of the Zambesi Expedition’s findings by geographers, we find the RGS meeting room functioned as a ‘space of presentation’ where reporting took place. But this presentation was not one-sided. The metropolitan geographers talked back to the fieldworkers in this space, criticising methods and observations while reinforcing a division of labour between observers and analysts. Ideally, the field was a space of pure observation, while analyses occurred in the more controlled empirical setting of the metropolis. As seen above, this ideal was neither strictly met nor were the different workspaces precisely located. Critical geographers also worked in a metropolitan field of texts and maps while explorers could

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110 On ocular demonstration and James MacQueen’s role as a critical geographer in the mapping of the Niger see, Withers, “Mapping the Niger”.
112 Livingstone, *Science, Space, and Hermeneutics*.
not resist drawing conclusions in the field. These conflicts of method and authority underscore the debates that I have been discussing here.\footnote{From the 1870s similar debates were held concerning the content of survey training courses run by the RGS. See P. Collier and R. Inkpen, “The Royal Geographical Society and the Development of Surveying 1870-1914”, \textit{Journal of Historical Geography} 29, no. 1 (2003), 93-108.}

Beyond informing our understanding of debates within the RGS, discourse on method both obscures and reveals issues concerning the micropolitics of science, the nature of accepted ideologies of science, and the particular cognitive development of the individuals involved in the discussion.\footnote{Miller, “Method and the ‘Micropolitics’ of Science: The Early Years of the Geological and Astronomical Societies of London”, 229.} The RGS’s wider public statements about its methods worked to hide internal debates about the proper application of those methods. Where we see radical empiricists challenging those who argued from the slightest notion of theory or speculation, we must recall that they were all working within a larger ideological consensus that sought to promote scientific ways of knowing as unified, accessible and transferable to other discourses.\footnote{Yeo, “Scientific Method and the Rhetoric of Science in Britain, 1830-1917”.} Following the example of Alexander von Humboldt, who had died in 1859 and who was extensively eulogized by members of the RGS, British geographers strove to work inductively from particular empirical descriptions to wider understandings of how the whole world worked while simultaneously demonstrating their competence to the wider scientific community.\footnote{Geographers at this time continued to endure accusations of working within a less intellectually rigorous discipline. M. Bowen, \textit{Empiricism and Geographical Thought: From Francis Bacon to Alexander Von Humboldt} (Cambridge: 1981): 10.}

It was not only in geography that such debates could take place, though the RGS was the natural home for such discussions. In the examination of botanical and zoological fieldwork in the previous chapter, it was shown how debates about method could reveal where race, class, and education contributed to determinations of authority and credibility. In geography, metropolitan analysts and critics used similar criteria when assessing credibility while seeking to exert control over fieldworkers and their methods in order to maintain the status of their discipline. There is a special case outside of geography where such assessment and critique occurred in reference to zoological collections. Using published materials uncovered during this research and as yet not used by scholars of Livingstone, the next section looks at criticisms coming from a powerful member of Germany’s scientific community.
Wilhelm Carl Hartwig Peters and the Zambesi Expedition

An important, but largely forgotten critic of the Zambesi Expedition, Peters wrote from his position in Berlin as Professor of Zoology and director of the Zoological Museum. Earlier in his career, Dr. Wilhelm C. H. Peters (1815-1883) spent nearly six years in Mozambique between 1842 and 1848, including nine months’ residence at Tete. He gathered extensive zoological and botanical collections and published descriptions of his collections, with assistance, over a period of thirty years.117 Unfortunately, because Peters published so slowly, disputes occurred between the naming of his specimens from the 1840s and those collected by Kirk and the others. Peters became incensed after reading an article given by John Edward Gray on 9 February 1864 to the Zoological Society of London which identified Mozambican lizard specimens collected by Kirk. The following excerpt from the article started the row, Gray wrote:

*Cerbohiaurus robustus* Dr. Peters gave the name *caudia* but Kirk says this name means “I don’t know,” which was probably the response of a native asked. Common near Tete. The native told Dr. Kirk that it entered fowl-houses and killed the fowls, and that it bit very hard.118

Peters was quick to respond to this slur against his ability to gather local information. His response, dated 14 July 1864 appeared in the *Proceedings of the Zoological Society of London* on 8 November that year:

As from this it might appear that I had collected the very important indigenous names of animals which I met with in Mozambique in a thoughtless and unremarkable manner, you will allow me the following remarks:

…I never took down a name from a person whom I did not understand; and all native names I have published have been carefully compared and corroborated by several persons.

…I am particularly indebted to Senhor Pascoal, Senhor Candido Jose da Costi Candozo, Senhor Nunez, and Senhor Botleho for their assistance in pronouncing and writing the native names. All four were natives (not negroes), spoke very fluently the Portuguese language, and knew the productions of the country. In doubtful cases about the native names of

117 Peters, *Reise Nach Mosambique*: The members of the expedition certainly knew something of Peters’s work because an unpublished linguistic work prepared in Sierra Leone and drawn up with Peters’s help was specially printed for supply to the Expedition W.H.I. Bleek and W.C.H. Peters, *The Languages of Mozambique: Vocabularies Drawn up from the Manuscripts of Dr. Wm. Peters and from Other Materials* (London: 1856).

zoological objects, they called their negroes and the names were discovered.119

Peters described his collection methods further and then dramatically revealed that the word in question, ‘Caaia’, was a misprint in a Berlin journal and thus the error made its way to London. He also contradicted Kirk by stating that the word signifying ‘I do not know’ at Tete is ‘penu’. Peters then questioned Kirk’s report that the Gerrhosaurus was reported to leave the river and invade the fowl-houses. Commenting on his personal experiences at Tete, Peters concluded his complaint:

I cannot believe that the language of Tette can have changed so much since my time, that a word which only exists in a misprint at Berlin should have been introduced instead of a word which was used every day, and at the same time, in three different dialects.

Neither did I hear that the Gerrhosaurus enters the fowl-houses and kills the fowls, which is rather astonishing as the Gerrhosaurus does neither climb nor fly, and the fowl-houses, at least at Tete, are provided with perches, on account of the rats. Dr. Kirk will, perhaps, be able to tell us whether the same native who gave him such valuable information about the customs and common appearance of the Gerrhosaurus was his teacher in the language of Tette?220

Peters’s response was fierce, he launched a direct attack upon Kirk’s field methods and choice of informants. Kirk replied to this letter tactfully, acknowledging that he did not know about the misprint and that he never meant to launch an ad hominem attack in print. He had also written to Livingstone for advice concerning the linguistic points of Peters’s comments.221 But these concessions did not lead him to give Peters the upper hand completely as Kirk’s response demonstrates:

From a letter of Dr. W. Peters in the Proceedings of the Zoal. Soc. 1864, p. 377, I find that a casual word of mine has given that gentleman some annoyance which on my part was not intended. On handing over the Reptiles collected by me in Eastern Tropical Africa to the British Museum, Dr. Gray remarked that one of them, Gerrhosaurus robustus, was, according to Dr. Peters, named ‘Caaia’ by the natives of Tete. I had not seen Dr. Peter’s paper ‘On the reptiles of Mosambique,’ and I remarked that this word meant in the native language, ‘I don’t know.’ To this I attached no importance, nor was it meant for publication; still less was I aware that the word, ‘Caaia’ had been a misprint.

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120 Original italics, Ibid.
Dr. Livingstone writes me thus: “Mr Moffat has been collecting words in the Sechuana language for the last forty-three years, and finds new ones every week. In eight years I had upwards of seven thousand and rejected many hundreds as either uncouth or to me quite useless. I think there were eleven names for a lion, and no end of words meaning different shades of fools!” Dr. Peters has referred to me a vocabulary of the Mozambique languages, published by Dr. Wm. H. J. Black [sic], from manuscripts of his and other materials, now including minerals. Only about 900 words are given here, whereas, judging from what Dr. Livingstone says of the Sechuana, this dialect must contain an equal number of terms; and no one could, in my opinion, in nine months collect even the common expressions. Let me assure Dr. Peters that there is no necessity for supposing that the language has changed since 1845, because one word is omitted from his vocabulary. The word ‘penu,’ which Dr. Peters gives as signifying ‘I don’t know,’ does so only inferentially, and means literally ‘perhaps,’ ‘it may be,’ ‘possibly.’ There are other expressions more definite, and in common use. In regard to the last part of Dr. Peters’ letter, I will remark that the majority of Tette fowls live in the huts of the people, and not on perches. And may I remind him of the widespread idea in Africa that the bite of the Chameleon (Chamaeleon dilepis) is venomous to man, although it possesses no means of inflicting more than a slight squeeze with its weak jaws. He will therefore possibly concede that the same people may believe that the Gerrhosaurus kills fowls.122

While conceding some zoological expertise to Peters, Kirk was not about to allow his four years’ residence in Zambesia to be upstaged by Peters’s nine months. Calling upon the expertise (in sub-Saharan languages) of Robert Moffat, David Livingstone’s father-in-law, Kirk marshalled years of experience behind him and brought into question Peters’s ability to make credible conclusions about languages spoken near Tete. He also, in very clear terms, disagreed with Peters on the sleeping habits of the chickens of Tete and his overzealous reliance upon local testimony concerning animal behaviour.

At face value, this entire argument borders on the ridiculous: the men are arguing, in print, about where chickens sleep at night. But much more was at stake. The evidence provides a direct view of the degree to which trust and reputation contributed to the construction of knowledge about foreign nature. Both Kirk and Peters were respected members of the Pan-European scientific community and their

122 The vocabulary referred to is authored by Dr. Wilhelm Heinrich Immanuel Bleck, not “Black” as suggested in the letter. J. Kirk, “Letter Dated 28 February Replying to Dr. Peters”, Proceedings of the Zoological Society of London (1865), 227.
reputations secured the trust placed in their reports of field observations. We can assume that almost none of the readers of the PRGS was planning on going to Tete themselves to verify the information. If Kirk and Peters were not even able to agree on the chicken coops, then however well they may have presented their data, others (with good reason) would begin to suspect their veracity and ultimately their future reputation as trusted observers. The entire exploration ‘project’, from beginning to end, was threatened by such disagreements. In the same way that laboratory experiments were thought to be reproducible, here, if two Europeans visited the same African locale, they should report similar observations. Livingstone was plagued by similar troubles when his reports of the Cahora Bassa rapids differed in quality from those of Baines and the others. The field observer must be considered accurate to be effective. Any threat to this accuracy was taken very personally, even if it concerned the chicken coops.

Another aspect of this debate brings us back to the local informants discussed in the previous chapter. Though on the surface they appear scarcely more important than the lizards and chickens, this debate in fact dealt specifically with Kirk and Peters’s skill in interrogating informants. Peters explained his corroboration of sources carefully, and so drew his readers into his fieldwork methodology. Though located in the ‘wilds’ of Zambesia, Peters indicated that he maintained an organized, sceptical, European gaze and chose his informants based upon criteria brought from Europe.

Kirk challenged this attack on methodological grounds. Relating to his fieldwork in this instance, he made almost no mention of informants, preferring instead to offer reports of first-hand observations. His knowledge of local languages was personal and extensive, only referring to other linguistic research when discussing the more universal methodology of gathering vocabularies in foreign lands. Kirk replied to Peters’s criticisms by indicating his superior experience to the readers of the PRGS, who would also be quick to notice the lack of simple reliance upon local informants in Kirk’s response. Kirk drew upon the standards of his scientific community well, and appears to have won the day.

The zoological debate was clearly personal and contributed to Peters’s overall displeasure with the claims of discovery for the Expedition. It was the Livingstone brothers’ publication of their Narrative in 1865 that angered Peters the most. Peters took great offence at what he called ‘Dr. Livingstone’s pretensions’ to claim discoveries in the region, given his obvious ignorance of what was already known. Peters prefaced
the 1868 volume (Zoologie IV: Flussfische) of the Naturwissenschaftliche Reise Nach
Mossambique with a lengthy diatribe against Livingstone that included:

It was not to be expected that a man like Livingstone, a man
distinguished by his insurmountable wanderlust, extraordinary
physical tenacity and great intrepidity, yet a man of little
acquaintance with the literature of his own native land, should
somehow have any knowledge of the literature of Germany.¹²³

Pardoning Livingstone’s ignorance thus, Peters accused the entire scientific community
in Britain of even more irresponsible disinformation. The British, he challenged, were
clearly ignorant of anything written in German apparently because Livingstone was able
to claim false geographical discoveries before the RGS and BAAS without any
reproof—discoveries that Peters claimed were already ‘incorporated in the regular
school curriculum in Germany’.¹²⁴ Peters also slyly mentioned that of the fish specimens
returned by the Zambesi Expedition, most were already represented in his own
collection—which he made over a much shorter period of time.¹²⁵

Peter’s attack was based in the main upon a question of cartographic
interpretation: the representation of the Zambesi delta and in particular the location of
the main distributary. Livingstone alleged that the Portuguese had been regularly
producing false maps showing the main distributary of the Zambezi to be the Kwakwa,
with its mouth at Quelimane. He argued that this lie was given to mislead British anti-
slavery blockade ships, thus allowing Portuguese slavers to escape via the true
entrance.¹²⁶ Peters was offended that his Portuguese friends were so insulted. He
indicated, firstly, that everyone already knew that the Kwakwa was not an important
channel of the Zambezi. Second, Peters argued that if anything the Portuguese were
only guilty of following the maps drawn by an earlier British expedition on the Zambezi
led by William Owen in 1823.¹²⁷ In crossing the line from science to politics, Peters
alluded to the diplomatic tensions caused by the Expedition’s activities in Portuguese

¹²³ Thanks are due to Dr. A. Hilley for translations of Peters’s work. Peters, Reise Nach Mossambique.
¹²⁴ This is not entirely accurate for a minority of Livingstone’s British detractors, such as James
MacQueen, attacked him regularly on exactly the same grounds. Cf. Ibid.
¹²⁵ It is possible that Albert Günther’s refusal in 1874 to allow Peters access to the British Museum’s
zoological collections may be related to Peters’s harsh words. See an angry letter from Peters to
Richard Owen dated 23 December 1874, NHM, Owen Correspondence, 62.21/302. In the letter
Peters stated that he will have nothing to do with the British Museum ever again.
¹²⁶ Livingstone and Livingstone, Narrative of an Expedition. 12-14. The Kwakwa may have been an
important outlet when Quelimane was first established in the early sixteenth century. In the 1860s it
was still directly navigable during periods of high flood and during lower water periods were used to
transfer loads between the two rivers regularly.
¹²⁷ All three European members of that short-lived expedition died on the river. Owen, “Particulars of an
Expedition up the Zambezi to Senna”.

