

**Professionalizing Science:
British Geography, Africa, and the Exploration of the Nile**

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Dissertation Prospectus

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Abstract: *This dissertation identifies the mid-nineteenth century as an inflection point in the practice, organization, and perception of science in Britain. In assessing the history of British exploration in Africa, I investigate how a new generation of explorers overcame social and economic barriers that limited scientific work to gentlemen scientists. I examine the strategies employed by explorers to bolster their scientific credentials, such as a commitment to accurate measurements; a reliance on learned institutions such as the Royal Geographical Society to confer scientific and financial capital on explorers; and a devotion to ideologies prevalent in British geographic circles such as abolitionism and the holistic description of the world. By investigating how these strategies occurred in the context of Nile exploration, I connect the issue of the professionalization of geography with questions of empire, indigenous knowledge, and the transnational nature of British geography. Finally, I chart the development of geography from its seeming unity with the establishment of the Royal Geographical Society to the division of the field between academic geographers and field scientists. It is my hope this study can assess how the legacy of Nile exploration helped transform science in the nineteenth century and reframe the relationship between science and society.*

Introduction

Two strands of inquiry have dominated histories of science in the long nineteenth century. Assessing how class, education, and networks influenced scientific knowledge production and highlighting the natural sciences, one set of historians has placed the gentlemanly scientist at the center of British science from the seventeenth century through the mid-nineteenth century. A second set of historians picks up the story later, with the process of professionalization and disciplinary formation occurring in the late-nineteenth century. These historiographies address some common themes. Both detail how individuals navigated scientific communities that enforced boundaries based on class, gender, and conduct. Both give attention to practices derived from and influenced by social or economic practices, showing how science was, above all, a social practice. But the two historiographies do not explain the change from gentlemanly science to professionalization, or assess how scientists themselves navigated this shift in practice and epistemology.

Understanding this transition has the potential answer key questions about how British science professionalized. The history of how science professionalized is also the history of empire, class, and transnational networks. Professionalization brought middle-class scientists

into scientific disciplines at a time that the middle class increased their political and economic representation in wider society.¹ Industrialization and colonialism brought a transnational dynamic that connected British scientific communities with continental, transatlantic, and colonial networks of knowledge production. The emergence of distinct scientific disciplines occurred as universities and businesses formed, alongside established learned societies, as venues for scientific research and funding. As scientists navigated networks, institutions, and practices that were in a state of flux, they also changed science, developing new conventions about scientific method, research management, and presentation of scientific findings.

The new science of British geography and its most visible enterprise, African exploration, played a central role in these transitions. In charting geographers and explorers of Africa as agents of these changes, this project identifies the mid-nineteenth century as an inflection point in the organization, practice, and perception of science. The project will evaluate how geographers fashioned their personas as scientists to respond to prevalent social, professional, and ideological pressures. They did so in part by bolstering geographers' scientific credentials to include a greater emphasis on measurement and the translation of exotic field notes into more "scientific" records. Changes in the basic practices of scientific work took place against the background of a new landscape of learned societies and institutions in financing and sponsoring expeditions and fieldwork. This study will also investigate how scientists navigated the transition to institutional support instead of the personal wealth or patronage that existed during the era of the gentlemanly scientist. Finally, this study will examine geographers' transnational networks of

¹ The historiography of British class is extensive. For a few examples, see: Gareth Stedman Jones, *Outcast London: A Study in the Relationship between Classes in Victorian Society* (Oxford: Clarendon Press, 2013); Leonore Davidoff and Catherine Hall, *Family Fortunes: Men and Women of the English Middle Class, 1780-1850* (London: Hutchinson, 1987); Margot Finn, *After Chartism: Class and Nation in English Radical Politics, 1848-1874* (Cambridge: Cambridge University Press, 1993).

support to assess the degree to which the internationalization of scientific communities was integral to trends of professionalization.

From Gentlemanly Science to Professional, Scientific Research

Historians of science have written much about the social context of science in the eighteenth and nineteenth centuries. Forgoing older narratives of science as progressive and teleological, historians of science have instead examined individual, institutional, and social considerations in the development and proliferation of scientific practices. My research builds on this literature. This section includes an overview of the literature on gentlemanly science, self-fashioning, institutional funding, and epistemological changes prominent in British science during the nineteenth century.

The literature of the gentleman scientist is rich and varied, but Anne Secord's article on the correspondence between naturalists and artisans is typical of the literature on the gentlemanly scientist.² Secord describes the relationships developed by gentleman naturalists with lower-class artisans. By assessing this correspondence, Secord shows the myriad strategies artisans used to be recognized by gentlemen patrons and the social expectations of patronage by these same gentlemen naturalists. By delivering botanical samples and information, artisans expected reciprocity from gentlemen in the form of patronage or payment. In turn, gentlemen expected artisanal deference to social betters. The goal was not for artisans to become gentlemanly

² Anne Secord, "Corresponding Interests: Artisans and Gentlemen in Nineteenth-Century Natural History," *The British Journal for the History of Science* 27, no. 4 (December 1994): 383-408; Secord's article comprehensively details the main aspects of the gentlemanly scientist at the turn of the nineteenth century. The theme of the gentlemanly scientist emerges in histories of the early modern era surrounding the formation of the Royal Society and the circle of scientists exemplified by Sir Francis Bacon. See Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle and the Experimental Life* (Princeton: Princeton University Press, 2011) and Steven Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago, 1994).

naturalists but to establish the recognition that they had the scientific skills to be accepted into the wider community of natural science.³

The connection between shifting social norms and scientific reputation is further elaborated in studies of the mid-nineteenth century. In his study of geology in the 1830s, Martin Rudwick's *Great Devonian Controversy* touches on the topic of gentlemanly science.⁴ Rudwick uses debates among geologists over the dating of geological strata to address the way social contexts were shaping scientific debates. Rudwick argues that the "contexts of discovery and justification are thus not only descriptively inseparable, but also analytically indistinguishable."⁵ Like Secord, Rudwick describes how class distinctions oriented a scientist's reputation among his peers. According to Rudwick, the scientific reputation of a person was fluid, depending not just on the quality and quantity of the work produced by the scientist but also on how the wider scientific community perceived that work.⁶ To be seen as competent by their peers, scientists had to earn their reputations and maintain them.⁷

An assumption underpinning gentlemanly science was that scientific work would be self-funded. To be self-funded implied that the scientist was disinterested, that is, had no stake in the results of his observations, and no reason to lie or manipulate the results.⁸ A gentleman who had the financial means to support his scientific work without the need to profit from his work was considered trustworthy by his peers. Conversely, suspicion was directed to the scientist who sought to make a living from his work given the incentive to manipulate the work to increase

³ Secord, "Corresponding Interests," 388, 408.

⁴ Rudwick, Martin. *The Great Devonian Controversy: The Shaping of Scientific Knowledge among Gentlemanly Specialists* (Chicago: University of Chicago Press, 1985).

⁵ Rudwick, *Great Devonian Controversy*, 438.

⁶ Rudwick, *Great Devonian Controversy*, 420.

⁷ Rudwick, *Great Devonian Controversy*, 420.

⁸ Secord, "Corresponding Interests," 384.

potential profits. Ironically, this need to make a living on one's scientific work also became one of the hallmarks of professionalization.

