A British Sky: Imperial Networks and the Symbiotic Relationship Between Imperialism and Astronomy in the Nineteenth-Century British Empire

21 November 2019

*Revised 30 January 2021*

*Abstract*

Despite modern perceptions of science as an apolitical, irreligious, democratizing force, science has historically been a tool used by individuals and organizations for their own purposes. In the case of late European empires, science and scientific “progress” were valuable tools for agendas of Christianization and civilization. Moreover, scientists and scientific methods could be used to further the types of work needed to grow empire – such as a map-making and exploration. However, the relationship between science and empire was not limited to imperial domination. Scientists and scientific bodies could also use the tools of empire to further their scientific work. Among the various scientific disciplines practiced in the nineteenth century, astronomy played an interesting role in entrenching the relationship between science and empire – particularly as it was practiced on the fringes of the British empire.

Growing empires necessitated the creation and proliferation of new technologies that in turn made practicing science in recently acquired colonies much easier. The interconnected web of new technologies, scientists, and imperial structures of power and politics combined with scientific desires, colonial ideals, race relations, and imperial economies of trade and knowledge to produce an incredibly complicated vision of science. Astronomy, in its looking to the heavens, reflected back upon earthly issues to ultimately reveal the tangled ideologies that permeated British imperial science at this time. This story of British imperial astronomy is meant to complicate modern notions of what science is and has been.

Politically, economically, socially, and intellectually, colonialism presided over the domestic and international ethos of the British Empire throughout the nineteenth century. The characteristics of empire had dramatically changed since the eighteenth century, wherein empire “was much less an empire of settlement and more one of trading posts and plantations.”[[1]](#footnote-0) An increased globalized colonial world found itself altered by new technologies, emerging economies, and scientific discovery. A great age of Western science, the nineteenth century saw scientific progress and imperialism indelibly wedded in a number of significant ways. Astronomy found itself amongst the various scientific disciplines intertwined with colonialism and, for better or for worse, both astronomical and colonial progress benefitted from the relationship. British astronomy of the nineteenth century was pulled into the realm of imperial science; it was within this realm that various scientific and non-scientific factors helped shape the modern world. Within the British Empire, networks of information changed science altogether, science was used for the advancement of colonial pursuits, and empire became a tool for practicing science. Astronomy as it was practiced on the fringes of the empire helped entrench the symbiotic relationship of colonialism and science in the nineteenth century.

 Amongst the great technological developments of the late eighteenth and early nineteenth centuries was technology that permitted global travel and communication with greater speed and ease than any previous era. The invention of the steam engine and the laying of track across Europe and many colonial territories permitted scientists and other academics to travel in safety and – relative – comfort. At the same moment, naval travel had advanced significantly, and it became clear following the Napoleonic Wars that Britain was the preeminent naval power.[[2]](#footnote-1) Politically, the establishment of colonial governments and military forces in foreign lands made travel to the global south safer for Europeans. The violent subduing of many of the world’s non-white peoples allowed for no question as to what the global power dynamic looked like – the world was to be understood through a colonial lens and that lens dictated that European peoples commonly had free reign over foreign spaces. It was in the context of these developments that Western astronomy could be practiced in the southern hemisphere. Colonies like India and the Cape of Good Hope were useful observing terrains thanks to good weather that afforded clear skies.[[3]](#footnote-2) Observatories were established in both colonies; the particularly notable Royal Observatory at the Cape of Good Hope was finished by 1827.[[4]](#footnote-3)

However, the furnishing of observatories, and even personal travel of amateur and professional astronomers, was a logistically complex ordeal. Telescopes and other instruments were fragile and required gentle handling whilst en route to their final destination.[[5]](#footnote-4) Once at their intended locale, it became clear that maintenance had been privileged by the services available in England at the time. There were simply no reliable experts in the colonies who could fix a broken instrument.[[6]](#footnote-5) Out of necessity, “local networks of scientific knowledge” began to arise.[[7]](#footnote-6) Astronomy took on a bespoke shape in these non-European spaces. Astronomers became opticians and campaigners on behalf of their observatory. Many depended on informal personal contacts to get to materials they required. Sir Thomas Maclear engaged in letter writing campaigns to other astronomers and scientifically-inclined gentlemen so as to “facilitate his work and to acquire scientific instruments.”[[8]](#footnote-7) Confronted with challenges posed by colonial frontiers, support networks developed within the colonial scientific community to provide aid, advice, and even encouragement where private and government organizations, like the Royal Society, fell short. It is important to note that colonial astronomers faced another battle – that of recognition. As they were separated by time and space from metropolitan scientific centres (the scientific centre of the British Empire being London), it was difficult to be relevant. Colonial astronomers had to produce “tangible and useful results” with some immediacy in order to “justify their existence.”[[9]](#footnote-8) In some cases, it was intonated that the role of a colonial astronomer was simply to collect data so that it could be processed in London. The London-colony relationship was just as classed as British society; even though it was their fellow British astronomers at these outposts, they were nevertheless “relegated to a lower scientific social order.”[[10]](#footnote-9)

Imperial knowledge networks had existed even in the eighteenth-century British Empire, but in the nineteenth century the political and social grounds on which they had been established were defined and clarified. Attitudes accepting of indigenous knowledge and practices hardened as settlers and explorers were no longer dependent on the natives for survival.[[11]](#footnote-10) Omnipresent colonial networks did much to bring nodes of scientific knowledge together. The material links of the observatory and its instruments to Britain demonstrate the interaction of political and economic spheres of colonial life with scientific endeavours.[[12]](#footnote-11) Astronomy as it was practiced in the colonies was sometimes limited by the attitudes of the British imperial scientific institution, but it was also dependent on Britain for materials and maintenance. For colonial astronomers, London could condescend, but it was also the node through which all knowledge and research had to pass to be legitimized. Without London, connections to the scientific world were impossible.