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territory and demonstrates for us how politics and geography were linked through exploration.128

Peters’s remarks remind us that news concerning expeditions travelled far beyond Britain. Expeditions—and their reporting and consequences—were international events. Geographical societies around the world exchanged journals and information about newly explored areas. New images of Africa produced by the Zambesi Expedition contributed to cartographies of Africa worldwide.129 In this case, a conflict of opinion about geographical information resonated through considerations of national pride, precedence, and territorial claims. Summing up his opinion on these debates, Livingstone wrote his response to those who would challenge his discoveries in the region:

Native information has been appropriated by Europeans and possibly some more reliable geographical knowledge may have been buried in the Portuguese archives but it may be presumed that only when the interior and lakes were visited by Englishmen and the results given to the world that the discoveries can be said to be made at all.130

**Conclusion**

It was partly because the scientific community was so self-conscious in the early 1860s that the Expedition received such harsh criticism. Livingstone, the great ‘scientific explorer’, was proving to be less a ‘man of science’ than people had hoped. A number of his great claims turned out to be nothing more than conjecture based upon insufficient evidence and questionable methodologies: the navigability of the Cahora Bassa rapids and the Rovuma River, the healthfulness of the Shire Highlands and local capacities for commercial agricultural production. Such inconsistencies not only indicated methodological irresponsibility, they potentially damaged the entire scientific

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128 The Expedition and its impact upon future boundary commissions separating Portuguese and British spheres of influence could be examined in light of Burnett’s work along these lines in British Guiana. Burnett, Masters of All They Surveyed: Exploration, Geography and a British El Dorado.
129 Notices of the Expedition’s findings with accompanying maps regularly appeared in Germany. For an example see Anonymous, “Dr. Livingstone’s Fahrt Auf Dem Nyassa-See”, Petermann’s Mitteilungen (14 March, 1863), 107-09.
community and its public support. We can thus better understand why Murchison was reportedly morose about the Expedition as it closed up, and why the critical geographers took such a hard look at its results. Leaders in the scientific community, especially Murchison, deliberately used men like Livingstone as lightning rods for public attention, and hopefully, public funds.¹³¹ Less popular projects would benefit by riding the coat-tails of the famous, and in this case they did. Should large projects become discredited, then adjacent support for less popular projects would be lost as well. In an era when formal links between science and government were still being forged, the scientific community had to maintain a high level of self-regulation.

While the larger goals were not achieved, botany, zoology and the earth sciences all benefited from the fact that a British expedition was sent to the Zambesi. A great deal of specimens, data, photographs and paintings resulted; and these were appreciated not only by pale scientists hiding in a herbarium, but also the wider intellectual community. In more polite reviews, the results of the Zambesi Expedition, while neither publicly earth-shattering, nor scientifically tremendous, were at least noticed:

> Although the results of this expedition have not been in all respects commensurate with the sanguine hopes that had been formed of it, it has been the means of extending our geographical knowledge by several important discoveries; and Dr. Livingstone and his fellow-travellers have collected much information on the geology, botany ornithology, and zoology of the districts which they have leisurely surveyed; they have thrown much light on the hydrography of the south-eastern part of Africa, and obtained a far more complete knowledge of the native tribes, their languages, habits, state of civilisation and religion, than was possible in the former expedition.¹³²

Allowing this type of reception to stand on its own ignores, however, its opposite, namely public criticism focused upon what Livingstone said the region should be like and how it actually turned out to be. The deaths of the UMCA missionaries especially angered a public that still remembered the disastrous Niger Expedition of 1841-1842 when so many people died for so little. An anonymous letter printed in The Times makes a point-by-point attack on Livingstone’s rhetoric and its results:

> We were promised cotton, sugar, and indigo, commodities which savages never produced; and, of course we get none.
> We were promised trade, and there is no trade, although we have a Consul at £500 a year. We were promised converts to the Gospel, and not one has been made. We were told the

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¹³¹ Driver, “David Livingstone and the Culture of Exploration in Mid-Victorian Britain.”
¹³² [Tremheere]: 3.
climate was salubrious, and a Bishop and some of the best
missionaries of the temperate region of South Africa, with
their wives and children, have perished in the malarious
swamps of the Zambesi. In a word, the thousands subscribed
by the Universities and the thousands contributed by the
Government, have been productive only of the most fatal
results….Dr. Livingstone is unquestionably a traveller of
talents, enterprise, and excellent constitution, but as it is now
plain enough that his zeal and imagination must surpass his
judgement.  

It did not pass by many observers that—outside of science—little more was
known about the Zambesi region in 1864 as compared to 1857 that was not negative.  
Slavery, especially the internal market, was rampant and getting worse; the Zambesi was
not a deepwater river; the climate was less than welcoming, and promising interior
regions were difficult to reach. In his original book about the region Livingstone had
made great claims and few were immediately realised. By the end of the Zambesi
Expedition many agreed with James Stewart, who after spending most of 1862 and part
of 1863 as a guest of the Expedition investigating the possibilities for a Scottish mission
station, recorded in his journal:

In the afternoon I went down to the river-bank a short way
and threw with all my strength into the turbid muddy
weedeovered Zambesi my copy of [a] certain ‘Missionary
Travels in South Africa’. The volume was fragrant with
odours of and memories of the earnestness with which I
studied the book in days gone by. How different it appeared
now! It was nothing short of an eyesore, the very sight of its
brown covers. I do not think it is as the Rev. R. M [?] is said
to have called it, ‘a pack of lies,’ but it would need a great
many additions to make it the truth. Thus I disliked the book
and sent it to sink or swim into the vaunted Zambesi. So
perish all that is false in myself and others.

This chapter has examined the metropolitan reception of knowledge produced
by the Zambesi Expedition. Initially, the published ‘product’ of the expedition is
presented. Here the variety of trajectories and representation that specimens and data
undergo is seen in the form of its final product. These articles present ‘universalised’
knowledge that has been taken from the field and brought into British science. It has
been seen that in different disciplines the context of the field site was of varying
importance. In the case of geomagnetic studies, the ‘local’ was not a factor, instead the

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133 Anonymous, “The East African Mission (Reprinted from the Examiner)”.
134 Compare the big themes running through Livingstone, Missionary Travels and Researches in South Africa:
to Livingstone and Livingstone, Narrative of an Expedition.
135 The editor of the journal speculates that ‘Rev. R.M.’ may be Robert Moffat, Livingstone’s father-in-
measurements were similar to those made all over the globe.\textsuperscript{136} In the case of geography or economic botany the context of the field was the subject of lengthy discussion.

The reception received by the knowledge the fieldworkers was not always welcoming. These situations have been highlighted here in particular because they reveal most clearly the tensions between credibility, rhetoric and trust. Debates between Kirk and William Desborough Cooley and between Kirk and Wilhelm Peters demonstrate vividly the importance of the spaces of collection within metropolitan knowledge. In order to assess whether or not Kirk’s knowledge was credible required consulting his field practices. The status of local informants was questioned along with the explorer’s skills as interpreter of their testimony. Explorers acted as intermediaries or advocated for the local. Again, themes of travel, trust and credibility are apparent. These final points echo the main themes of this thesis. The conclusion which follows returns to these themes along with the others, though credibility may be seen everywhere as having a vital role in all the activities of expeditions.

\textsuperscript{136} This may relate to Pynson’s findings that the exact sciences were minimally affected by their locations. Here I rely on the discussion in P. Palladino and M. Worboys, “Science and Imperialism”, \textit{Lis} 84 (1993), 91-102. For Pyenson’s response see L. Pyenson, “Cultural Imperialism and Exact Sciences Revisited”, \textit{Isis} 84 (1993), 103-08.
Chapter 7: Conclusion

When a native of the temperate north first lands in the tropics, his feelings and emotions resemble in some respects those which the First Man may have had on his entrance into the Garden of Eden. He has set foot in a new world, another state of existence is before him; everything he sees, every sound that falls upon the ear, has all the freshness and charm of novelty. The trees and the plants are new, the flowers and the fruits, the beasts, the birds, and the insects are curious and strange; the very sky itself is new, glowing with colours, or sparkling with constellations, never seen in northern climes.\(^1\)

\[\text{\ldots} \]

[The European] must never forget that, in the tropics, he is an exotic plant.\(^2\)

These two quotes, taken from the extreme ends of the Livingstone brothers’ *Narrative*, evoke the duality of the tropics in the mid-Victorian imagination. On the one hand a place of overwhelming beauty, and on the other a region of deadly miasmas and insufferable climate.\(^3\) The tropics were *different* and the analysis of the methods used by the members of the Zambezi Expedition to manage this difference has occupied large portions of this thesis. The central problem of Victorian scientific practice was to take the wild nature found in numerous unknown regions and incorporate it into the structures of natural history. It is this idea of the Zambezi basin as a place where scientific practice was *taken to* that I would like to discuss here by way of conclusion. I will first review the findings of the main chapters before turning to a brief discussion of the general themes.

Chapter 3 examined the formative period of the Expedition. The ‘culture of exploration’ dominant in the 1850s was examined in order to see how an expedition was built from the social, ideological, scientific and technical ‘tools’ available at the time.\(^4\) Initially, the motivation for the Expedition appears to have been dominated by the ‘civilising mission ideology’, often summarised as the ‘three Cs’: Commerce, Christianity and Civilisation. If these qualities of British life were accepted by the people of central Africa, then the slave trade would disappear along with millennia of ‘darkness’. The first

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\(^1\) Livingstone and Livingstone, *Narrative of an Expedition*. 14.
\(^2\) Ibid.: 427.
\(^4\) Driver, *Geography Militant*. 
step, Livingstone argued, was exploration.\textsuperscript{5} Places needed to be mapped first, then the inhabitants could be introduced to civilisation, he referred to this as ‘opening up’ or ‘the thin edge of the wedge’.

Many biographers have in the past isolated the idea of the civilising mission as the main motivation for the Zambesi Expedition. However, a closer look at the specific mood concerning Africa in the later 1850s, especially 1857, revealed that Africa was not as high on the popular agenda as supposed. The continent was a commercial backwater while larger issues like the Indian Uprising dominated the press.\textsuperscript{6} Moreover, the evidence surviving from the formative period demonstrated that leading figures in the scientific community were involved in lobbying for and then planning the Expedition from the beginning. The members of the Expedition who served below Livingstone were chosen only with the approval of the scientific community and the briefs given to these members were written by scientists.

Stafford’s research into the life of Sir Roderick Murchison finds that the geologist used expeditions to Africa to test his structural theories.\textsuperscript{7} This thesis extends that conclusion and finds that the expedition was used by many branches of science to either test theories or collect data. Furthermore, it is shown here that without the involvement of the scientific community and the promise of data and collections, the Government may have not found cause to fund Livingstone’s second expedition.

Science and the civilising mission thus used each other to procure public support. The tension between empirical and humanitarian goals that occurred throughout the Expedition were part of its foundation.

These tensions were most clearly realised in the conflicts discussed in Chapter 4 which takes a close look at the use of technology by the explorers, in particular steam navigation and imaging technologies. Steam ships were great symbols of British industrial superiority and were used on the Expedition in part because of the image they projected. When they failed to live up to this image, frustrations and anger resulted.

The chapter details the negotiations undertaken to bring steam to the Zambezi and the struggle to deploy it effectively once there. The role of the steamers as symbols of

\textsuperscript{5} Livingstone, Missionary Travels and Researches in South Africa: 673.

\textsuperscript{6} Important studies here are: Brantlinger, “Victorians and Africans: The Genealogy of the Myth of the Dark Continent”; Hobshawn, The Age of Capital: 1848-1875; Robinson, Gallagher, and Denny, Africa and the Victorians.

\textsuperscript{7} Stafford, “Roderick Murchison and the Structure of Africa”.

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power is examined through the interactions that occurred between the explorers and the locals onboard and around the ship.