Despite studies assessing the issue of gentlemanly science and the need of non-gentlemen scientists to make a living, historians of the natural sciences have not extended this analysis to chart the professionalization of the natural sciences.⁹ Endersby, through assessing Hooker's life and career, shows the daily life of a scientist and the many cultural, social, financial, and practical difficulties scientists encountered. Endersby argues that in the early nineteenth century, scientific institutions were not in themselves markers of scientific credibility.¹⁰ Instead, "good manners, courtesy, and an aura of respectability had to do the work" for any would-be scientist to build a reputation for themselves.¹¹ Despite inheriting both his father's directorship at Kew Gardens and his father's social connections, Hooker would struggle to maintain a sustainable living during his early career.¹² There are hints of mechanisms in which the professionalization of botany occurred. Still, this transition was uneven in Endersby's study, with the narrative of Hooker's career occurring contemporaneously with Charles Darwin. Further, Hooker's role at Kew would become the arbiter of information exchange for botany worldwide. As Endersby notes, Hooker's ability to transform Kew occurred concurrently with the expansion of the British Empire, allowing Kew to become the center of imperial botany.¹³ But Endersby's study is not a history of Kew Gardens since gardens' transition to become the center of imperial botany was inseparable from Hooker's career.

⁹ Jim Endersby, *Imperial Nature: Joseph Hooker and the Practices of Victorian Science* (Chicago: University of Chicago Press, 2010).

¹⁰ Endersby, *Imperial Nature*, 29.

¹¹ Endersby, *Imperial Nature*, 29.

¹² Endersby, *Imperial Nature*, 6.

¹³ Endersby, *Imperial Nature*, 110.

With Rudwick and Endersby we can see the briefest indications of the professionalization of the natural sciences. Both histories detail how individuals sought to balance the need to keep up with social expectations of being disinterested men of science while also maintaining a livelihood. But missing in these studies is an elaboration of how the transition from gentlemanly science to professionalization occurred. This is in contrast to histories of other scientific fields that were transformed during the Second Industrialization Revolution, such as chemistry, medicine, and physics.¹⁴ In those fields, the path of gentlemanly science towards professionalization goes through the growth of private industry, where the potential of immense profits overcomes prior social norms.¹⁵ But the connection between the natural sciences (e.g. botany, ethnology, and later geography) and industry is not as strong. For geography, the Royal Geographical Society (RGS) functioned as the primary institution of the field in Britain for the entirety of the nineteenth century. There was no other organization, public or private, that would hold the authoritative position of the RGS over British geography until the rise of geography departments at British universities by the close of the century, an effort spearheaded by the RGS itself. Given the close relationship between the RGS and the British state, the professionalization of geography took on a different character than in other fields where private industry coexisted with scholarly research. Charting the professionalization of British geography must begin by examining the role of the RGS in the development of geography.

¹⁴ For an example on the professionalization in biology, see Lynn Nyhart, *Modern Nature: The Rise of the Biological Perspective in Germany* (Chicago: University of Chicago Press, 2009); For an example of professional astronomy, see Simon Schaffer, "Astronomers Mark Time: Discipline and the Personal Equation." *Science in Context* 2 (1988): 115-145; For a look at the professionalization of British physics and engineering, see Crosbie Smith, *Science of Energy: A Cultural History of Energy Physics in Victorian Britain* (London: Athlone, 1998).

¹⁵ For examples on the intersection of professionalization and industry, see: Simon Schaffer, *Late Victorian Metrology and Its Instrumentation: Manufactory of Ohms* *Washington: Spie Optical Engineering Press, 1992); Bruce J. Hunt, "The Ohm is Where the Art Is: British Telegraph Engineers and the Development of Electrical Standards," *Osiris* 9 (1994): 48-63; Bruce J. Hunt, "Scientists, Engineers and Wildman Whitehouse: Measurement and Credibility in Early Cable Telegraphy." *British Journal for the History of Science* 29, no. 2 (Jun. 1996): 155-170.

Despite the RGS's role in the development of British geography, Felix Driver observed that few histories of the RGS existed.¹⁶ Of early works on British geography and the RGS, D.R. Stoddart's article "The RGS and the 'New Geography'" comes closest to detailing the professionalization of British geography.¹⁷ Stoddart's institutional history examines the Royal Geographical Society in the nineteenth century, grappling with why the society saw a drastic change in its membership and its mission by the end of the century.¹⁸ Stoddart's study focuses on the leadership of the society, marking the death of Sir Roderick Murchison in 1871 as a turning point in the society's history.¹⁹ Stoddart asserts that the "Darwinian revolution" brought about the professionalization of British scientists, but he does not elaborate on or fully support this claim.²⁰ Stoddart's study explains the society's goals in pushing for the teaching of geography in British schools and universities, but it does not detail how professionalization came about or why it occurred. In focusing on how the RGS created geographic curricula in British universities, Stoddart does not mention the state of field expeditions that, in his words, were so intertwined with the geographic project.²¹ Given the continued exploration of Africa through the early twentieth century, Stoddart's silence on this subject is troubling.²²

There is one more aspect of Stoddart's article worth considering. In concluding his section on the rivalry between geologists and geographers in the 1870s, Stoddart claims that geographers had gained ground in redefining the study of landforms as belonging to their

¹⁶ Felix Driver, *Geography Militant: Cultures of Exploration and Empire* (Oxford: Blackwell Publishers, 2001): 25.

¹⁷ David R. Stoddart, "The RGS and the 'New Geography': Changing Aims and Changing Roles in Nineteenth," *The Geographical Journal* 146, no. 2 (July 1980): 190-202.

¹⁸ Stoddart, "The RGS," 190.

¹⁹ Stoddart, "The RGS," 194.

²⁰ Stoddart, "The RGS," 195.

²¹ Stoddart, "The RGS," 195.

²² Stoddart's article is an early attempt to chart the history of academic geography. While the following sections will touch on more recent works that do a better (if still incomplete) job in describing the professionalization of geography, institutions like the Royal Geographical Society figure centrally in any attempt to detail this process, at least during the early days of the society's history. The creation of geographical departments in British universities offers another topic through to examine the relationship between institutions and the professionalization of British geography.

disciplinary area but that this move came “at the expense of human and economic geography.”²³ What were these geographies that were no longer part of the discipline? As Stoddart is a geographer and not a historian, it is easy to imagine that Stoddart sought to trace the development of his own discipline in a way that would exclude elements that were once synonymous with geography but, at the time of Stoddart’s article, were no longer practices of the field.²⁴

Beyond professionalization, an epistemological shift occurred across all sciences during the nineteenth century. In their work on “objectivity,” Lorraine Daston and Peter Galison argue that the mid-nineteenth century saw a shift towards an epistemology that prioritized the collection of scientific data instead of crafting an idealized archetype of the phenomenon in question.²⁵ As Daston and Galison describe, an ideal emerged in the mid-nineteenth century that idealized knowledge and data as being free from the taint of human intervention; knowledge would be “unmarked by prejudice or skill, fantasy or judgment, wishing or striving.”²⁶

In the natural sciences, this commitment to accuracy occurred in tandem with approaches developed from the Romantic movement in continental Europe. In his study of the relationship between the German romantics and Charles Darwin, Robert Richards argues that Romanticism brought about the idea that life and humanity were interlinked, creating the holistic thinking that superseded the Newtonian mechanical-view of the cosmos that was in vogue in Britain in the preceding century.²⁷ Susan Faye Cannon made this connection in her description of nineteenth-

²³ Stoddart, “The RGS,” 200.

²⁴ A common feature of many histories of geography and exploration is that they are often composed by geographers and not historians. This will be discussed further when I touch on the works of Felix Driver and Matthew Edney in the next section.

²⁵ Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007): 42-43.

²⁶ Daston and Galison, *Objectivity*, 17.

²⁷ Robert J. Richards, *The Romantic Conception of Life: Science and Philosophy in the Age of Goethe* (Chicago and London: University of Chicago Press, 2002); A similar intervention can be seen in Norton Wise and Crosbie Smith’s study on William Thompson’s solution of the two-sphere problem and a reorientation of British physics in its rejection of eighteenth-century views of equilibrium in favor of perspectives influenced by the spread of the steam

century natural science.²⁸ Citing Alexander von Humboldt as the exemplar of a new style of science, Cannon defined this “Humboldtian science” as being “the accurate, measured study of widespread but interconnected real phenomena in order to find a definite law and a dynamical cause.”²⁹ Cannon views this trend as being distinct from the Baconian science that preceded Humboldt’s style.³⁰ Richards and Cannon view Humboldt’s influence on British natural science as profound, and they link a holistic approach to understanding the world; “everything was relevant” in terms of observation and data gathering, to the works of Charles Darwin and the theory of natural selection.³¹

Taken together, changes in epistemology meant that scientists sought to measure the world quantitatively. But how are these changes reflected among the work of nineteenth-century geographers and explorers? The historiography of geography has devoted much attention to how metrology figures in the development of geographic sciences such as exploration and cartography. These analyses have much to say about the intersection of empire and science and in highlighting non-Western geographies.

Matthew Edney’s *Mapping an Empire* touches on metrology in its history of the Great Trigonometric Survey of India.³² Situating his study from 1765 to 1843, Edney charts the trajectory of attempts by the East India Company to map South Asia as both an attempt to surveil the population and reflecting British social prerogatives. In the latter’s case, Edney argues that the company had a variety of methods to survey South Asia, such as indigenous cadastral

engine across all facets of life. See, M. Norton Wise and Crosbie Smith. “Work and Waste: Political Economy and Natural Philosophy in Nineteenth Century Britain (II).” *History of Science* 27, no. 4 (December 1989).

²⁸ Susan Faye Cannon, “Humboldtian Science,” in *Science in Culture: The Early Victoria Period* (New York: Dawson and Science History Publications, 1978): 73-110.

²⁹ Cannon, “Humboldtian Science,” 105.

³⁰ Cannon, “Humboldtian Science,” 73-75; Cannon declines the opportunity to define what Baconian science means, instead claiming that the term’s use by her peers among historians of science have made it difficult to give a set definition.

³¹ Cannon, “Humboldtian Science,” 105; Richards, “The Romantic Conception,” 10, 519.

³² Matthew Edney. *Mapping an Empire: The Geographical Construction of British India, 1765-1843* (Chicago: University of Chicago Press, 1990).

mapping and existing topographical surveying techniques.³³ Instead, surveyors chose the newer technique of triangulation because they considered this technique as a “higher art” over the alternatives, reflecting British “rationality” over the “irrationality” of Indian cartography.³⁴ Not that British surveyors ignored indigenous geographies. As Bernardo Michael points out, the East India Company used preexisting Indian cadastral surveys for British maps of India.³⁵ But even when using Indian maps, British cartographers sought to “rationalize” these for their own maps.³⁶

This epistemological shift is also evident among geographers who lacked the knowledge for accurate measurements, but who nonetheless attempted to circumvent their lack of metrological skills in the service of science and empire.³⁷ D. Graham Burnett’s *Masters of All They Surveyed* details Robert Schomburgk’s exploration of British Guiana between 1834-1844, highlighting Schomburgk’s idiosyncratic approach to surveying the territory.³⁸ Working with minimal knowledge of surveying techniques, Schomburgk had to instead rely on dead-reckoning and astronomical observations to explore an unfamiliar land.³⁹ Schomburgk further used “rhetorical strategies” to connect these observations with the more illustrious examples of Humboldt and Sir Walter Raleigh.⁴⁰ However, Burnett does not connect Schomburgk’s self-fashioning strategies with issues of class or social norms, instead emphasizing the contentious nature of the Guyana-Venezuela border crafted by Schomburgk.

³³ Edney, *Mapping an Empire*, 27-28.

³⁴ Edney, *Mapping an Empire*, 28.

³⁵ Bernardo A. Michael, “Making Territory Visible: The Revenue Surveys of Colonial South Asia,” *Imago Mundi* 59, no. 1 (2007): 78-95.

³⁶ Michael, “Making Territory Visible,” 86-87;

³⁷ D. Graham Burnett, *Masters of All They Surveyed: Exploration, Geography, and a British El Dorado* (Chicago: University of Chicago Press, 2000): xii.

³⁸ Burnett, *Masters of All*, xii.

³⁹ Burnett, *Masters of All*, 25-33, 92-98.

⁴⁰ Burnett, *Masters of All*, 37-38.

The ways in which measurements are taken and recorded in exploratory missions connect directly to changes in epistemology. However, missing in these analyses is any connection between the use of metrological techniques and the self-fashioning impulse in nineteenth-century science. These studies have little to say about how individual geographers leveraged measurements to bolster their reputations. Instead of inquiring how individuals navigated the use and recording of measurements, Edney and his colleagues have focused on the division between British geographers with non-Western geographies. This focus has highlighted the rhetoric and mechanisms that legitimized colonial dismissal of indigenous knowledge.

Geography and African Exploration in the Transition to Professional Science

Historians of geography have studied African exploration in great detail. But while these historians have ably commented on the intersection of science and empire, less has been said about the connection between the exploration of Africa with the larger changes occurring within the field of geography itself. Whereas the geographers of prior decades emerged from the gentry, geographers of the late-nineteenth century reflected the social and economic changes of their time. Operating worldwide, geographers came from social groups that had not been part of the scientific community, such as career military men, adventurers, sportsmen, missionaries, and merchants. Drawn from diverse backgrounds, the British geographers of the late-nineteenth century drew financial and scholastic support from institutions such as the Royal Geographical Society. This diversity in backgrounds further signaled a diversity in geographers' motivations. Other motivations, including humanitarian, personal, political, and economic concerns, now joined the gentlemanly scientist's idealized view of science as a disinterested pursuit that would undermine that original vision. Geographers became vocal in their patriotic fervor and their enthusiasm for the imperial project. In the race to discover new lands, the potential of wealth and celebrity proved a tempting desire for many geographers. Explorers touted enthusiasm for moral

missions, such as religious conversion and abolitionism, as benefits of exploration. How these factors played into the development of geographic science makes up a major theme of this study.⁴¹

Since Stoddart's study, historians of geography have expanded their scope of analysis from the formation of academic geography. As seen with the works of Edney and Burnett, case studies of initiatives or individuals speak to issues of self-fashioning, epistemology, and the legacy of imperialism. Felix Driver's *Geography Militant* differs from these works in its comprehensive analysis of British geography in the nineteenth century, assessing exploration, academic geography, and geography's role in the building of the British Empire. Driver states that his aim is to assess "a set of cultural practices which involve the mobilization of people and resources, equipment, publicity and authority" that made British exploration possible.⁴²

Identifying these "cultures of exploration" allows Driver to write a study that does not treat British geography as if it were a unified, singular entity.⁴³ Driver emphasizes how variegated and diverse geographers and their supporters were. In fact, Driver makes pains to show that nineteenth-century geography was plagued by tensions between lofty ideals of science, salvation, and progress with baser motives of imperialism, profit, fame, and subjugating native peoples. Driver provides case studies of individual explorers such as David Livingstone and Henry Morton Stanley, examining the diverse images assigned to those explorers. Was Livingstone a missionary, a scientist, or a harbinger of imperialism? Why did Stanley inspire so much disgust

⁴¹ This history of exploration has matured considerably in the past few decades. The postcolonial turn, specifically the works of Edward Said and Michel Foucault, have greatly influenced the writing of histories of the exploration and geography to speak to the intersection of colonialism and science. J.B. Harley's writings on the history of cartography further revealed the manner by which maps reflected the prerogatives of institutions and states. See, Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (New York: Pantheon Books, 1971); Edward W. Said, *Orientalism* (New York: Pantheon Books, 1978); John Brian Harley, "Deconstructing the Map," in *The New Nature of Maps: Essays in the History of Cartography*, edited by Paul Laxton (Baltimore: John Hopkins University, 2001): 150-168

⁴² Driver, *Geography Militant*, 8, 12.