The chapter also examines the images produced by the Expedition, linked to steam power because many of the most iconic images of the project include the steamers. Baines created images of steam power that glorify and ridicule its use on the river, his images are the most important chronicle of the hopes and failures of the early years they were in the field. Elsewhere Baines turned his eye to recording the flora, fauna and human inhabitants of the region, providing important records of Zambesian life in the later 1850s.\(^8\) His images were not photographs though, they brought activities and space together to reveal distributed processes in local settings. In some senses this is a disingenuous archive, it is not ‘real’ in that the refining of sugar did not happen in the way Baines portrayed it. Once we understand what he intends, then we can see much larger spaces implied in a compressed village scene. He took his role as a mediator seriously and offers very ‘efficient’ images of local practices.

In photography, the situation is more complicated because, for now, the bulk of the images are not extant. We do not have direct access to Charles Livingstone’s work. In the calotypes made by Kirk we can see how he used photography to record life \textit{in situ}. He also attempted landscapes and made images of local material culture, though without the people. He used processes that required long exposures preferentially. Despite these shortcomings the images are historic because they are the first. Photographers did not return to that part of the world for over a decade.

The analysis of field work continues in Chapter 5. The spaces of collection were examined in detail. The role of local informants was considered in depth and their epistemic contributions considered. The absence of the local voice in the records of their field work was queried and found to have causes related to ideologies of race, class and empiricism. It was necessary for the British explorers to demonstrate their control over the spaces of collection in order for the knowledge they gathered to be accepted as valid elsewhere. Thus geographies of credibility are uncovered. Evidence for this came from written and material sources, the latter in the form of extant specimen collections. But the local voice was not everywhere obscured and this chapter also shows how local

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\(^8\) His work in botanical illustration is discussed in Arnold, “Thomas Baines and Southern Africa Flora: ‘My Small Skill in Botany’.”
information persisted through representations of the region. This latter point will be expanded upon below.

The politics of the spaces of collection cannot be fully understood in isolation. In Chapter 5 practice in field spaces is connected to the empirical concerns of metropolitan spaces. A series of case studies provides evidence for this. The case studies also demonstrate the circulation of knowledge through the scientific community, from field to metropolis and beyond. Simple centre-periphery models and reductive ideas of ‘centres of calculation’ are challenged because the networks which specimens followed from field to analysis did not match such a pattern. The zoological specimens in particular were shown to have been distributed widely through a loose network of naturalists linked by professional relationships. This conclusion does not deny the central importance of the British Museum or Kew Gardens in this but rather suggests that ‘facilitation’ rather than ‘calculation’ may be a better way to describe the organisational work that was performed at these sites. Other studies which look at Kew’s role as the conductor of a network of colonial botanic gardens support this change in focus.9

The final chapter leads chronologically to the end of the Expedition, when the field workers returned to Britain to unpack, collate, analyse and present their results to the scientific community. Whereas the previous chapter looked from the field to the metropolis, here the focus is on the metropolitan spaces of science. To this end a review of scientific literature which used data or specimens from the expedition was made. The institutions and individuals who performed analyses were identified. This was done so that the representation of the Zambezi basin in Britain could be examined where it happened: obviously in the Narrative, but also in the discussion of a few specimens among many in taxonomic publications where the context of the collection site is almost totally absent.

In periodicals and in debating halls the critics of the Expedition challenged the empirical results of the Expedition. These statements reveal for us the difficulty of moving knowledge from distant, local fields to the universalised discourse of Victorian science. Credibility is challenged precisely, with critics locating where testimony is being used as evidence, where the explorers had limited control over their observations or

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where interpretations were considered biased. The Kirk/Cooley debate over the geography of Lake Nyassa was tensely discussed as the critical geographers faced off against an ‘actual observer’. The direct observation of natural phenomena by disciplined senses—in this case a British explorer using the appropriate instruments—was acknowledged by everyone present to offer the firmest conclusions. However, where this did occur, the home-based geographers challenged the travellers’ interpretations.

Wilhelm Peters, writing from Berlin criticised the zoological results of the Expedition fiercely, particularly comments made by Kirk. This resulted in a published debate over the local name and behavioural characteristics of the lizard *Gerrhosaurus robustus*. Their arguments criticised each others’ field methods, especially the ability to interpret local testimony. The strength of Metropolitan—in this case European—knowledge was inextricable from field practice. Both Peters and Kirk realised this and defended their methods of gathering information to prove that they were reliable reporters of distant nature. As few opportunities existed to double-check or replicate their work, trust was critical. The reason that the Kirk/Peters debate was so important is that Peters had been to the Zambesi as well. He offered the only criticism based upon this personal experience.

With this summary of the chapters complete, I conclude with a discussion of the general themes of the thesis. This research has used the Zambesi Expedition to examine a number of assumptions that historians and geographers of Victorian science have developed. By and large these assumptions are not challenged here but they may now be better understood through this detailed analysis of the activities surrounding and performed within a single expedition. The emphasis here has not been on changes in theories or practices over time, but rather on the relationships between practices performed between and within different spaces. Theories, in this analysis, are one of the many parts of practice and as such play only a supporting role here.10 The expedition was mainly about collecting and thus did not—nor was it expected to—alter general assumptions about nature. In fact, the general assumptions about nature were being overturned in the metropolis during the Expedition as the controversies over Darwinism began while it was in the field. With this in mind, these closing words will bring together the different ‘spaces of expedition’ considered here.

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10 The only theory that we can argue was challenged by the results of the Expedition were those of Roderick Murchison concerning the morphology of coastal ranges in southeastern Africa. See Stafford, “Roderick Murchison and the Structure of Africa”, 29.
The Zambezi was a place where the investigators were foreigners and where these outsiders perceived local concerns that threatened to swamp their universal scientific discourse at every bend in the river. Their dutifully-trained senses were threatened by an onrush of exhilarating novelty while their bodies were assaulted by disease. Instruments rusted, specimens were spoiled with rot or vermin and the river itself thwarted steam navigation while resisting all attempts at survey. Politically, the situation was incomprehensible: European colonists paid tribute to Ngoni kings, black men called themselves Portuguese, settlers fought against government soldiers, the slaves were armed and a far-off monarch in Lisbon claimed to be in control. The political and environmental climate was not just challenging—it was uncontrollable.

It is therefore not surprising that the original plan for the Expedition was to travel far beyond the region of Portuguese settlement and high above the malarious lowlands of the Zambezi valley. On the Batoka Plateau a small British consular station (with a Union Jack flying overhead) would provide an ordered space centred on a prefabricated iron house. From here temporary forays into the surrounding wilds could be made in order to catalogue the natural resources of the region, always with a controlled space to return to. This fixed outpost of British culture would allow for the careful and methodical production of an accurate representation of African nature. It was intended that the metropolitan spaces of scientific discourse would be linked to the middle of southern Africa through practices of disciplined observation, accurate mapping, recorded images and the return of catalogued, preserved specimens.11 The skills and standards for all these practices were British. They were transported to the Zambesi in the form of instruments, manuals and embodied knowledge. In the plan for the Expedition, we find clear support for Livingstone’s recent conclusion that science as a cultural practice ‘is best exemplified with particular clarity in the field’.12

Scientific practice was also shown to be contested in the field: different aspects of practice entailed different conceptions of space. The failure of the original plan because of barriers to steam navigation in the form of the Cahora Bassa rapids led to struggles between the scientists and the environment and between themselves. The duties of managing the Expedition restricted the time allowed for research. The steamers, with their demands for fuel and inability to proceed through shallow water,

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11 This list is paraphrased from themes discussed in Livingstone, *Putting Science in Its Place*: 153-67.
12 Ibid.
imposed the locations for collecting excursions onshore, not the empirical concerns of botany or geology. The letters of Kirk and Meller to Kew Gardens demonstrate very clearly that there were serious conflicts over the geography of scientific practice. They could not collect where they wanted. Thornton only succeeded in proceeding unfettered in his geological research when his duties to the Expedition were removed. When Livingstone asked him to return he agreed only with the proviso that he should be able ‘to travel about the country very much where I wished’.\footnote{13}

Despite these conflicts, this thesis has shown that a large amount of specimens and data were gathered in the field and returned home successfully. Many of them remain preserved in Natural History collections around Britain today. It has also shown that the collections were often trusted to be what the fieldworkers said they were. This is no small feat to be filed away in the archives of Victorian science. These same specimens are found today in active herbaria and zoological collections, they continue to be consulted as holotypes, as data in biogeographical studies and for systematics. Scientists in the twenty-first century continue to accept, and to rely upon, the credibility of the members of the Expedition as scientists. This raises important questions about the unique ability of science to circulate among peers as well as through history.

The latter part of this question has not been fully addressed here but the first part has. The field offered a specific set of challenges to the members of the Expedition while they were trying to produce scientific knowledge. They reacted to the challenges by using strategies that would answer two purposes: solve the problem locally and use a solution that would be universally acceptable, that is, it would meet the standards of the British scientific community who believed in the universality of their science. The explorers were thus always acting with two places simultaneously in mind: field and metropolis. In this sense, they were never only locals on the Zambezi, nor could they be. To properly understand the social interests that shaped scientific practice in the field it has been necessary to disclose the metropolitan discourses that informed that practice.

The maintenance of credibility has been isolated as a key theme here. It was required of the appointees to the expedition prior to their selection and was renegotiated throughout the project. Livingstone began to lose credibility among geographers and other supporters as his predictions of the navigability of African rivers began to dry up, though his reputation would soon recover. Kirk and Meller never lost

\footnote{13 14 July 1862, Tabler, ed., \textit{Papers of Richard Thornton}: 254.}
credibility as their results were accepted and even where challenged, they argued their positions successfully. Both went on to careers as Consuls, along with Charles Livingstone whose work as a technician was deemed accurate. Baines, for reasons that have nothing to do with the success of his assignment as the artist, lost his hard-earned credibility as an explorer, but only in Britain. In South Africa Baines continued his career as an explorer and landscape artist.

Given these career consequences we find, in turn, an interesting result. Many of the explorers’ contemporaries in 1864 considered the Expedition, taken as a whole, to be something of a failure. But this did not lead to ignominy for all involved. Instead they were able to use the Expedition as evidence of their abilities and expertise and moved on. This serves to remind us that credibility was about practice and not results. With the only partial exceptions of Baines and Thornton (who was later exonerated) none of the leading members was successfully accused of improper behaviour. The failure of the Expedition to achieve its grandiose plans to civilise the southern tropics was not a failure of method. Rather, political, climatic, technological and geographical difficulties were offered. In any case, the Expedition as a whole was not the concern of the botanists, zoologists, geophysicists and cartographers who were perfectly happy with the results produced for their field. Here, the field workers had acted appropriately and their results were, if not a huge success, at least thoroughly respectable.

One area were credibility was energetically negotiated concerned the testimony of local informants. Whether Portuguese, Goanese, Makololo, Manganja or Chikunda it was undecided among the fieldworkers and metropolitan analysts how to assess who deserved recognition. The purpose of expeditions was to put British senses on the scene and thus to bypass uncertified testimony. Field work proved to be more complicated and required the frequent use of local testimony. Such testimony was unregulated by the metropolitan community and was thus, suspect. The task of the field workers became in some instances to assimilate local knowledge into their own conclusions and then argue in the metropolis for its validity. The field encounters, taking place as conversations, were fraught with possibilities for prevarication, distortion and misinterpretation. The debates between Kirk and Peters or those between the

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14 As has been shown Livingstone himself was accused of irresponsibility and prevarication but this was not a majority opinion. Such debates over his character continue today cf. Jea, Livingstone; Ross, David Livingstone: Mission and Empire.

15 cf. Withers, “Reporting, Mapping, Trusting: Making Geographical Knowledge in the Late Seventeenth Century”.

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critical geographers and the explorers reveal that within the spaces of a society’s meetings and publications the management of field difficulties contributed directly to metropolitan assessments of credibility. When the explorers argued successfully for their informants, the information provided by these informants was allowed to ‘participate’ in science through the medium of the members of the Expedition.

This last point is crucial. By tracing knowledge from the field to the metropolis the persistence of the local voice within British science has been documented. This thesis has shown a variety of cases where local testimony was discussed and debated, used to challenge conclusions and used to support them. Not all locals were the same, and issues of race, class and language figured strongly into the recording and representation of the local informant. Nevertheless, their knowledge was valued. This conclusion challenges findings that emphasise the obscuring or elision of local voices in Victorian epistemology. Local testimony could not stand alone and did require a ‘chaperone’ in the form of the field worker but was nevertheless accorded some independent value and indeed, in some cases, was actively sought.

This conclusion alters an emphasis often used in representations of scientific travel narratives. As documents seen in the mode of imperialism they are, as Barnett has classified them, ‘Narratives of Possession’. This thesis has instead examined these documents in the mode of empiricism, uncovering the practices used to reliably represent Africa in Victorian Britain. I would argue that the latter form of analysis is the most prudent. The imperial aspects of Victorian science are not lost in the identification of the social and empirical interests that contributed to the construction of credible knowledge about the Zambesi Basin. Rather, imperial interests stand alongside the empirical, religious, scientific, technological, personal and institutional interests that constructed practice. The examination of the instructions given to the Expedition demonstrate this plurality clearly.