⁴³ Driver, *Geography Militant*, 25.

by geographers in the RGS but was nonetheless celebrated by his peers?⁴⁴ Driver's goal is not to land on one side of these questions, but to show that the conflicting motivations of individual explorers reflected the conflicting interests and prerogatives of geography writ large.

As the largest and most influential scientific society in 1870, the Royal Geographical Society role in British science has been understudied by historians.⁴⁵ To his credit, Driver does not frame *Geography Militant* as a simple history of the organization. Nor does Driver present the RGS as a monolith. In fact, Driver presents the RGS as a rudderless organization, lacking any clear vision for the society and unable to agree on what the organization should prioritize. Further, disputes divided the RGS between field explorers and so-called "armchair geographers," those mapmakers and academics who believed the society's aim was to collate and synthesize expeditionary findings. In contrast, field explorers viewed their expeditions in far-off lands as the primary way in which someone could produce scientific knowledge.

Driver is correct in framing the RGS as a "coalition of interests" rather than a "centre of calculation."⁴⁶ However, this analysis is incomplete. The first issue lies with Driver's dismissal of Cannon's "Humboldtian science" in describing the work of RGS geographers.⁴⁷ Driver acknowledges that while Cannon's framework describes the work of Charles Darwin, he is nonetheless skeptical this framework can apply for the RGS as geographers. Driver believes that the holistic vision of Humboldt and Darwin was not shared by all British geographers. Further, Driver argues that the data collected by RGS explorers was not all numerical, as ethnologic data did not fit into the framework of "accuracy" that Humboldt and his contemporaries held dear.

⁴⁴ Stanley is most known for his meeting with David Livingstone in 1869, but was involved in the exploration of the Zambezi and Congo Rivers. Stanley's involvement in the establishment of the Congo Free State and the Emin Pasha Expedition in 1886-89.

⁴⁵ Driver, *Geography Militant*, 25.

⁴⁶ Driver, *Geography Militant*, 21, 36-37.

⁴⁷ Driver, *Geography Militant*, 35-36.

The second issue concerns Driver's premise that differences among RGS members prevent analysis of the RGS beyond Driver's framework of intersecting exploratory cultures. Driver writes that "it is indeed difficult to characterize a body which finds room for missionaries, anti-slavery campaigners, roving explorers, mountaineers, antiquarians, geologists and naturalists under its umbrella as a coherent 'centre' at all."⁴⁸ Given that the literature on the RGS before *Geography Militant* was sparse and akin to Stoddart's institutional history, Driver's framing of the RGS as a coalition and less a center is useful in highlighting the prerogatives and agendas that pushed British geography forward in the subsequent century.

The disparate interests of the RGS did coalesce into a single organization in 1830. The RGS became the successor to the African Association, the Palestine Association, and the Raleigh Club. In 1830 and through Murchison's tenure as the society's president, the Society could attract a diverse membership that made it Britain's most important scientific institution by 1870. What was it about the RGS that made it an attractive venue for geologists, abolitionists, sportsmen, cartographers, and missionaries? Driver is correct that the intersection of empire and science factored into the RGS's popularity.⁴⁹ But what was it about this intersection that encouraged collaboration in 1830 but not in 1900?

An avenue for further investigation is that an early function of the RGS was to encourage specialization among geographers, particularly geologists and cartographers, to produce the work that Humboldt and self-financed gentlemanly scientists could once perform. As Driver acknowledges, the RGS was founded in the aftermath of Cook's voyages, when an increasing amount of exploratory information was processed through multiple departments and institutions inside and outside the British government.⁵⁰ While maritime navigation depended on the Royal

⁴⁸ Driver, *Geography Militant*, 47.

⁴⁹ Driver, *Geography Militant*, 44.

⁵⁰ Driver, *Geography Militant*, 28.

Navy's sponsorship, overland expeditions had fewer state-backed resources and required the private wealth of gentlemanly explorers like Humboldt. Further, whereas Humboldt's work was prodigious and derived from multiple fields of inquiry, there was only a finite supply of polymaths who could simultaneously be naturalists, geologists, cartographers, and ethnologists. Therefore, the broad constituency of the RGS allowed for skills rarely found in a single individual who exemplified the holistic vision of scientific work that Humboldt and his contemporaries represented. Even if individual RGS geographers did not conform to Cannon's ideal of the Humboldtian scientist, the end product of ethnological, geological, naturalist, and spatial investigations was a global vision of the world and Britain's place within it. This specialization in the early history of British geography signified an early beginning to the fracturing of the field into distinct disciplines by the end of the century.

There remains a danger in reading modern visions of scientific work back in time. Coined in 1833 by William Whewell, the term "scientist" has evolved to mean different things at different times. For example, writing in the journal *Science* in 1885, H.G. Prout considered the scientific credentials of the deceased Charles Gordon after the fall of Khartoum. Prout cautioned his readers to think of Gordon not as gifted in his accomplishments, but as a man who applied reason and critical thinking to all problems before him. Prout celebrates Gordon's military, geographical, and administrative career as deriving from Gordon's scientific training. While hagiographic in tone, Prout's work insists that Gordon's deeds are within reach for anyone who applies scientific thinking to his own life. Given this expansive definition of what it meant to be "scientific," it may be useful to consider that other commitments may have been considered scientific that no longer are.

One such example can be seen in the role anti-slavery sentiment played in the early history of the RGS. The African Association, a predecessor organization to the Royal

Geographical Society that sought to map West Africa and the Niger River, was already a venue for abolitionists who saw geography as connected with their goal of ending the slave trade. This impulse did not end with the society's formation in 1830. My preliminary research into Nile exploration has revealed the strength of abolitionism in guiding the exploration of Central Africa. This can be seen in the debates surrounding the 1861 expedition of John Hanning Speke, whereby rumors of slave trading ruined his reputation among his fellow geographers.⁵¹ Likewise, Samuel White Baker's second expedition to Central Africa in 1869-1873, where Baker served as both explorer and an Egyptian governor tasked with suppressing the Nile slave trade, was celebrated by the RGS with a banquet that included the Prince of Wales.⁵² While Driver and others have written about the abolitionist impulse in the work of David Livingstone and like-minded missionaries, it is important to ask to what extent this sentiment was widespread among geographers and served as another way of bounding British geographers together, at least until the salience of slavery declined in the late-nineteenth century.⁵³

With all of this in mind, how do we write about scientific institutions in the context of intersecting interests? Susan Faye Cannon's study on Cambridge University provides one approach for crafting an institutional history.⁵⁴ Cannon attempts to synthesize various understandings (or misconceptions) concerning how "self-reflecting" circles of intellectuals organized themselves and remained in communication with one another. Referring to this as the "Cambridge network," Cannon defines it as "a loose convergence of scientists, historians, dons,

⁵¹ I presented a paper on this topic at the Ohio Valley History Conference in October 2018 entitled "'The Failed Explorer: John Petherick and Reputation in Nile Exploration.'"

⁵² S.W. Baker, "The Khedive of Egypt's Expedition to Central Africa," *Proceedings of the Royal Geographical Society of London* 18, no. 1 (1873-1874): 50-69.

⁵³ This re-evaluation of anti-slavery sentiment beyond is emerging among historians of science. For example, Adrian Desmond and James Moore have argued that Darwin's antipathy to slavery was a motivating factor in compelling Darwin to push through with the writing of his theory of natural selection despite Darwin's fear of a backlash. See Adrian J. Desmond and James R. Moore. *Darwin's Sacred Cause: Race, Slavery and the Quest for Human Origins* (Chicago: Univ. of Chicago Press, 2011).