It has also been shown that these interests were realised in different spaces. Scientific practice was performed in precise locations and across oceans. The geography of knowledge changes when different types of practice are discussed: geomagnetic observations, botany, zoology, geography, ethnography or medicine. This indicates again that expeditions have a plural if not also multiple character. This thesis has attempted to capture the many practices involved so that the Zambesi Expedition, as a

16 Barnett, “Impure and Worldly Geography”.

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knowledge-producing endeavour, may be understood. An optical metaphor comes to mind: the Expedition was a lens turned upon the Zambezi basin by the British scientific community, the region was brought into focus through that lens. However, the lens was that of an arthropod, a compound eye which perceives different images and has multiple foci. The Narrative written by the Livingstone brothers was an attempt to bring many of these images together, but they acknowledged that the natural history was largely overlooked in the book and left that for Kirk to write. This never occurred and thus the results of the Expedition have only ever appeared—and remain—in isolated disciplinary spaces or as only limited instances in larger syntheses to different purposes.17 In a sense, then, this work has been an exercise in historical restitution in re-placing scientific encounters. The thesis has brought together these scattered findings—united at one time but in another place—to reconstruct the scientific practices of the Zambesi Expedition.

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American Philosophical Society, Philadelphia, USA
  L462: Lea, Isaac, Notes of Travel, European Journal 1852-53
Edinburgh University Library Special Collections
  Gen 523: Murchison Correspondence in the Gieke Collection
David Livingstone Centre, Blantyre
  Objects related to the Zambesi Expedition
Museum of Natural History, London
  General Reading Room and Zoology Library
    DF200 Keeper of Zoology’s Correspondence
    DF216/28: Zoological Donations Record, 1848-73
    DF218/7: Vertebrata Accessions Record, 1861-90, Mammalia, Reptilia, Pisces
    DF218/8: Vertebrata Accessions Record, 1861-90, Mammalia, Reptilia, Pisces
    DF220/2, Zoology Department Visitors Book, 1857-71
    OC87.62 Richard Owen Correspondence.
Entomology Library
  Annulosa (accessions register) volume 3: 1850-63 and volume 4: 1864-81
Darwin Centre
  Reptile and Fish Accessions Register
National Library of Scotland, Edinburgh
  ACC 9942: Papers and Photographs of Sir John Kirk
  MSS 10707-760 and 10770-79: David Livingstone, letters, journals and maps
  MS 10780: Microfilm copies of manuscripts related to the life of David Livingstone
from the following locations:
  South African Library, Cape Town
  Archivo Historico Ultramarino, Lisbon
  David Livingstone Centre, Blantyre
  British Library, London
  Public Records Office, Kew, London
  Royal Geographical Society
School of Oriental and African Studies, London
Bodleian Library, Oxford
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MM.14.16: Richard Owen’s suggestions for the Expedition
MM.14.17: Joseph Hooker’s suggestions for the Expedition
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Appendix A: extracted bibliography of scientific literature related to the Zambesi Expedition.

Note: See Table I, page 170. This list contains articles that refer to data or specimens collected by members of the Zambesi Expedition and is comprised of chiefly ‘hard’ scientific literature. Dates range from 1858 to 1877. This list does not include newspaper or other popular media.

**Annals and Magazine of Natural History**


**Ibis**


**Journal of the Academy of Natural Sciences of Philadelphia**

**Journal of the Society of Arts**

**Journal of the Linnean Society: Botany**


*Journal of the Linnean Society: Zoology*


*Journal of the Royal Geographical Society (does not include yearly Presidential Addresses)*


*The Lancet (does not include frequent short, general notices about the ZE)*


*Proceedings of the Academy of Natural Sciences of Philadelphia*


*Proceedings of the Royal Geographical Society* (does not include yearly Presidential addresses)


**Proceedings of the Royal Society of Edinburgh**


**Proceedings of the Zoological Society**


Gray, John Edward. “Description of a Soft Tortoise (Aspidochelys Livingstonei) from the Zambesi, sent to the British Museum by Dr. Livingstone.,” *Proceedings of the Zoological Society of London* 1860. 5.


Gray, John Edward. “Revision of the Genera and Species of Chamaeleonidae, with the

Günther, Albert. “Report on a Collection of Reptiles and Fishes made by Dr. Kirk in the

Kirk, John. “letter dated 28 February replying to Dr. Peters,” Proceedings of the Zoological Society of
London 1865. 227.

Zoological Society of London 1864. 649-660.

Peters, Wilhelm Carl Hartwig. “letter dated 14 July responding to Kirk’s comments of February

Selater, P. L. “Characters of a new species of falcon, discovered by the late Dr. Dickinson, of
1864. 248.

**Report of the British Association for the Advancement of Science**

Kirk, John and Norton Shaw. “Extracts of a letter of Dr. Kirk to Alex Kirk, Esq., relating to the
Livingstone Expedition,” Report of the British Association for the Advancement of Science 1859. 185-
186.

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Murchison, Roderick Impey. “Opening Address to Geography and Ethnography Section,”
Report of the British Association for the Advancement of Science 1864. 133.

**The Technologist**

Anonymous. “The Cotton Trade,” The Technologist: a monthly record of science applied to art,
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Jackson, John R. “Notes on Some African Vegetable Products,” The Technologist: a monthly record
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Jackson, John R. “On the Products of the Pea Family (Leguminosae): part III Mimoseae,” The

Rock, Thomas D. “Monkey Bread Nuts, or Fruit of the Baobab,” The Technologist: a monthly record
of science applied to art, manufacture, and culture 1: 1861. 346-350.

**Transactions of the Botanical Society**

Kirk, John. “Letter from Dr. John Kirk, Physician and Naturalists to the Livingstone
Expedition, relative to the Country near Lake Shirwa, in Africa,” Transactions of the Botanical
Society 6: 1859. 317-321, plate VII.


Transactions of the Epidemiological Society


Transactions of the Linnean Society


Appendix B: authors of papers using data or specimens from the Expedition, 1858-1877


2. Baly, Joseph Sugar (1817-1890), Physician and Entomologist; authority on Coleoptera.

3. Bentham, George (1800-1884); Botanist who worked at Kew (unpaid); President of the Linnean Society, 1861-74; wrote *Genera Plantarum* with Joseph Hooker for 1861-83. *DNB/DJB*.


7. Findlay, Alexander George (1812-1875), Geographer, Hydrographer. *DNB*.

8. Frauenfeld, George Ritter von (1807-1873), Entomologist. Was in London the summer of 1865 and received some mussel specimens from the collections of the late Hugh Cuming. Three were from Kirk’s collection, how this occurred is unclear.


14. Lea, Isaac (1792-1886), Publisher, Zoologist; Academy of Natural Sciences of Philadelphia. *DJB*.

15. Lindsay, William Lauder (1828-1880), Physician Superintendent Murray’s Hospital, Perth; lichen specialist.

16. MacLeod, Lyons (?), British Consul to Mozambique in late 1850s.
17. Oliver, Daniel (1830-1916), Botanist; Assistant, Kew Herbarium: 1858-1864, Keeper: 1864-90; Professor of Botany, UCL: 1861-88. DSB


19. Sclater, Philip Lutely (1829-1913), Lawyer and Ornithologist; Secretary of Zoological Society of London: 1860-1903. DSB
Appendix C: Kew and Edinburgh correspondence of Sir John Kirk and Dr. Charles Meller.

Sir John Kirk's letters at the Royal Botanic Gardens, Kew.
Note: Letters marked 'DC' are located in the Director's Correspondence, Kew microfilm reel and letter numbers are listed. Those marked 'ZEB' are in the bound volume of papers titled Southeastern Africa: Zambezi Expedition. Kirk sent letters to both Joseph Hooker (JH) and his father Sir William Hooker (WH). It is not clear why there are almost no letters from 1858-59. After 1864 Kirk has many more letters at Kew that do not relate to the Zambezi Expedition and are not listed here.

<table>
<thead>
<tr>
<th>TO</th>
<th>DATE</th>
<th>ADDRESS</th>
<th>LOCATION</th>
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<tbody>
<tr>
<td>JH</td>
<td>30 April 1858</td>
<td>Simon's Bay, Cape Colony</td>
<td>DC r.59 #179</td>
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<tr>
<td>WH</td>
<td>26 February 1860</td>
<td>Kongone mouth (Zambezi)</td>
<td>DC r.60 #156</td>
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<td>JH</td>
<td>13 December 1860</td>
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<td>Kongone mouth</td>
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<td>JH</td>
<td>7 March 1861</td>
<td>Rovuma Bay</td>
<td>ZEB</td>
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<td>WH</td>
<td>21 April 1861</td>
<td>Pioneer, Johanna (Anjouan Comoros)</td>
<td>DC r.60 #159</td>
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<td>27 May 1861</td>
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<td>6 December 1861</td>
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<td>18 December 1861</td>
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<td>Pioneer, Kongone mouth</td>
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<td>DC r.60 #170</td>
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<td>31 August 1862</td>
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<td>DC r.60 #165</td>
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<td>JH</td>
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<td>Pioneer, Johanna</td>
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Note: These letters are located with the John Hutton Balfour (JHB) Correspondence, Volume 8, except where otherwise noted. Details of published letters given.

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<td>JHB</td>
<td>? 1864</td>
<td>Brates Park Road, Brentford W.</td>
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Dr. Charles Meller's letters at the Royal Botanic Gardens, Kew

Note: All of these letters except one are found in the Director's Correspondence, the exception being bound into a volume of the Plant Lists (PL) books located in the Kew library. The latter is an extensive narrative of his journey to Annapurna, Madagascar containing many botanical and geological descriptions. The last two letters in the table are not related to the Zambezi Expedition directly, but discuss his return to Mauritius.

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<td>JH</td>
<td>1 February 1862</td>
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<td>DC r.60 #255</td>
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<td>WH</td>
<td>2 April 1862</td>
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<td>WH</td>
<td>2 June 1862</td>
<td>Naval Hospital, Simon's Bay</td>
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<td>Gorgon Port Louis, Mauritius</td>
<td>PL vol.30, pp.290-305</td>
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<td>WH</td>
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<td>Gorgon Port Louis, Mauritius</td>
<td>DC r.60 #258</td>
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<td>WH</td>
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<td>Johanna</td>
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<td>2 June 1864</td>
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<td>DC r.42 #118</td>
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<td>Port Louis, Mauritius</td>
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Appendix D: publications based upon this research

Article 1: ‘Treasures of Kew: David Livingstone, John Kirk, and Buaze Fibre’

Appears in Kew, n.46 (September 2004), p. 41

‘Notwithstanding the comparatively favourable reports on this fibre received so far back as 1857, nothing has since been done to further its utilization in this country.’

Thus ends an article on fibres derived from the shrub buaze (Securidaca longipedunculata, Fresen.) in the Kew Bulletin of Miscellaneous Information, September 1889. This plant’s ‘fifteen minutes of fame’ is closely linked to the career of David Livingstone, the Scottish explorer of Africa. In 1857, Livingstone was at his most popular. Speaking to audiences throughout Great Britain he promoted the introduction of ‘three Cs’ (Commerce, Christianity, and Civilisation) to southern Africa. Once these were introduced, he argued, the slave trade would fade away, ousted by more lucrative commodities. The key to this policy was to identify potential cash crops in the region.

To this end, Livingstone was given command of a government expedition to the Zambezi River in 1858. His team included two economic botanists, John Kirk (later Sir) and Charles Meller. They had specific instructions from Joseph Hooker, head of the Museum of Economic Botany at Kew, to investigate potentially valuable plants.

Kirk’s journals contain numerous descriptions of buaze and he collected specimens of its products. Fortunately, we know the history behind one of these specimens that is now on display at the Plants+People Exhibition in Museum No. 1. Having befriended Chief Chibisa, the expedition frequently stayed at his village, known today as Chikwawa, in southern Malawi. The Chief often gave them assistance and he provided ample information on local plant products. On 31 March 1859, Kirk records that while at the Chief’s house, ‘I bought a beautiful net for fish, made of buaze fastened together with the reef knot.’ Kirk sent this net to Kew along with raw fibres. The latter were submitted for testing by textile manufacturers in London and Manchester and performed well. Buaze appeared to be a strong candidate for commercial uses as a substitute for flax and was promoted in popular science periodicals.

So why did nothing come of it? The potential for buaze appears to be as ill-fated as the Zambezi Expedition itself. Promoted as “God’s Highway” to Africa’s
interior, the Zambezi River proved extremely troublesome for navigation. Tropical
diseases and diplomatic issues with Portuguese settlers mounted further obstacles. To
Livingstone’s great disappointment, the government recalled the expedition in 1863 and
did not consider funding another. His dream had suffered a setback and buaze was
quickly all but forgotten, except as an example of how the Victorians investigated plant
products from around the world at Kew.
Article 2: ‘From Lake Nyassa to Philadelphia: a Geography of the Zambesi Expedition, 1858-64’


Abstract. This paper is about collecting, travel and the geographies of science. At one level, it examines the circumstances that led to Isaac Lea’s description in Philadelphia of six freshwater mussel shells of the family Unionidae. John Kirk collected the shells during David Livingstone’s Zambesi Expedition, 1858-1864. At another level it is about how travel is necessary in the making of scientific knowledge. Following these shells from Zambesia to Philadelphia via London elucidates the journeys necessary for Kirk and Lea’s scientific work to progress and illustrates that the production of what was held to be malacological knowledge occurred through collaborative endeavours that required the travel of the specimens themselves. Intermediaries in London acted to link the expedition, Kirk’s efforts and Lea’s classification across three continents and to facilitate the novel description of six species of freshwater mussels. The paper demonstrates the role of travel in the making of mid-nineteenth-century natural history and in developing the relationships and credibility necessary to perform the research on which classifications undertaken elsewhere were based.