⁵⁴ Susan Faye Cannon, "Cambridge Network," in *Science in Culture: The Early Victoria Period* (New York: Dawson and Science History Publications, 1978): 29-71.

and other scholars, with a common acceptance of accuracy, intelligence, and novelty.”⁵⁵ Instead of writing a history of Cambridge’s role in nineteenth-century science, Cannon depicts the university as the venue in which social networks formed -- networks that would bound together a cohort of scholars, scientists, and politicians who saw themselves belonging to an “intellectual totality.”⁵⁶ Driver views the cooperation of RGS members as resulting from intersecting interests. Nonetheless, it is worth considering if an “intellectual totality” formed among geographers in the early-nineteenth century that resulted from changes in epistemology, the influence of Humboldtian science, and shared abolitionist sentiments.

Driver’s study covered the broad themes of British geography during the era of African exploration and covered three explorers while raising unanswered questions. A more expansive study on explorers is found in Dane Kennedy’s *The Last Blank Spaces*.⁵⁷ Kennedy’s work, while covering similar themes to Driver’s earlier *Geography Militant* distinguishes itself in its focus on explorers by examining the explorations of Africa and Australia. Kennedy argues that commonalities exist in how explorers on both continents produced knowledge, and how that knowledge production became problematic.⁵⁸ Kennedy’s work touches issues of knowledge production, the transnational nature of British geography, and the intersection of empire and geography. In addition, Kennedy highlights the rivalry between field explorers and armchair geographers. In this feud, armchair geographers saw themselves as the “guardians” of geography as a scientific discipline who viewed explorers with suspicion.⁵⁹ While explorers like Speke voiced their disdain for these geographers, most explorers were conciliatory.⁶⁰ This is the closest

⁵⁵ Cannon, “Cambridge Network,” 30.

⁵⁶ Cannon, “Cambridge Network,” 63.

⁵⁷ Dane Keith Kennedy, *The Last Blank Spaces: Exploring Africa and Australia* (Cambridge: Harvard University Press, 2013), Kindle Edition.

⁵⁸ Kennedy, *Last Blank Spaces*, location 78.

⁵⁹ Kennedy, *Last Blank Spaces*, location 811.

⁶⁰ Kennedy, *Last Blank Spaces*, location 776-817.

Kennedy comes to discussing self-fashioning among British explorers. As Kennedy states that there was a class dynamic that fueled the rivalry between explorers and armchair geographers. So what strategies did explorers use to legitimize themselves in the eyes of these gentlemen geographers? These strategies go unremarked in Kennedy's study.

Whereas Edney and Driver wrote from a perspective that highlighted the many ways British geography was used to impose imperial rule onto hapless Africans, Kennedy's study pays attention to how explorers were indebted to the human intelligence provided by Africans themselves. By exploring the manner by which indigenous knowledge was integrated into the building of British geography, Kennedy channels the recent historiography of African exploration in his analysis.⁶¹ In his chapter "Intermediaries," Kennedy spends considerable time on examples of Africans and Australian aboriginals who guided explorers throughout the century. This section is informative but relies much on examples from regions of settler colonialism. With the Nile Valley, Kennedy's examples are not only few, but there is little said about the marshalling of Egyptians and Sudanese intelligence and manpower to explore Central Africa. Likewise, Kennedy has little to say about the European community in Khartoum that, in the 1860s and 1870s, provided intelligence and aid to British-led expeditions in the Nile Valley. The Nile, therefore, provides a unique situation where cross-cultural contacts are more complicated than in other areas of Africa.

⁶¹ The literature of the exploration of Africa is vast. This literature also intersects with the history of European-African encounters and the history of European colonialism in Africa. Examples include James McGowan, "Uncovering the Roles of African Surveyors and Draftsmen in Mapping the Gold Coast, 1874-1957." in *Decolonizing the Map: Cartography from Colony to Nation*, Ed. Akerman, James R. 2017; Harold M. Wesso, "The Colonization of Geographic Thought: The South African Experience." in Godlewska, Anne, and Neil Smith, *Geography and Empire* (Oxford: Blackwell, 1994); Helen Tilley, *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870-1950* (Chicago: University of Chicago Press, 2011); Richard Price, *Making Empire: Colonial Encounters and the Creation of Imperial Rule in Nineteenth-Century Africa* (Cambridge: UK, 2008).

In recent decades, historians have increasingly examined the issue of cross-cultural contact between science and Sub-Saharan Africans. One such example is David Lambert's *Mastering the Niger*, which provides another model for how historians of exploration can acknowledge both developments in Britain and recognize the incorporation of non-Western geographies in their analysis of regional exploratory projects.⁶² Examining the career of the cartographer James MacQueen (1778-1870), Lambert covers how the mapping of the Niger River was part of larger discussions concerning the future of the Trans-Atlantic slave trade. MacQueen was not the first European to map the river, but MacQueen's "A New Map of Africa" (1841) became the most influential for the next few decades. Lambert's investigates MacQueen's strategies in gathering local knowledge in the crafting of his map. This includes MacQueen's reliance on foreign merchants operating in West Africa, reliance on the writings of Mungo Park, and by interviewing slaves in his West Indies plantations who had local knowledge of the region.

Building on this literature, I will investigate how self-fashioning among explorers in Africa brought about the professionalization of British geography. I seek to identify the strategies used by explorers to bolster their reputations to audiences composed of gentlemanly scientists. I further investigate the question of professionalization that neither Kennedy nor Driver's work answers. Ending their studies at the turn of the twentieth century, Kennedy and Driver do not investigate the continuation of field work in Africa after the heyday of exploration. The RGS's *Geographical Journal* continued to be updated with expeditionary notes on Africa and other regions through the early-twentieth century, with colonial officials funding surveying work, ethnographic surveys, and geological expeditions in Central and East Africa.⁶³ Further,

⁶² David Lambert, *Mastering the Niger: James MacQueen's African Geography & the Struggle Over Atlantic Slavery* (Chicago: University of Chicago Press, 2013).

⁶³ These articles are also found in *Man* and the *Quarterly Journal of the Geological Society*, journals of the Royal Anthropological Institute and the Geological Society of London, respectively. Both journals carried expeditionary articles once found in the RGS's own journal, highlighting the diversification of geography into niche disciplines.

missionaries never stopped visiting the continent, continuing in Livingstone's footsteps. The process of specialization that began in 1830 continued, with the explorer's task divided among specialist field scientists, colonial administrators, and Christian missionaries. To chart the trajectory of geography's professionalization, it is necessary to chart the evolution of field science into the early-twentieth century. The Nile Valley provides a venue to observe this evolution in action.

The Nile and Scientific Change

The search for the source of the Nile was the defining exploratory mission of the mid-nineteenth century. Long a mystery to Europeans since antiquity, the question of the Nile source provided an early means to explore the African interior. Attempts had been made since the eighteenth century to travel up the river, but the Sudd swamplands of southern Sudan proved too difficult to traverse. The nineteenth century proved a turning point in the search for the river's source. Since Napoleon's conquest of Egypt in 1798, the Ottoman province had opened to European sciences such as archaeology, the nascent field of Egyptology, linguistics, and Orientalists like Edward William Lane curious about Egypt's history and culture.