Introduction

In discussing the geography of knowledge during the early modern period, Steven Harris sets a theme that I borrow for this paper: ‘How science travels has as much to do with the problem of travel in the making of science as it does with the problem of making science travel.’ Prompted by his heuristic, this paper investigates aspects of the geography of the Zambesi Expedition and how travel and the performance of science were constituent parts of that project. It examines a collection of zoological specimens made on the expedition by Dr. John Kirk, the expedition’s botanist. Tracking the movement of specimens and investigating how these paths are created provides insight, I suggest, into how we may place expeditions within larger scientific projects specifically and the Victorian scientific community more generally. In Harris’ paper, the long-distance corporations he examined became the site of knowledge generation, with the ‘acquisition, transport, and concentration’ of knowledge as the

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1. This research has been made possible by a Darwin Trust of Edinburgh studentship and a Sir Joseph Banks Scholarship from the Centre for Economic Botany, Royal Botanic Gardens, Kew. I would like to thank Professor Charles Withers, Simon Naylor and my anonymous reviewers for their valuable comments on earlier versions of this paper. Thanks are also due to staff at the Academy of Natural Sciences of Philadelphia; American Philosophical Society; Natural History Museum, London; Royal Botanic Gardens, Kew & Edinburgh; David Livingstone Centre, Blantyre (Scotland); and the National Library of Scotland


I use the spelling ‘Zambesi’ when referring to the Expedition proper, following contemporary usage; otherwise I use the now more common, ‘Zambezi’. Lake Nyassa is today referred to as Lake Malawi, though I retain the former name for historical consistency. In all quotations I retain the authors’ spelling.
modes through which this composite site is to be understood. ‘Situating knowledge and
its means of acquisition in the context of corporations allows knowledge production to
be viewed both as ‘local’ and ‘distributed’ without privileging the former over the latter
or, more generally, the micro over the macro.’

In this paper, locating the performance of science on the Zambesi Expedition—
uncovering the geography of knowledge generation—I do not wish to emphasise the
local over the distributed nor explore the specific role played by corporations. The
network of naturalists analysed here were not part of one institution that could be
equated with Harris’ corporations. Rather, the Zambesi Expedition in conjunction with
other institutions forms the ‘site’ of knowledge generation to be considered. My
concern to follow a specimen collection across a scientific community and its
institutions entails the description of numerous spaces where knowledge was produced
and received. These ‘spaces of production’ and ‘spaces of consumption’ and the
particular modes of discourse that are internal to those spaces have been analysed by
authors interested in the geographical dimensions of science making and reception,
often working within a social constructivist outlook. David N. Livingstone’s ideas of
‘spaces of expedition’ and ‘spaces of circulation’ are particularly relevant here and lead
us to consider the ‘diverse places where science is made.’ Here, the emphasis is on how
these diverse spaces are linked through the movement of specimens and people across
the globe.

The characterisation of natural history as ‘a science of networks’ has been
examined in detail elsewhere. Camerini, in her study of early Victorian fieldworkers
claimed that, ‘relationships pervade the practice of fieldwork,’ arguing that these
relationships served to provide the logistical and epistemic foundations for collecting
activities. Local knowledge in the form of specimens, in order to become more widely
accessible, must be transferred to sites where they may be authoritatively analysed. This

3 Harris, op. cit. (1), 298-9.
4 J. Golinski, Making Natural Knowledge: Constructivism and the History of Science, Cambridge, 1998, S. Shapin,
‘Placing the View from Nowhere: Historical and Sociological Problems in the Location of Science’,
6 E. Spary, Utopia’s Garden: French Natural History from Old Regime to Revolution, Chicago and
7 Her chapter also discusses the importance of the Royal Navy as a means of maintaining those
work of transference, mobilising teams of collectors and porters, successfully preserving specimens, locating packing materials and finding secure transportation out of the field, was, and remains, a complicated affair involving many people. The sites where analysis is performed, often termed ‘centres of calculation’ after the work of Bruno Latour, are those social and epistemic spaces where local knowledge is assembled, recorded and unified into universal knowledge through the use of theories and methods recognised as valid by the wider scientific community. The institutions were themselves locations were the heterogeneous nature of science was played out on a day-to-day basis in the varied work of preserving, identifying, cataloguing, displaying and viewing specimens. Specimens can act as boundary objects in these situations, remaining identifiable to all the groups, but employed to fill different requirements by each.

It has been argued that the combined analytical work performed at centres of calculation cannot be done singly, but requires the work of a community, ‘Universality, objectivity, and accumulation are not characteristics of technoscientific knowledge itself, rather they are effects produced by the collective work of the technoscientific community.’ This empirical transformation from local knowledge to the universal ‘view from nowhere’ has come under increased investigation. The concept of travel between scientific sites—the travel of facts, standards, techniques and materials—has been marked as an important area for study as some scholars move away from focusing

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on specific locales to analyses of more widely distributed scientific activity.\textsuperscript{13} In discussing this ‘spatial turn’ in Science Studies, D.N. Livingstone has noted that where scientific practices are spatially distributed the issues of credibility and expertise, and the institutions that maintain them, become critically important to our understanding of how such practices are sustained.\textsuperscript{14} Unlike individuals invited to observe Boyle’s air-pump demonstrations, few natural historians in the nineteenth century had the opportunity to directly observe tropical specimens \textit{in situ}.\textsuperscript{15} Unverifiable faith in the credibility of the collector as reporter remained for Victorian naturalists a critical, if continually problematic, characteristic of scientific analyses of the world’s flora and fauna.

With these ideas in mind, this paper approaches the scientific work of the Zambesi Expedition by examining the links that connect the field and museum, the collector and the analyst. The focus will be on uncovering the forms of travel that were necessary to transform unknown mussels found in a lake that had only recently appeared on European maps into regimented examples of the typical molluscan fauna of Lake Nyassa that slotted easily into pre-established taxonomies. The paper will begin with a description of the Zambesi Expedition and its multifaceted instructions from the Foreign Office. The main agents in the story, the mussels, Sir John Kirk and Isaac Lea will then be introduced before turning to a discussion of how the mussels travelled the globe in the early 1860s, followed by conclusions.

\textbf{The Zambesi Expedition}

The Zambesi Expedition worked in the field from March 1858 until early 1864. The leader of the expedition was David Livingstone. This Scottish explorer was at the height of his fame in 1857, having published late that year his \textit{Missionary Travels and Researches in South Africa}, an account of his explorations in the region including details of a trans-African walk from the Atlantic to the Indian Ocean that enthralled the Victorian public.\textsuperscript{16} In respect of the Zambesi Expedition, Livingstone was appointed ‘H.M. Consul at Quelimane for the Eastern Coast and independent districts of the interior, and

\begin{flushright}
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\textsuperscript{13} C. Withers, ‘Reporting, Mapping, Trusting: Making Geographical Knowledge in the Late Seventeenth Century’, \textit{Ishi} (1999), 90, 497-521. and Shapin, op. cit. (4)
\textsuperscript{14} D.N. Livingstone, ‘The Spaces of Knowledge: Contributions Towards a Historical Geography of Science’, \textit{Environment and Planning D: Society and Space} (1995), 13, 5-34.
\end{flushright}
commander of an expedition for exploring Eastern and Central Africa, for the promotion of Commerce and Civilisation with a view to the extinction of the slave-trade."\(^{17}\) His instructions from the government included scientific, humanitarian, and economic activities. These interests represented the ‘blending of diverse missions where African affairs are concerned’; an amalgamation of purposes typical of government-sponsored Victorian African exploration.\(^{18}\) The purposes were linked via a civilising mission ideology that joined commerce, Christianity, and civilisation in one grand plan essentially to ‘modernise’ African society whilst providing raw materials for British industry. The main tenets of this ideology held that by increasing communication between ‘civilised’ and ‘uncivilised’ cultures through commerce, the process of ‘opening up’ Africa to British trade would result in an end to the barbarism assumed to exist there. Livingstone and other like-minded missionaries had faith that Christianity would quickly follow in commerce’s footsteps. To this end the natural resources of the region first had to be investigated via expeditionary science.

The overall plan for the Zambesi Expedition was to pilot a river steamer up the Zambesi River and set up a base of operations near the capital of Chief Sekeletu, Linyati, located on the Batoka Plateau (now western Zambia). The highland region was chosen because it was considered to lie at a sufficient altitude to reduce the threat of malarious fevers and was far enough inland to avoid diplomatic wrangling over Portuguese territorial claims along the lower Zambezi. Livingstone had earlier developed a friendly relationship with Sekeletu and considered the monarch to be supportive of his plans to introduce legitimate, non-slave-based commerce and Christianity. From this central ‘depot’, the surrounding region would be analysed by the naturalists, its resources catalogued and specimens collected.\(^{19}\) It was also hoped that the ‘moral influence’ of this group of Europeans would have a positive impact on the social mores of the surrounding communities.

Following the precedent of Foreign Office expeditions to the Niger in West Africa, the logistics of transport and correspondence were placed in the control of the Admiralty,


specifically Captain John Washington, Chief Hydrographer. 20 In organizing the scientific work and selecting the collectors who would accompany Livingstone, leading members of the Royal Geographical Society (RGS), the Royal Society, the British Museum, Kew Gardens and the Kew Observatory offered advice concerning whom to appoint and provided the training necessary for making appropriate observations. Because the Expedition was to be funded by public money, specimens collected in the field were to become the property of the British Government and sent either to Kew Gardens or to the British Museum for analysis and first refusal. 21

Various types of expertise were necessary to organize the expedition. A politician, a botanist, a zoologist, a geologist and a geophysicist wrote separate letters of instruction for members of the expedition. 22 Steam ships were built on Merseyside to be used for transport on the Zambezi. 23 British diplomats placated Portuguese fears that the expedition possessed ulterior motives to extend British power into an area that had been nominally Portuguese since the early sixteenth century. 24 The tasks of handling correspondence and provisions for the expedition fell to the Admiralty ships stationed at Simon’s Bay, Cape Town. While expeditions connote an image of heroically self-sufficient explorers hacking through the jungle, the truth was to the contrary: the Zambesi Expedition involved hundreds of people performing mundane tasks in support of the few who received the public’s adulation and the plaudits of their peers. As Camerini concluded in her study of the fieldwork of Darwin, J. Hooker,

20 John Washington (1800-1863) was promoted to Rear Admiral in 1862. His papers relating to this Expedition reveal in great detail the bureaucracy of managing the ‘home’ side of a government expedition; Royal Naval Museum Library, Portsmouth (hereafter, RNML) (MSS 120).
22 For Livingstone’s letter of instruction see, Foreign Office to David Livingstone, 25 February, 1858, Appendices. RNML (MSS 120). Instructions for the other members are published in Wallis, op. cit. (19).
23 The expedition’s first paddle steamer, MaRobert, spectacularly failed to live up to expectations, largely due to Livingstone’s exaggerations of the navigability of the Zambezi River complicated by the builder, Macgregor Laird’s, use of a novel but rust-prone type of steel hull in its construction; J.G. Parr, ‘The Sinking of the Ma Robert: An Excursion into Mid-Nineteenth Century Steelmaking’, Technology & Culture (1972), 13, 209-25.
Huxley, and Wallace, “The scientific arenas of natural history…are all collective enterprises.”

Figure 1: Unionid mussels collected by Kirk. (courtesy of the Academy of Natural Sciences of Philadelphia)

The Mussels

Malacology, the study of molluscs, attracted persons interested in scientific questions as well as those who were enthralled with shells as decorative objects. The ease of preserving and transporting mollusc shells made them an ideal object of study for the sedentary museum curator or cabinet-based investigator interested in teasing out taxonomic puzzles. The existence of molluscs in the fossil record readily connected them with geological questions, offering a perfect bridge between geology and biology for the Victorian polymath. The mussels under consideration here—those collected by Kirk and described by Lea—are all part of the Unionidae, a large Family of freshwater molluscs

25 Camerini, op. cit. (7), 373
26 This plate appears in I. Lea, ‘New Unionidae, Melanidae, Etc., Chiefly of the United States’, Journal of the Academy of Natural Sciences of Philadelphia (1866), 6, New Series, Plate 12
containing around 1000 species.\textsuperscript{28} Although most widely distributed in North America, hence the name, Unionids are found all over the world.