The political and military reforms of Muhammad Ali Pasha (r. 1805-1848) increased contact between Europe and Egypt, with European military officers, miners, and engineers arriving to Egypt to reform and modernize the region.⁶⁴ This occurred with the simultaneous conquest of Sudan by Egypt, and brief wars between Egypt and the Ottomans in the 1830s and 1840s. It is in this context that a small but increasing number of Europeans visited and settled in Khartoum, which became a hub of Western activity in Sudan until the Mahdist revolt later in the

⁶⁴ For a detailed examination of Muhammad Ali's reforms in Egypt, see Khaled Fahmy, *All the Pasha's Men: Mehmed Ali, His Army, and the Making of Modern Egypt* (Cairo: American University in Cairo, 2002).

century. It is in this context that the first travelers attempted to surmount the obstacle of the Sudd, including the Welsh engineer-turned-explorer John Petherick.

At the same time, East Africa became an alternative venue for explorers to visit. In the 1850s, expeditions visited the region to avoid the Sudd swamplands to find the Nile's source. Led by Richard Francis Burton, these RGS-sanctioned expeditions resulted in controversy when Burton and his companion John Hanning Speke disagreed over which lake, Victoria or Tanganyika, was the actual source of the Nile river in 1858. This resulted in the RGS backing a new expedition, with Speke confirming his findings in his return to Britain in 1863. This narrative is found in Alan Moorehead's histories of Nile exploration.⁶⁵ Despite being over half-a-century old, Moorehead's history of Nile exploration is still the most comprehensive account of the endeavor. Moorehead's work does not incorporate the methodologies or analytic framework found in subsequent histories of science and histories of explorations mentioned above. Perhaps because of this older literature, the history of Nile exploration has been superseded by either case studies of specific explorers or, with Driver and Kennedy, by broad studies about exploration.

The first issue I consider is the relationship between British geographers and Egyptian authorities on the Nile. This relationship goes unmentioned in Driver's *Geography Militant*, with only one reference to Egypt in the study regarding a functionary's brief service in Egypt.⁶⁶ While Kennedy touches on the "proto-imperialism" of Egypt and Zanzibar in helping British explorers penetrate Central Africa, Kennedy does not spend much time considering the implications this relationship had in the formation of British geography.⁶⁷ Petherick, Samuel White Baker, Charles Gordon, Romolo Gessi and their contemporaries required the funding and the help of the Egyptian state to explore Central Africa.

⁶⁵ Alan Moorehead, *The White Nile*. (New York: Harper, 1960); Alan Moorehead, *The Blue Nile* (New York: Harper & Row, 1962).

⁶⁶ Driver, *Geography Militant*, 152.

⁶⁷ Kennedy, *Last Blank Spaces*, location 2200-2290.

Unlike in Australia or settler colonies in Africa, Nile explorers did not envision that the regions they were exploring would become British. Until the Urabi Revolt of 1882, British agents and explorers presumed that Egypt would rule over Nile Valley for the foreseeable future. Explorers like Charles Gordon and Samuel White Baker not only functioned as RGS-backed geographers but also would serve as Egyptian military governors over Sudan and Equatoria.⁶⁸ The dual blows of the Urabi Revolt (1882) in Egypt and the Mahdist War (1888-1881) in Sudan furthered the militarization and institutionalization of exploration as an overt arm of British imperialism. But with the creation of the Anglo-Egyptian condominium over Sudan in 1899, the establishment of Gordon Memorial College in Khartoum and the resumption of field scientific work in Sudan offers an opportunity to compare and contrast science before and after the establishment of a colonial context. Colonial institutions in Sudan can provide an opportunity to examine how geographic science (and its subdivisions) was conducted at the same time the RGS's prestige was in sharp decline.

On self-fashioning and professionalization, the Nile exploratory missions also offer an interesting case study of how men unfamiliar with geography could become explorers through their presence in Sudan. Since the Nile Valley was settled and much of it was under Egyptian control, individuals could use that relative stability to make a name for themselves as explorers and men of science. John Petherick is an early example of this pattern. Arriving in Egypt to help build Egypt's coal mine industry, Petherick soon struck out on his own to become a gum and ivory trader based in Khartoum. His initial expeditions in southern Sudan allowed Petherick to present himself as a man of science given his unique status as the only Briton on the ground. Likewise, Samuel Baker could leverage his status as the only Briton in Abyssinia and Gondokoro in 1861-63 to facilitate his discovery of Lake Albert. That discovery allowed Baker

⁶⁸ The Egyptian province of Equatoria includes the territories of modern-day South Sudan and Uganda.

to become one of the most well-known explorers of his day. In both instances, men with modest means could use the existing infrastructure of Egypt to position themselves as men of science.

The development and professionalization of the geographic sciences in Britain were not exclusive to the British Isles or Africa. The work of Italians, Americans, and Germans geographers augmented that of the Royal Geographical Society.⁶⁹ Beyond the geographers themselves, exploratory missions across the continent were reliant on the labor and knowledge provided by locals. Egyptian soldiers, Sudanese cooks, and African porters made the exploratory missions of the 1850s onward multiethnic and multilingual affairs. The exploration of Africa predated colonialism but continued after the imposition of colonial rule across the continent. Starting with George Basalla's essay "The Spread of Western Science" (1967), historians of science have grappled with questions surrounding the utility of categorizing science through a colonial lens. In charting the professionalization of British geography within this colonial context, I engage with questions surrounding the emergence of so-called "colonial science" as distinct from metropolitan science.

The Nile Valley differs from other regions in that explorers coexisted with travelers in the region. Egyptian travel narratives are extensive, and would-be explorers who sought to differentiate themselves from travelers had to find strategies (such as metrology) to highlight their scientific credentials in contrast to popular literature. This is true even as men like Brownell and Baker were reliant on popular travel narratives for large portions of their exploratory missions. Thus, in the Nile Valley, the difference between travel narrative and exploratory diary is not all that clear. In conjunction with the rivalry between armchair geographers and explorers

⁶⁹ Previously mentioned was the case of Clarence Melville Brownell, the American physician-cum-traveler desired to become an explorer in his attempt to join Petherick's expedition. In the aftermath of the American Civil War, the Union veteran Charles Chaillé-Long was hired by Egypt, along with a hundred other veterans, to help in the training of the Egyptian Army. Chaillé-Long used this opportunity to serve with Charles Gordon in Sudan, who served as both governor and RGS explorer. It was there that Chaillé-Long contributed to the exploration of Central Africa, discovering minor lakes and rivers in the process.

that Kennedy highlighted, explorers also had to face pressure from “below” to fashion their narratives to be more “scientific” than mere travel narratives.

In summary, the exploration of the Nile Valley presents an ideal focus for an examination of the issues of self-fashioning, professionalization, transnational science, and institutional support in British geographic exploration. Changes in epistemology differentiated exploratory science from travel narratives by prioritizing the quantifiable measurement of the world. These innovations allowed would-be explorers to craft their work to signal their scientific credentials, allowing for the possibility of individuals outside the circle of gentlemanly science to present themselves as scientists. The Nile also allowed aspiring explorers to venture deep into Sudan and access local knowledge to facilitate the exploration of Central Africa. British exploration of the Nile shows how disparate individuals of differing backgrounds navigated social, cultural, and economic conditions to create and disseminate geographical knowledge, and to make new scientific disciplines.

Research Methodology

This study will examine how individual field geographers (i.e. explorers) navigated social, institutional and cultural conditions to cast themselves as geographers and men of science, tracing the professionalization of geography in the process. The core of my research will rely on assessing the writings of explorers themselves. Explorers recorded their findings and daily activities through copious journal writing. Data collection and a commitment to accurate measurements saw explorers of different social backgrounds to position themselves as scientists, men who could speak objectively through data instead of social standing or prior reputation. Field journals were the sources on which explorers based their professional publications. From articles published in the *Proceedings of the Royal Geographical Society* to travel narratives sold

to popular audiences, the literature produced by geographers depended on the writing and reproduction of journals.