The path of the mussels is best followed by beginning at the end, with their description. In 1865 some of the mussel specimens Kirk collected were described by Heinrich Dohrn in the \textit{Proceedings of the Zoological Society of London}. Heinrich (1838-1913) was a noted zoologist who had taken his PhD from Berlin in 1861.\textsuperscript{29} He was the brother of the more famous pioneer of marine biology, Anton Dohrn (1840-1909). Their father, Carl Augustus Dohrn (1806-1892), was a successful entomologist. Although most of Heinrich’s papers and collections were destroyed in the bombings of Stettin (now Szczecin, Poland) during World War II, it is likely that Dohrn had seen shells from the Zambezi while studying in Berlin, where Wilhelm Peters, who had collected along that river in the 1840s, was Professor of Zoology.\textsuperscript{30} In his description of Kirk’s specimens, Dohrn lamented the absence of certain shells that he knew were originally part of the collection sent to him for description:

I regret very much that there are no Unionidae in the collection which I got for examination. All I can state from the above list [of species] is, that the conchological fauna of Lake Nyassa seems to belong to the same region with Natal; but most of the freshwater species from the lake having turned out to be hitherto unknown, and some of the other species having been found by Captain Speke and others far more northwards, it is rather difficult to come to any conclusion from the present collection.\textsuperscript{31}

Elsewhere in the article Dohrn quoted a letter from Kirk, which explains the absence:

The Unionidae of the lake having previously been described and figured by Isaac Lea, in a paper read before the Academy of Natural Sciences of Philadelphia, April 12th, 1864, are not here included. They number six species, and one still remains undescribed.\textsuperscript{32}

\textsuperscript{29} Thanks are due to Dr. Christiane Groeben, archivist at the Stazione Zoologica ‘Anton Dohrn’ in Naples, Italy (founded by Anton in 1874) for her assistance over this ‘forgotten’ naturalist of the Dohrn family. C. Groeben, ed. \textit{Correspondence Karl Ernst von Baer, Anton Dohrn}, Philadelphia, 1993, 32.
\textsuperscript{32} Ibid.
Why would six shells out of the Lake Nyasa collection have been removed in this way; especially since their removal hindered Dohrn’s task of drawing conclusions about their geographic distribution in respect to other African collections? The unique Unionid specimens, most likely new species, were specifically separated from the main collection and sent to Philadelphia, Pennsylvania for description by Isaac Lea while Dohrn received the remainder. A closer look at Lea and his relationship with the British Museum may help to answer the above question and illustrate the networks of correspondence and credibility through which the shells were moved.

**Isaac Lea 1792-1886**

Isaac Lea was born in Wilmington, Delaware in 1792 and moved to Philadelphia in 1807 to work in his eldest brother’s importing house.\(^\text{33}\) He married into the family of Matthew Carey and in 1821 became a partner of the leading Philadelphia-based publishing house, M. Carey & Sons. Aside from his publishing career, Lea maintained an avid interest in geology and natural history he had developed in his youth; exploring the countryside of south-eastern Pennsylvania. Lea was elected to the recently-formed Academy of Natural Sciences of Philadelphia (ANSP) in 1815, at the age of 23.\(^\text{34}\) In 1827 he published his first article on the little-studied molluscan genus *Unio* in the Academy’s journal.\(^\text{35}\) The following year he was elected to the American Philosophical Society (APS).

Through his many articles, normally published in the Academy’s *Journal and Transactions* and the *Transactions of the American Philosophical Society*, Lea’s expertise on the Unionidae spread.\(^\text{36}\) The ANSP exchanged journals with many societies throughout

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\(^{35}\) DSB.

\(^{36}\) Lea published almost exclusively in these publications, see his complete bibliography in Scudder, op. cit. (32).
Europe, as did the APS. Unbeknownst to him, Lea’s early work was widely read by European malacologists; a fact that would surprise him during his first trip to Europe.

Lea travelled during his life, but he did not, except in his early youth, travel to collect in the field. Rather, from his base in Philadelphia, Lea courted relationships with collectors throughout North America and the wider world, utilizing family and business relations where possible. As his knowledge of his interests grew along with the reputation of the ANSP, many specimens also appeared unsolicited. This abundance of natural history specimens provided a firm foundation for Lea’s analysis of Unionidae systematics. Well supplied, he was able to work in his cabinet like an American Cuvier, exploring the waterways of North America by allowing others to do the fieldwork for him.  

Lea took two extended trips to Europe. The first occupied much of 1832 (April-November), the second took place between June 1852 and November 1853. The trips were very much ‘grand tours’ of Europe although they also included frequent visits with leading scientists and their institutions. Upon arrival in London on his first trip one of his first acts linked to natural history was to meet John George Children and John Edward Gray at the British Museum on 4 May 1832.  

From them Lea was surprised to learn that that his most recent memoir on Unio had been read to the Royal Society the night before.  

The subsequent pages of his journal list one introduction after another, and a flurry of invitations to scientific meetings. Upon meeting Michael Faraday he was invited to the evening meetings of the London Institution (7 May 1832). Lea called on Charles Babbage and then Charles Lyell (11 May). At the Geological Society Lyell introduced Lea to Sir Roderick Murchison, from whom invitations to their meetings were extended.  

As Lea’s expertise in malacology became recognized, he was often asked to rearrange others’ collections according to his ideas on molluscan

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38 Children (1777-1852) worked at the Zoological Department from 1823-40. Gray (1800-75) worked with Children from 1824 and succeeded him as Keeper until retiring in 1863. DSB.
39 It appears strange that Lea was unaware of his paper being read and equally strange that the Royal Society did not know of the author’s presence. It is possible that his arrival was truly unannounced. Certainly, it is likely that Lea had little direct knowledge of London’s scientific society, if we may judge by the almost daily mentions of introductions to members of that community in Lea’s journals.
40 Murchison (1792-1871) was currently serving as the society’s President. DSB.
systematics.\textsuperscript{41} He also presented many of the people and institutions he visited with specimen collections.\textsuperscript{42} After nearly a month in London, Lea and his family travelled to Oxford in June 1832 so that he could attend the annual meeting of the BAAS. From England Lea travelled to Paris, Belgium, and to Switzerland, frequently visiting naturalists and collections, before returning to Philadelphia in late 1832.

After retiring from the publishing house in late 1851, Lea returned with his family to Europe, arriving in Liverpool in June 1852. They travelled quickly through England to Paris to begin an extended tour of Germany, France, Italy, Austria, the Netherlands and Belgium. They returned to England in September 1853, in time for the meeting that year of the BAAS in Hull, England. As on the first trip, Lea visited natural scientists wherever he went. At the University of Berlin Lea met Professor Lichtenstein who showed him a collection of shells brought back from the Zambezi River by Wilhelm Peters in the 1840s. These were probably the first species of \textit{Unio} from southeastern Africa that Lea had seen.\textsuperscript{43}

While in London Lea regularly visited the British Museum and became good friends with Henry Thomas De La Bèche and Richard Owen. He assisted both in the organization of specimens and discussed lecturing possibilities for them in the US. Shortly before leaving Europe for the last time, Lea was invited to speak about Pennsylvanian fossils at the Philosophical Club of the Royal Society (October 27, 1853). At the end of the meeting he talked with William Benjamin Carpenter about possibilities for him to move to a professorship in Philadelphia. Lea recorded the mundane reason for this in his diary; ‘Carpenter’s salary at University College is nothing like the payment of a chair in our colleges at Philadelphia.’\textsuperscript{44}

Reading Lea’s journal reveals how important his trips to Europe were for his reputation as a scientist. He helped to arrange specimens at the British Museum, the Jardin des Plantes and at the University of Berlin. He attended soirées at the Murchison’s, chatted with Alexander Von Humboldt in Berlin and was given a dinner by Prince Charles Bonaparte of France in Paris. During his two trips to Europe, Lea defined (and claimed) his area of expertise by meeting with other naturalists in Europe,

\textsuperscript{41} At the request of Mr. [John Edward] Gray I named all the Unionidae, some of which had erroneous names’ Isaac Lea, diary entry, 21 May 1832, ANSP (Coll:452).

\textsuperscript{42} Presenting specimens as a socially-bonding act is described in Cooper, op. cit. (33), 46

\textsuperscript{43} Scudder, op. cit. (32), 29 also cf. (27).

\textsuperscript{44} Lea, diary entry, 27 October 1853, APS (L.462). Carpenter (1813-1885) was the Fullerman Professor of Physiology at the Royal Institution and Professor of Forensic Medicine at University College, \textit{DJB}. 
discussing theory, arranging collections, and exchanging specimens. As I will soon show, this reputation will assist our understanding of the shells’ route and Lea’s connection to Sir John Kirk.

**Sir John Kirk 1832-1922**

Born as the son of a minister in Forfarshire, John Kirk was not wealthy like Isaac Lea. He became interested in natural history, especially in botany while studying medicine at the University of Edinburgh. There he had been a student of John Hutton Balfour, Dean of the Medical Faculty as well as Regius Keeper of the Royal Botanical Garden in Edinburgh and Queen’s Botanist to Scotland. Balfour was one of the founders of the Botanical Society of Edinburgh in 1836. After finishing, Kirk volunteered to serve as part of the Civil Hospital Staff during the Crimean War.

Due to administrative troubles while in Asia Minor, Kirk unexpectedly found himself with free time to botanise in the area. He also travelled to Syria and Egypt and collected there. Upon returning to England in the spring of 1857 he consulted Sir William Hooker at Kew Gardens about his specimens. This would appear to be one of their first meetings. By the end of the year, Kirk was offered the post of economic botanist and chief medical officer to accompany Livingstone on his return to southern Africa at the head of a government expedition.

Kirk was offered a post on the Zambesi Expedition because he had succeeded in medical school and proved his hand at fieldwork around the eastern Mediterranean. He was young (25) and in good health. His qualifications as a physician made him doubly useful to the Expedition. Two major figures in botany at the time recommended him, Balfour and William Hooker. In addition, Kirk possessed ‘travellers’ credentials’. Four weeks before Kirk was first named to accompany Livingstone, Sir William Hooker recommended Kirk as a suitable candidate for the Chair in Natural History at the University of Kingston, Ontario writing, ‘He has, since he completed his education, improved himself by travel, especially in the East.” Livingstone, in first mentioning Kirk, writes of the young doctor’s successful travels in Egypt and Palestine as part of his

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46 Balfour (1808-1884) graduated in Medicine from Edinburgh in 1831 and was Dean of its Medical Faculty from 1849-1879. DSB
47 Coupland, op. cit. (44), 57.
48 Ibid., 62.
49 23 November 1857, National Library of Scotland (hereafter NLS) (ACC 9942/49).
credentials.\textsuperscript{50} Mention of the specific botanical work Kirk performed while travelling is noticeable by its absence. A key reason for his appointment lay, then, in his having ‘proved’ himself in a foreign field. His trip to Asia Minor fits in his life as a rite of passage, providing foreign experience necessary for his further career.\textsuperscript{51} Thus certified, Kirk was predetermined to be trustworthy and a credible reporter of natural phenomena.\textsuperscript{52} Once on site in the Zambesi Basin, he would interpret nature for those not present and more importantly, pack up bits of nature and transport them home. This process will be examined next.

**Expedition Geography: making mussels move**

Kirk collected the mussels on Lake Nyassa in September or October 1861, though he does not record the exact date.\textsuperscript{53} During this period Kirk, David and Charles Livingstone, John Neil, an able seaman, and ‘a score of attendants’ travelled nearly the whole length of the lake in a small sailboat with a following shore party.\textsuperscript{54} It was a difficult trip and offered limited opportunities for collecting due to the speed of their travel and a lack of porters to carry specimens. Their main intention was to record the dimensions of the lake and determine its place in the region’s hydrography. It may be that Kirk did not collect the specimens himself but utilized local assistants, was presented the shells or even that he purchased them at a market: these are all methods of acquiring specimens he describes elsewhere in his journals.\textsuperscript{55}

The group returned to the main body of the Expedition, who were waiting for them at the first cataracts of the Shire River, on 8 November 1861. Their boat, HMS *Pioneer*, was readied and the group started downstream in the hopes of meeting an Admiralty ship at the delta of the Zambesi. Unfortunately, they ran aground on a sandbank and remained stuck for over a month waiting for the river to come into flood.

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\textsuperscript{50} Livingstone had wanted Joseph Hooker to serve in this position. The younger Hooker opted to stay home due to family concerns and his increased responsibilities at Kew. His refusal to join the Expedition bothered Livingstone for some years. See D. Livingstone to J. Hooker, 26 October, 1857; 28 December, 1857 and 9 December, 1861 NLS (MS 10779/10a).
\textsuperscript{54} D. Livingstone and C. Livingstone, Narrative of an Expedition to the Zambesi and Its Tributaries: And of the Discovery of the Lakes Shirwa and Nyassa, 1858-1864, London, 1865, 274.
\textsuperscript{55} Foskett, op. cit. (52), passim.
\end{flushright}
While idle, Kirk wrote letters to Joseph Hooker and William Hooker describing the flora and fauna along the western shore of Lake Nyassa. The first letter was written on 6 December 1861 to William Hooker and mentions the Lake Nyassa shells specifically.56 Kirk had packaged up a number of crates and he requested that a small tin box of shells, packed inside a larger case, be forwarded to ‘Professor Owen’. The next letter to William Hooker written nearly two weeks later indicates that Kirk removed the tin of shells from the larger box along with some cotton samples and oil nuts.57 It appears that there was a chance to send a small amount of packages ahead to the coast by canoe, and Kirk thought to send the small tin box of shells ahead instead of keeping them with the bulk of his collection, stuck on the sandbank.58 In the letter he again indicated that the shells should be forwarded to Owen and requested, ‘if he sends me the names of them I should be much obliged.’59 By mid-January, the chance to send the some correspondence ahead did not materialise and the tin box of shells was back in its original crate marked, ‘for Prof. Owen’.60 The river rose and the Pioneer finally reached the coast on 20 January. HMS Gorgon met them there on 31 January to transfer correspondence and supply provisions.

Confident the shells were finally on their way, Kirk wrote to Richard Owen on 15 March 1862 to alert him of the new specimens. The Expedition was busy transporting pieces of their third steamer, Lady Nyassa, upriver from the mouth of the Zambezi as they unloaded them from HMS Gorgon. The letter opens with Kirk writing:

> I send through Sir W. J. Hooker a collection of shells from the borders of Lake Nyassa. Among them I doubt not you will find several new ones. They will at least be interesting as I think it contains more species than any other collection from the Lake Regions.61

In the last part of the quote here, Kirk is alluding to the mussel shells collected by Richard Burton and John Hanning Speke on their East African Expedition.62

56 John Kirk to William Hooker, 6 December 1861, Royal Botanic Gardens, Kew Library (hereafter RGBK) (Zambezi Expedition Book, pp. 18-23).
57 John Kirk to William Hooker, 19 December 1861, RBGK (Director’s Correspondence v.42/163).
58 A letter to Joseph Hooker the previous day (18 December, 1861) indicates this. RBGK (Director’s Correspondence v.42/162).
59 Kirk to W. Hooker, op. cit. (56).
60 John Kirk to Joseph Hooker, 9 January 1861, RBGK (Director’s Correspondence v.42/167).
61 Natural History Museum of London (hereafter, NHML), (Owen Correspondence, 62.16/437-440).
62 Sponsored by the RGS, Burton and Speke travelled from Zanzibar to Lake Tanganyika from 1857-9 and made preliminary observations of the southern shores of Lake Victoria. Kirk may have seen S. Woodward, ‘On some new Freshwater Shells from Central Africa’, Proceedings of the Zoological Society of
Although Kirk was located somewhat remotely in the field, developments elsewhere reached him through correspondence and influenced the way he saw his own specimens and their relative importance. If the mussels he collected were of the same species as those found by Burton and Speke, then a strong argument could be made that Lakes Nyassa and Tanganyika were connected by a river. This revelation would have provided further evidence in the ongoing efforts to determine the sources of the Nile. At the time Kirk was sending the shells to England, Speke was crossing into the Kingdom of Uganda, trying to prove that Lake Victoria was the source of the Nile.63 Knowing this must have highlighted for Kirk the importance of the Lake Nyassa specimens and helps explain why he was keen to get them home and described as quickly as possible.

The shells, with other mails and specimens, went with HMS Gorgon when it left the Mozambique Channel for Cape Town on 4 April 1862. The cases were taken to Simon’s Bay and then transported to Sheerness Yard, at the mouth of the Medway on the Thames estuary, by HMS Cossack and were addressed ‘through the Secretary of State for Foreign Affairs to Kew Gardens’. The Admiralty notified William Hooker on 9 September of their arrival and a few days later the specimens were sent by train to Kew.64

The case holding the shells was opened along with ten others at the Kew Museum for Economic Botany on 16 September 1862.65 The shells were forwarded to, ‘Prof. Owen, Brit. Museum.’66 The rest of the material remained at Kew because Kirk specifically requested this of William Hooker in the letter of 6 December, 1861.67 It was understood that the context necessary to fully understand and classify the specimens would be lost if they were dispersed before his return home. In a letter to John Washington, Livingstone instructs that botanical and zoological specimens must remain with Joseph Hooker at Kew, ‘till the arrival of the collector, whose knowledge...will be most advantageous in classification.’68 Aside from the mussel shells and a few other

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64 Letters from the Admiralty to William Hooker, RBGK (Zambezi Expedition Book, pp. 32-5).
65 The entry book listing for the day reads ‘one small tin box of shells’. RBGK (Economic Botany Collections, Museum Entry Book, 102.1862).
66 Ibid.
67 Kirk to W. Hooker, op. cit. (55).
specimens, the bulk of the zoological materials remained packed in crates at the herbarium for two years waiting for Kirk. It would appear that moving from local to universal knowledge here required the physical presence of the collector, who stood as proxy for the Zambezi basin, confirming the natural habitat of specimens. Without his presence, the specimens could lose their local meanings and were in danger of becoming dislocated curios. Though Kirk would not be the author of the descriptions of most of his collection, zoological and botanical, he still held control over their fate. This indicates his credibility as a collector and the importance of his field knowledge to the final description.

Kirk’s credible reputation in London’s scientific community may be understood through contrast to the controversy surrounding Paul du Chaillu and his description of gorillas in the wild. Published in May 1861, his narrative was fiercely criticised by some members of the zoological profession, notably John Edward Gray, Keeper of Zoology at the British Museum.  

Du Chaillu attempted to cross the line from mere collector to scientist without possessing the necessary credentials and thus brought controversy upon himself and his defenders. Many of the details of his account fell under doubt. McCook’s analysis of the Du Chaillu affair demonstrates that collectors who lacked scientific authority were meant to remain relatively invisible, trusted to collect but not to conclude.  

Kirk, on the other hand, authored his own scientific papers where he felt capable, bowing to others’ authority where he did not. He was commonly mentioned and cited in papers where his specimens were described. Neither his credibility as a field worker nor authority as a scientist were ever called into doubt—he smoothly operated in both capacities and approached the Victorian ideal of a fieldworker: reserved, daring and scientific.  

Keeping most of the Zambezi collections sealed until Kirk returned and opened them himself allowed the chain of credibility from the field to the published description to remain tightly linked. The mussels, however, were particularly interesting. Their description could not wait, thus they were sent ahead.

At the British Museum the specific donation entry for the mussels reads, ‘1862 October 8th, a collection of shells, collected during Dr. Livingstone’s Expedition and

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71 Exposure to danger in the field could lend the collector more authority in the metropolis: B. Hevly, ‘The Heroic Science of Glacial Motion’, *Ori (1996)*, 11, 66-86.
presented by Dr. Kirk. Post Office, Cape of Good Hope.\textsuperscript{72} Although this entry would appear to indicate the shells in question, it is not clear why they are listed as coming through the Cape Post Office and this form of registration does not match the information found at Kew Gardens. This can be interpreted as a clerical mistake, for the other evidence presented above suggests conclusively that the shells went to the Museum via Kew; their dates of arrival at Kew and the British Museum correspond to the parcel’s description.

In tracing the movement of specimens from Kirk’s hands via Admiralty ships to Kew and then the British Museum, we are tracing lines of authority that linked field collectors to metropolitan research centres. Trust was placed in those who transported the specimens and those who took responsibility for them. Kirk does not indicate in his letters that he had an analyst for his specimens in mind. Instead, Richard Owen, as superintendent of the natural history departments of the British Museum, was expected to deal with the collection appropriately. In this role, Owen acts as an integral part of a network upon which the expedition’s scientific credibility and significance would depend.

The shells next appear in the \textit{Proceedings of the Academy of Natural Sciences of Philadelphia} on 12 April 1864. In his, ‘Descriptions of Six New Species of UNIONIDAE from Lake Nyassa, Central Africa, &c.’ Lea writes:

The specimens herein described are of unusual interest. They are the first which I have seen from Central Africa, and I am greatly indebted for them to the liberality of John Kirk, M.D., of Edinburgh, who accompanied the Zambezi Expedition, under the British Government, as Medical Officer and Botanist. There are six in number, all of which I believe to be undescribed. … The three Uniones differ from any type I have heretofore seen from Africa. … It is greatly to be regretted that none of the soft parts were preserved, that we might compare their anatomy with those from America. Lake Nyassa is one of the three great central lakes of Africa, and has a southern drainage in the Zambezi River. It is, in extent, as Dr. Kirk informs me by letter, `exceeding two hundred miles north and south, and from fifteen to sixty miles wide, and is fifteen hundred feet above the sea. It lies between the parallels of $14^\circ$ and $18^\circ$ south latitude’.\textsuperscript{73}

\textsuperscript{72} NHML (Zoological Donations Record, 1848-73. DF216.28).
\textsuperscript{73} I. Lea, ‘Descriptions of Six New Species of Unionidæ from Lake Nyassa, Central Africa, &c.’ \textit{Proceedings of the Academy of Natural Sciences of Philadelphia} (1864), 16, 108-9. Lea errs here as he recorded in his diary previously seeing Zambesian \textit{Unio} specimens when he was Berlin in 1853. cf. (43).
Lea described the specimens and, with acknowledgment to their home environment and collector, named them: *Unio kirkii*, *Unio nyassaensis*, *Unio aferula*, *Spatha alata*, *Spatha modesta*, *Spatha nyassaensis*. This article was collected together with others and republished with plates in the Academy’s *Journal* a few years later (Figure 1). Tracing in detail the shells’ movement from Kirk to Lea via Owen as intermediary is not easy. Letters from Kirk to Lea appear to have not survived and it is unclear if the letter to which Lea refers above was personally written to Lea by Kirk or if it was a general letter accompanying the specimens. Kirk never had an opportunity to meet Lea and they do not appear to have known each other personally. But, as shown above, Lea was a close personal acquaintance of Owen and others working at the British Museum.

Given what we know from Dohrn’s article, it is clear that the Unionid shells were selectively removed from the main collection and specifically sent to Lea for analysis.74 Others were qualified to do this work. Dohrn certainly implies that he could have done the job and did not approve of splitting the collection in the first place. According to Dohrn, splitting the collection up between analysts diminished its value as evidence for the biogeography of mussels in southern Africa. Despite these issues, instead of keeping the shells together and using a more local specialist, the *Unio* specimens were separated out and sent to Lea. Possibly to avoid any priority dispute or confusion in naming, when the remainder of the shells were sent to Dohrn for description, no Unionids were included, so if there were duplicates retained at the British Museum, Dohrn was clearly not allowed to see them, hence his ‘regret’.75 Dohrn was very much acknowledged as an expert in malacology, but Lea was the established expert on Unionids. In 1863, Lea had been sent Unionid molluses recently collected in South America by Patricia María Paz y Membiela, former director of the Spanish Comisión Científica del Pacífico, demonstrating that Lea’s expertise was widely acknowledged in the early 1860s and he was receiving specimens of this Family from government-sponsored expeditions worldwide.76

Described, named and published in Lea’s articles, the mussels were then fully incorporated into western scientific knowledge. They have been moved from the farthest empirical and geographical peripheries into the metropolitan knowledge system

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74 Dohrn, op. cit. (30).
75 Ibid.
epitomised by London’s scientific institutions. In following the mussels to their final
destination we find, however, that the metropolis relocated itself along lines of
credibility and authority leading to Lea in Philadelphia, where the journey ends. This
raises some questions, discussed in the conclusion, over what we mean when we use
terms like ‘centre of calculation’ and how we are to understand the geography of the
‘metropolis’.

Conclusion

The complexity of activities constituting expeditions—some mundane, some
recoverable but others less so, yet all about the doings of science—explains the subtitle
of my paper, namely a geography of the Zambesi Expedition.77 There are numerous
other possible geographies that could be described depending upon which aspects of
the expedition’s work are the subject of interest. The ‘spatiality’ of the expedition
described here is but one of many factors contributing to the construction of a natural
history of the Zambezi basin through this expedition.78 Indeed, the life histories of the
key players in the story of how the mussels are described are offered as another
important aspect of understanding fieldwork and the distribution of specimen
collections.

In this case study I have tried to demonstrate the importance of travel in making
the relationships that form the networks of natural history possible. Travel brings
people, ideas, and specimens to places in the form of expeditions, and it carries them
away. By tracing the trajectory of the shells a number of other journeys besides that of
the expedition itself have become important. Understanding these journeys provides
important evidence concerning the social geography of mid-nineteenth century science
and the intricate connections between field collectors, institutions, and ‘analysts’. Kirk
and Lea, not otherwise connected, were brought together by a tin box of shells,
intermediaries in London’s scientific institutions and Lea’s established reputation.

If we may think of the British Museum as a Latourian ‘centre of calculation’ in
this case, where further work is done to ‘mop up the inscriptions,’ then it must occupy a

77 I highlight the possibility for other geographies due to the multifaceted nature of expeditions, not, in
this case, due to what D.N. Livingstone has styled ‘a postmodern inclination to expunge the definite
article.’ M. Hoyler, T. Freytag, and H. Jöns, ‘Geographical Traditions, Science Studies, and Biography:

78 In his review of D.N. Livingstone’s Science, Space and Hermeneutics, op. cit. (5), Steven Shapin argues that
spatial ‘factors’ would be better termed ‘modes’ as they are fundamental to our perception. British
Journal for the History of Science (2003), 36, 89-90. Elsewhere Shapin has called for a more robust
geographical perspective in the history of science in which travel is key: Shapin, op. cit. (4), passim.
space stretching from Philadelphia, across London, to Berlin—an unwieldy image that is overly reductive.\(^79\) By following the mussels through society, the centre of calculation proves to be a fictitious place if we assume it to be the end of the line where all the further analytical work was performed. Here, the metropolitan centres of science acted to propel the specimens further along their epistemic journeys as material collected on the expedition was dealt with, literally, on a case-by-case basis. The work at the museum involved receiving specimens, evaluating them briefly and then sending them on to an appropriate expert for proper analysis, wherever they may be.\(^80\) This taxonomic triage may be reviewed today in the rough identifications given to specimens in museum accessions registers and donation books. The point of the exercise was to get a quick idea of what was arriving so that a specialist could be assigned to identify them. Differences in the quality of initial classifications can be attributed to the skills of whichever individual was responsible for opening the box.\(^81\) In this role, the British Museum functioned less as a ‘centre of calculation’ and more as an entrepôt for natural history.