Looking at lesser-known figures in Nile exploration reveals common practices in measuring and surveying that reveal how metrology became an avenue for would-be explorers to show their scientific credentials to the wider scientific community. This is seen in the journals of Clarence Melville Brownell, an American traveler who would join John Petherick's 1861 White Nile expedition.⁷⁰ Brownell's daily logs began with a compulsive record keeping of temperatures taken throughout the day, followed by a measurement of wind direction, and ending with a comment on the weather. This commitment to record measurements began when Brownell was voyaging into the Nile as a tourist, eager to visit the surrounding antiquities. But this steadfastness in data collection allowed Brownell to position himself as a man of science, giving him the ability to talk his way to become a scientist on John Petherick's expedition. Brownell was not alone in this habit. Samuel White Baker, Julian Alleyne Baker, John Petherick, John Hanning Speke and other explorers in the Nile Valley all used metrology in their field journals.

In doing preliminary research at the Royal Geographical Society in 2017 and 2018, I discovered discrepancies between field journals and published accounts of the same expeditions. These discrepancies go beyond the rewording of events to include drastic reinterpretation of events and themes. Samuel Baker's journals provides an example of this, covering his 1860s expeditions along the Nile Valley. Baker's published revulsion to the horrors of the Nile slave trade elided his unsympathetic musings on the plight of the slaves in his field journals. To fashion a travel narrative for a British public who viewed slavery as anathema to British values, Baker recast himself as a strident abolitionist. To understand why explorers like Baker refashioned their personas to conform to acceptable British norms, assessing the changes made

⁷⁰ The Clarence Melville Brownell Collection, GB-0033-SAD, Durham University.

between field journals and published works in the context of wider social and economic pressures is critical. Preliminary research on John Petherick revealed a connection between idealized masculinities with the image of the explorer in the mid-nineteenth century. This connection can help reveal how social expectations of masculinity were managed in the writings of explorer.

The writings of the explorers themselves reflected the changes brought about by British science's professionalization and institutionalization. I seek to orient the understanding of British science through a re-reading of expedition manuscripts, correspondence, and published works produced by geographers and explorers through the nineteenth century. I situate these manuscripts with the geographer's impulse to craft their work to meet social and peer expectations. In shaping their public personas to resemble "men of science," geographers moved from mimicking gentlemen scientists to cultivating practices, traits, and virtues that moved British science towards professionalization.

I will assess the connections between science and exploration in tracing how science's meaning changed in the work of explorers and field scientists through the nineteenth and early twentieth century. The study will chart the course of the RGS during this time, paying special attention to its funding and legitimizing role in geographic science. By analyzing the society's correspondence, memoranda, and ledger I hope to examine the scope and evolution of funding given to Nile expeditionary missions. In addition, I will examine the papers of Gordon Memorial College at Durham University, and the papers of alternative institutions in Britain and North America to assess how funding for field science changed since the heyday of Nile exploration. Finally, I will investigate how missionary groups such as the London Missionary Society followed up on David Livingstone's ill-fated goal to find the Nile's source in service to abolitionism and religion.

I will also situate these developments in British geography by evaluating Egypt's role in facilitating the initial Nile expeditions in Sudan and Equatorial Africa. Egypt's conquest over Sudan in the early nineteenth century created an opportunity for travelers and would-be explorers to travel further south along the Nile than was possible before 1800. Unlike other exploratory venues, the Nile Valley allowed for a lower cost of entry for Europeans to travel and write about their voyages in the region. This allowed for an initial cadre of travelers and explorers to venture into Sudan that was not common elsewhere in Africa. By assessing the writings of explorers and travelers alike, I hope to assess the scope by which Egypt provided funds, men, and aid to exploratory missions it felt would aid it in consolidating its territorial claims in Central Africa. I will assess how the British state reacted to this development, and how British involvement shifted as a result to its occupation of Egypt and its suppression of the Mahdist War.

To evaluate the opinions of scientists, "armchair geographers," and of learned institutions towards explorers, I will rely on the correspondence and the transcripts of meetings from the RGS and other organizations such as the Royal Society, the Anthropological Society, and various British universities. I will pay special attention the Speke-Burton debates of 1859-1864 concerning the controversy of the Nile's source as this debate became tied with the question of the credibility and trustworthiness of both men. To gauge public debate, I will examine the coverage newspapers devoted to specific exploratory missions. More pertinent will be to assess book reviews of published exploratory diaries to see how different audiences reacted to self-fashioned narratives.

In assessing all these sources, I seek to understand the rhetoric, strategies, and techniques geographers used to position themselves as scientists. By assessing the journals of travelers, I will examine how both categories were demarcated and policed. By the end of the nineteenth century, the gentlemanly geographer had been transformed into a specialized professional. But

this transformation was not inevitable. It resulted from generations of geographers navigating the pressures and expectations brought to bear by their peers, by the lay public, and by their desire to make their craft into a profession. By understanding how British geography professionalized, we may be better able to understand how and why the creation of our contemporary scientific world was born in the exploration of the Nile.

Table of Contents -- Professionalizing Science: British Geography and the Exploration of Africa

This dissertation is divided into six chapters, each focusing on an aspect of the professionalization and splintering of British geography in the context of Nile exploration.

Ch 1: Gentlemanly Scientists and the Royal Geographical Society

In this chapter I examine the Royal Geographical Society in the first two decades after its founding in 1830. I examine how the early RGS reflected the dominance of gentlemanly science in the natural sciences during the early and mid-nineteenth century. After briefly discussing the factors behind the creation of the RGS, I turn my attention to the society's organization and management by assessing the early leadership of Sir Roderick Murchison, who guided the society on and off until 1871.

In addition, I argue that Susan Faye Cannon's concept of "Humboldtian Science" had a profound impact on British geography by emphasizing a holistic view of scientific work that sought to connect accurate measurements of the world with various scientific practices now considered distinct from geography. The RGS's formation allowed British cartographers to realize this vision through formalizing the relationship between armchair geographers, geologists, field explorers, and travelers in creating geographic knowledge.

Ch 2: Early Nile Explorations

In this chapter I assess how explorers fashioned their scientific credentials in the early years of Nile exploration. I will examine missionaries, travelers, and merchants operating in the region, paying special attention to the early career of John Petherick who transitioned from an independent merchant to become the RGS's main contact in Khartoum. Finally, I examine attempts in the 1850s to search for the Nile's source through overland routes in East Africa. I

look at the early missions of Richard Francis Burton, before ending the Speke-Burton controversy after the 1858 discovery of Lake Victoria.

I hope to assess how explorers relied upon metrological data (such as weather reports, temperature and altitude data logging, and ethnographic knowledge) to differentiate themselves as scientists. I will further examine how the relationship between these early explorers and the RGS evolved during this time. Finally, I will trace how these individuals were beneficiaries of Egypt's conquest of the Sudanese Nile in creating the necessary infrastructure to travel to Khartoum and begin exploring both Abyssinia and Southern Sudan.

Ch. 3: War on the Nile: Abolitionism and the Militarization of Exploration

In this chapter I will examine how explorers used the issue of slavery as a means to bolster their reputations as explorers. Here I argue that for the RGS, the perception of geographers as being against slavery was important for the image by which explorers presented themselves from the 1860s to the 1870s. I will examine how abolitionism figured into the founding of the RGS and trace anti-slavery sentiment through the discovery of the Nile's source. I assess how slavery figured in the careers of specific explorers, such as the accusations of John Petherick's involvement in the Nile slave trade. I will chart the rise of Samuel White Baker as the chief explorer of the Nile in the aftermath of Speke's discovery (1858-1863), culminating with Gordon's expedition in the mid-1870s. I will contrast this with the initial participation of missionary explorers like David Livingstone, who reflected a less militaristic approach to anti-slavery activism. I hope to show in these case that scientific credibility was premised as much by conduct, adherence to ideological norms, and an increasing militarization of Nile exploration.