Once distributed, specimens came under analysis. Consider that nearly 100 articles that directly utilise material or data collected by the Zambesi Expedition appear in scientific periodicals between 1858-1867. Not all of the authors were located at the British Museum or Kew Gardens. The host periodicals represent a variety of leading scientific societies including the Linnean Society, the Royal Geographical Society, the Royal Society, the Epidemiological Society and the Academy of Natural Sciences of Philadelphia. Distributing specimens for analysis was an important part of the work done in connection to the expedition, and it was work that relied heavily upon established professional networks. Specialists were identified through their reputation in publication and via personal acquaintance. Geographical location or ‘in-house’ status may have also been important when assigning workers to identify specimens, but in this case no one at the British Museum was considered capable. These networks were not always planned in advance but, rather, were established contingently, depending upon

\(^79\) Latour, op. cit. (9), 233.

\(^80\) The expert could very likely be located at the museum, or perform the work there. In this case, the ‘sending on’ is an operation internal to the institution, nevertheless the type of decisions made about the fate of specimens remain the same.

\(^81\) Thanks are due to Dr Colin MacArthy, Collections Manager for Reptiles, Amphibians and Fishes at the Natural History Museum, London. Our discussion of the accessions registers and his assistance in locating examples of Kirk’s specimens was invaluable.
the types of specimens produced. The minimal prior planning given to this aspect of the expedition demonstrates further the authority that the British Museum and Kew Gardens possessed as sites where the identification of specimens would be facilitated, but not necessarily undertaken. Sending specimens there was a necessary stage of the route to their full analysis. The ‘normal’ and unremarkable nature of these networks then is one reason why it is now so difficult to retrace such movements; records of these activities were not diligently kept.

This difficulty in retracing specimen trajectories may help explain why the use of specific collections or particular specimens as evidence for the social construction of natural knowledge is not often attempted by historians of science, though these types of investigations can prove fruitful. Difficulties arise where the contextual ‘history’ of a specimen has been lost because it was not considered as important as its morphology and geographical origin. As correspondence that accompanied specimens may not have made it to institutional archives but correctly remained with the specimen, important documents may be destroyed, lost or be otherwise irretrievable. Furthermore, natural history collections may not be cross-indexed by collector or expedition at all thus demanding arduous sleuthing to identify a collector’s specimens. Lastly, few, if any, ready-made search methods allow for the retrieval of publications ranging across disciplines that made use of a particular expedition’s materials. This case study is itself limited by such lacunae.

The example of the six Unionid shells illustrates how field workers possessed varying control over the later representation of their specimens. For example, in Dohrn’s article on the Union specimens, Kirk is only quoted to provide information concerning local context and regional distribution.82 Likewise, others cite Kirk in their articles naming specimens from the Zambezi collections, adding his first-hand knowledge of context (e.g., location, habit and uses) to desiccated taxonomic descriptions. In this guise, Kirk, as a fully-trusted collector, acts as an avatar for the Zambezi basin.83 Bringing the foreign space with him into these texts, Kirk repositions

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82 Dohrn, op. cit. (30).
the specimens back in the field. Fully incorporated into the forms of knowledge by which they must now be defined, the specimens could be imagined as if in situ, though now classified.

In Philadelphia, Lea used Kirk to interpret Lake Nyassa for his readers even though Kirk never travelled to North America and the two never met. By incorporating Kirk’s voice in the rhetorical structure of the paper by quoting his description of the lake, Lea retraced the journey made by the shells that is outlined here and took the reader back to the field and the site of collection. From a reader’s perspective, Kirk lifted the specimens from the lake and handed them to Lea. The distance between cabinet and field was rendered minimal, and the many local decisions made that kept the shells moving from Lake Nyassa to Philadelphia were obscured; a necessary rhetorical consequence if the local specimens were to have universal scientific significance.

This paper has examined the role of both local and distributed sites for knowledge production. Lea worked in Philadelphia in the private spaces of his study. Kirk roamed central Africa collecting at particular sites. Others at Kew Gardens and the British Museum acted to facilitate specimen identification. The sites of collection, facilitation and analysis are particular locales that fit into a larger, distributed pattern of knowledge generation necessary for the whole project to succeed. The Zambezi Expedition may be understood as the sum of these dislocated activities. Performing this sum requires that local and distributed modes of work are considered—indeed the historiography itself must be spatialised. As D.N. Livingstone has remarked, such work requires that we, ‘attend to spatial considerations at a variety of scales.’ This has been necessary in order to fully understand how expeditions contributed to spatially and temporally extended ‘projects’ such as Unionid systematics and provide a historical account that reflects this extension. The key that links the scales and defines the spaces in this study are the mussels we have been following. Normally considered rather sedentary creatures, they provided the raison d’être for a host of activities.

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84 Lea, op. cit. (72).
85 Harris, op. cit. (1), 294.
86 Livingstone, op. cit. (14), 27.
Appendix E: extract from Peters’s
*Naturwissenschaltliche Reise Nach Mossambique*


*Translation by Dr. Alison Hiley, Language Links Scotland.*

Vol. Zoologie IV Flussfische. 1868

Foreword

The present volume comprises those fish which present not merely a scientific interest, but which are also of politically economic importance as a chief means of subsistence.

The fact that I have restricted myself in this work to those fish which occur in fresh waters scarcely needs justification. The maritime fish which occur on the coasts of Mozambique (cf. Berichte der Königl. Akademie der Wissenschaften zu Berlin. [Report of the Berlin Royal Academy of Sciences], 1855, p.428 ff.) belong to the fauna of the great East Indian-Australian Ocean and therefore do not hold the same special interest as the river fish in relation to the regions I have travelled. Besides, *Colonel Playfair* and *Dr Günther* have just recently published a fine work, *Fishes of Zanzibar*, London 1866, a work which is based on the material gathered by the former and draws on all the literature on the subject; the work concerns all those fish which occur on the East coast of Africa. Any similar work would thus be utterly superfluous at the present time.

As can already be ascertained from earlier communications (Berichte der Königl. Akademie der Wissenschaften zu Berlin. [Report of the Berlin Royal Academy of Sciences], 1852 and 1855), the number of species I have observed in the Zambezi River region alone amounts to forty-three. According to the list drawn up by *Rüppell* in the year 1835, the total number of fish observed in the Nile previous to his findings ran to thirty (thus including those of the great Napoleonic Nile Expedition, to which he was able to add a further twenty), whilst this number has very recently doubled. In view of this, my Zambezi River count can be viewed as a relatively high result for a first expedition, and for one undertaken with such relatively limited means. On the other hand, and against expectation, the big British Zambezi Expedition of 1858 to 1864 only augmented the
number of those Zambezi fish which I had presented in my earlier published findings by one single species (Arius Kirkii), while many of those species which I had collected were not even observed at all by that expedition. In view of the manner to which certain of my scientific publications have been variously alluded in the work Narrative of the expedition to the Zambezi and its tributaries, London, 1865, I consider myself completely justified in drawing special attention to this fact. It was not to be expected that a man like Livingstone, a man distinguished by his insurmountable wanderlust, extraordinary physical tenacity and great intrepidity, yet a man of little acquaintance with the literature of his own native land, should somehow have any knowledge of the literature of Germany. It was also scarcely to be expected that the English geographers should be familiar with the specialist chart published in accordance with my materials by Kiepert in 1849\(^1\), or with my own briefly described itinerary in the Monatsberichten der Gesellschaft der Erdkunde zu Berlin [Monthly Proceedings of the Berlin Geographical Society], 1848, p.268 ff.; but it was to be expected that the English geographers should be familiar with such important recently published works as Kiepert’s Atlas and the communications by Petermann which utilise this material. This appears not to be the case, however. For otherwise some quarter or other in England would have taken exception to Livingstone’s pretension\(^2\) that the true mouth of the Zambezi was first discovered by him and that he was the first to establish that the River Quelimane was not the mouth of the Zambezi—a fact which had long before this alleged discovery been incorporated in the regular school curriculum in Germany. With regard to this pretended discovery, he would probably not then have dared to raise such accusations against the Marquis de Sa da Bandeira, a man so universally revered and highly respected by all parties for his strict sense of integrity and veracity. Even if they were not entirely unfounded, such accusations brook no educated response.\(^3\) For if, in his chart published in 1861,\(^4\) my honest friend, in whose vigorous active interest I was able to take pleasure throughout


\(^2\) Both in the Convention of the British Association for the Advancement for Science in Bath in the year 1864, and in the Proceedings of the Geographical Society of London, and in the above quoted travel work.

\(^3\) Inca citato, p.16, 241, 460, 461

\(^4\) Zambesia e Sofala. Mappa coordenado sobre numerosos documentos antigos e modernos portugueses e estrangeiros. Pelo V.de de Sá da Bandeira. 1861
the whole duration of my journey, made an erroneous assertion with regard to the
course of the Zambezi (both for the current period and for the dry season), then this is
only because he followed the British sources too trustingly, namely the chart which
stemmed from Owen’s expedition.\(^5\) It was not his intention, as Livingstone so
irresponsibly charged him,\(^6\) to mislead the English cruisers, which had been sent to
counter the slave trade, and thereby promote that trade which is so pernicious for the
Portuguese colonies. The view has long since prevailed that it can only be in the interest
of the Portuguese Government to suppress the slave trade in its colonies, and one of
the chief proponents of this view is none other than the Marquis de Sa da Bandeira.
Livingstone knows as well as I do, however, that without the connivance of the
governors, the slave trade would come to an end. It thus sounds strange coming from
his lips when he seeks to exculpate his friend, the disloyal Major Tito de Sicard (a man
who had already made an ill-famed name for himself in my day) and to lay the blame for
the latter’s crime at the feet of the Government in Portugal. I should have thought that
the recent events in Jamaica would have been ample proof that it is not always possible,
even for the best government, to prevent injustice and lawlessness in distant colonies,
where it must rely on its representatives. The fact that the Marquis de Sa da Bandeira
himself dealt with such undutiful officials with unrelenting severity and incorruptible
justice is too widely known for anybody who has any kind of knowledge of Portuguese
affairs to be in any doubt over it. Thus, moreover, when Livingstone commences the
foreword to his *Narrative* etc. by stating that he will report on the river systems, natural
productions and means (*capacities*) of regions which had not been explored at all before
him, he should at very least have restricted this claim to the explorations of his own
countrymen, although even this would not have been quite correct: for indeed a small
collection of plants originates from the markedly unsuccessful 1823 English Zambezi
expedition, over and above the malevolent plan to falsify the course of the river (which

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6 *I.c.* p.16. “The Kwakwa, or river of the Quillimane, some sixty miles distant from the mouths of the
Zambezi, has long been represented as the principal entrance to the Zambezi, in order, as the
Portuguese now maintain, that the English cruisers might be induced to watch the false mouth, while
slaves were quietly shipped from the true one; and strange to say this error has lately been propagated
by a map issued by the colonial minister of Portugal.” - - Would any other gentleman in Europe
construct a map such as that mentioned in the text and send it to the English Government as showing
the true mouth of the Zambezi?” - - p.460 - - “though it was notorious, that His Excellency had made
use of our previous information in constructing a map, in which by changing the spelling he had
attempted to prove that Dr. Livingstone had made no discoveries at all.” - - p.461 - - “we must declare
the conduct of the Portuguese statesman to Africa to be simply infamous.”
Livingstone attributed to the Marquis de Sa da Bandeira, and which the English Admiralty published).

With regard to the specialist execution of this volume, it only remains for me to say that those deviations which occur in relation to my earlier preliminary communications are the result of repeated, more precise investigations, and moreover that I have abandoned my earlier intention to illuminate the tables – from a scientific point of view this is unnecessary, besides which it would be both extremely difficult to execute to complete satisfaction, and in addition it would add unnecessarily to the costs. As for the rest, the statements regarding the colours are based only on those illustrations made from living animals. I have taken great trouble over the precise inquiries into the indigenous names and I hope thereby to have rendered the recovery of the species considerably easier for my successors. I have attempted in vain to receive specimens of some of the Zambezi fish whose names were given to me in Sena (for example *mesiriri*, *mansório* and *copari*). Nor could I clarify to which genus a ribbon-shaped fish “*campanção*” (that is, little band) belongs, which is said to occur in Lake Nyanja.

Berlin, April 1868
Appendix F: the grave of Sir John Kirk, 1832-1922

This thesis relies heavily upon the journals, correspondence and published writings of Sir John Kirk. During the research I became interested to locate his grave. A query to the Sevenoaks Library in Kent (Kirk’s home after returning from diplomatic service in Zanzibar in 1886) was successful. The 20 January 1922, issue of The Chronicle and Courier, a Kent newspaper, indicates that he was buried in the cemetery of St. Nicholas’ Church in Sevenoaks on 19 January. Among the attendees was Sir Frederick Lugard who, like Kirk, was one of the architects of the British African Empire. An image of Kirk’s tombstone is included here because the epitaph demonstrates clearly that despite a career dominated by diplomacy, Kirk considered himself first and foremost to be a scientist. The site itself offers an interesting contrast to the tomb of David Livingstone, buried in Westminster Abbey in 1874

![Sir John’s Kirk’s grave. The pair of similar tombstones behind and to either side are those of his wife and two of his three daughters](image)

![Detail of Sir John Kirk’s tombstone. Epitaph reads ‘Here rests the body of Sir John Kirk KCMG, KCB, MD, FRS. Born 1832 died Jan. 7 1922 Scientist, Traveller and East African Administrator, 1865-1887’](image)
το τέλος