Ch. 4: Egyptian and African Knowledge

This chapter examines on how explorers marshalled Egyptian, Sudanese, and African intelligence and labor for their exploratory missions. It further traces how this use shifted over time. This chapter will further attempt to assess how non-Westerners reacted to British explorers and, later, British-led Egyptian armies. By reading Western sources closely, I hope to reveal how Egyptian and African knowledge was transmitted and recapitulated by British geographers.

Ch. 5: Colonial Field Science: Geography's Decline after Exploration

This chapter will examine the state of field science in the Nile Valley during and after the Mahdist War, giving attention to the formation of colonial institutions which provided alternative venues of scientific activity in Sudan and Egypt. I first look at Henry Stanly Morgan's expedition to relieve Emin Pasha, before moving on towards the colonization of the region by the British after the end of the war. I examine the creation of scientific and colonial institutions in Sudan, Egypt, and Kenya, areas that were the staging ground for Nile exploration. I will examine how field sciences diverged from metropolitan geography, as alternative institutions in Britain and in the colonies took up the mantle of field science after the decline of geographic exploration. I will also examine at how the RGS figures into this new scenario, now one among many British institutions operating along the Nile Valley. I look at final dissolution of nineteenth-century British geography and the emergence of distinct disciplines that continue the use of field expeditions.

Ch. 6: Conclusion: The Legacies of Nile Exploration

This chapter will conclude the dissertation by examining the implications of Nile exploration to the history of science and the history of geography. I will look at examples of continued field work in Central Africa and engage with the focus of "armchair geography" that dominates current histories of geography.

Research Plans

I was fortunate to receive the Weaver research fellowship in the summer of 2017, when I spent a month in London conducting research in the archives of the Royal Geographical Society (RGS) and the British Library. Having received the Weaver award again for the summer of 2018, I returned to the United Kingdom to assess the figures central to Nile exploration, including explorers, spouses, adjuncts, and administrators, spending my time in archives in London, Oxford, and Durham.

I will devote my fourth year to research and writing. Given that there is no need to be on-campus during the fourth year, I will leave Nashville to travel to archives across the United States and Canada. The archives I'm most interested in visiting are at the Library of Congress, the Smithsonian Institute, and the Huntington Library. At the Library of Congress, I will examine the papers of Charles Chaillé-Long, an American adjunct to Gordon's Sudan expedition who spent considerable time in Khartoum and resented Gordon's scientific credentials. At the Smithsonian, I will assess the Russell E. Train Africana Collection which contains numerous manuscripts pertaining to Nile exploration. I will apply for the department's William Campbell Binkley Graduate Education Fund in order to fund this research trip. Finally, I will use my stipend to self-finance a research trip to the United Kingdom for six months.

For the 2019-2020 academic year I have applied for a short-term fellowship at the Huntington Library and for a year-long doctoral fellowship for the Consortium of the History of Science. If I am fortunate enough to receive these fellowships, I will augment my research plans by having an additional year to study at universities and libraries associated with the fellowships. This year I will apply for additional fellowships to finance further research trips. This includes the CLIR Fellowship on original sources, the Ford Foundation Fellowship, and the international Dissertation Research Fellowship. These fellowships will allow me to do further research in the United Kingdom for an additional year.

If I do not receive external funding, I will spend the fourth year researching in the United States and in the United Kingdom. I will then spend my fifth year writing my dissertation. I therefore expect to have my dissertation completed by the spring of 2021.

Archival Holdings

The Royal Geographical Society – London, United Kingdom

- The Royal Geographical Society’s archival holdings contains thousands of manuscripts related to the exploration of the Nile Valley, as well as the administrative archives of the Society during the latter nineteenth-century. The manuscripts include correspondences, memorandums, meeting minutes, journals, sketches, and maps that are useful for my project. Of particular interest are the collections of Roderick Murchison (founding member and President of the RGS); the Richard Burton collection; the Harry and Brigitte Spiro collection; and the Henry Morton Stanley collection.

National Archives (UK) – Kew, London, United Kingdom

- The National Archives contain governmental records pertinent to my research, including a separate collection of miscellaneous documents devoted to the exploration of Africa and of British policy in Egypt and Sudan.

The British Library – London, United Kingdom

- Despite prior visits to the British Library, I intend to return there in order to assess the Roderick Murchison papers. As the President of the Royal Geographical Society, his correspondences and writings would be helpful in illuminating the institutional perspective of Nile exploration.

The Royal Asiatic Society – London, United Kingdom

- The RAS contains a large portion of the papers of Richard Francis Burton.

The Royal Society – London, United Kingdom

- The Royal Society holds various travel narratives from before the founding of the RGS. The Royal Society also holds various medical reports and photographs from the turn of the twentieth century, as scientific research in the Nile Valley matures beyond exploration to more specialized sub-fields.

National Library of Scotland – Edinburgh, United Kingdom

- Numerous correspondences belonging to James Augustus Grant and John Hanning Speke are found at the Scottish national library. Most of the library's catalogues have not been digitized, meaning that more items may be available in the paper catalogues onsite.

The Sudan Archive at Durham University – Durham, United Kingdom

- The Sudan Archive at Durham University contains numerous exploratory and military journals written by Britons and Americans throughout the nineteenth and twentieth centuries. However, my future visits to Durham will focus on the establishment of the Gordon Memorial College in Khartoum after 1902, to trace the institutionalization of Nile exploration in a British colonial context.

Cambridge University Library – Cambridge, United Kingdom

- Cambridge's archives include a wide variety of visual culture pertinent to Nile exploration, as well as numerous journals and memoirs of Nile Valley travelers.

Royal Museum for Central Africa, Tervuren, Belgium

- The Royal Museum for Central Africa, while primarily devoted to Belgium's Congolese holdings, nonetheless has the bulk of manuscripts devoted to Henry Morton Stanley, the Anglo-American explorer and adjunct for the Congo Free State. I am interested in assessing Stanley's journals and correspondences regarding his search for the Nile's source as well as his more famous search for David Livingstone.

The Library of Congress – Washington, D.C., United States

- The Library of Congress contains the Charles Chaillé-Long papers, belonging to an American Civil War veteran who joined Gordon's expedition in Equatorial Africa in the mid-1870s.

The Smithsonian Institution – Washington, D.C., United States

- Russell E. Train Africana collection at the Smithsonian holds 6,500 items on African exploration, missionary activities, and visual culture that will prove useful to my research. These include letters from Samuel White Baker to various contacts in the United States; watercolor paintings depicting Livingstone's search for the Nile's source; letters from James Bruce, John Hanning

Speke, Richard Burton, and Charles Gordon; drawings from James Augustus Grant, and a variety of visual cultural artifacts that could prove useful to my project. Fortunately, many of these materials have been scanned and are accessible without the need to travel.

Yale University Library – New Haven, CT, United States

- Yale holds a couple of collections pertinent to Nile exploratory history. The Amelia B. Edwards collection holds an original manuscript and letters of the eponymous English traveler and Egyptologist. There is also an anonymous travel journal dated to 1842-1843 that details a voyage from Alexandria to the Second Cataract.

The Huntington Library – San Marino, CA, United States

- The Huntington contains the largest collection of manuscripts relating to Richard Francis Burton outside of the United Kingdom, including his personal library, correspondences, and journals.

Outside of Europe and North America, I am currently investigating leads in Africa for possible archival material. These include the Egyptian National Archives and the Zanzibar National Archives. While the National Archives of South Sudan supposedly contains unique manuscripts of the British administration over Equatoria, the civil war precludes any chance to visit those archives.