Beyond the complexities of imperial scientific connection, astronomy found itself used for the advancement of colonial pursuits, forming one side of the mutually beneficial relationship between colonialism and science. Requiring maps of their new possessions, European empires were keen to send explorers and cartographers to the far reaches of their territories to better understand the lay of the land – and what resources could thereby be exploited. In one very specific instance, the so-called “noblesse oblige” of astronomy was used as cover when Captain James Cook was sent to far-off territories to supposedly observe the 1769 transit of Venus. In reality, the expedition was sent to explore and map unclaimed territory.[[13]](#footnote-12) Aside from being a useful way to hide colonial ambitions, astronomical studies also supported empire with their scientific contributions. The broader category of “observatory sciences” that included geomagnetism and meteorology, along with astronomy, contributed to imperial exploration and cartography by way of their increasingly accurate measurements and chronometer regulation.[[14]](#footnote-13) These scientific advances proved themselves useful in the acquisition and maintenance of empire. Astronomy had an “unabashed association … with the practice of land surveying,” justifying the costs of the practice with the potential economic benefits of land grabbing.[[15]](#footnote-14) Observatories became imbued with purposes outside of pure astronomy – they were expected to contribute to the empire in meaningful ways, especially if they were funded by state agencies.

The dependency of the British Empire on astronomical progress extended beyond the tangible. As John Gascoigne put it best, “empires may be created by force but generally they need to be sustained by belief”.[[16]](#footnote-15) Science was a useful tool in creating and maintaining belief in the imperial program. The quest for scientific pre-eminence, in the minds of imperialists, elevated the European over the native. The British could prove via their scientific programmes that they were the masters of nature, a refined and civilized people whose foremost pursuit was that of knowledge. While this assertion was far from the truth given the behaviours and activities of imperial bodies, it nonetheless served as an important rationale as to why Europeans were the superior race and could justifiably subjugate the “superstitious savages” of the empire. [[17]](#footnote-16) Taken further still, if science was to be considered a gentlemanly and even holy pursuit (for to seek to understand the design of the Lord was a blessed thing indeed), then acquisitions and ethically questionable actions could too be justified. Service to science was patriotic and pious.[[18]](#footnote-17) The bureaucratic interest in science grew in the British Empire in the latter half of the nineteenth century as the practical benefits of observatory sciences aligned themselves with the convenient rhetoric of scientific study. It was becoming increasingly clear that “each day when the sun set on the British Empire, its telescopes continued to enhance imperial power,” and not just through pragmatic means.[[19]](#footnote-18)

 The observatory fulfilled other colonial ideologies as well. Chief among them was the imperial desire to “civilize” and “improve” the natives, namely by assimilating them culturally, religiously, and intellectually. Traditional indigenous knowledge was perceived as superstitious and pagan – and therefore fanatic. Religious ceremonies held in honour of celestial events such as eclipses were considered backwards and non-scientific. In British eyes, these displays not only proved the retardation of indigenous intellectual progress but also made the natives threatening. “Native ideas and native prejudices [had to] be reckoned with” because of their capacity to cause harm to European scientific exploits and their non-Christian ethos.[[20]](#footnote-19) If Christianity was the religion of rationality, then all other belief systems impeded the forward march of human progress. Colonial astronomer John William Herschel “intended both science and the empire to follow one path of ever-improving civilization,” what he saw as the most humane and logical progression for indigenous peoples.[[21]](#footnote-20) Due to these widely-held beliefs and prejudices, observatories became part of the colonial battleground of “civilizing” the natives. In their facilities, schools were established to teach the ways of European thought instead of the perpetually inferior native beliefs. Despite the inclusion of non-European peoples into these distinctly white, colonial spaces, indigenous scholars were not seen as equally capable of intellectual achievement due to the “emphasis on intrinsic racial differences” at this time (the power of which had been increased by the scientific rhetoric of social Darwinism).[[22]](#footnote-21) Indian surveyors trained by British observatory scientists were taught only how to observe, not how to make sense of their observations. Though the British took advantage of their race by sending them as agents of colonialism into indigenous spaces where Europeans would have been killed, their race also innately held them back from true scientific advancement.[[23]](#footnote-22) Indigenous peoples were assimilated, exploited, and belittled in the name of scientific progress for the sake of empire. The benefits that the British Empire accrued from these practices were not insignificant. Scientific rationalization is a tool that, like any other, can be wielded for better or for worse.

 Just as imperialism could benefit from astronomy, so could astronomy benefit from empire. New and exciting opportunities were available in the realm of astronomical practice thanks to the British Empire. As has already been stated, certain locales made better observing terrains than others and the technology that followed empire made voyages more comfortable and communication more convenient. Observatories were sometimes protected by military forces, allowing them to conduct work in peace and preserving constructed British comforts in decidedly non-British landscapes.[[24]](#footnote-23) Astronomers also received funding and resources from organizations interested in seeing the imperial program advanced. This was especially useful for those who were not wealthy gentlemen themselves, though class distinction within groups of astronomers were revealed upon travelling.[[25]](#footnote-24) Even those not interested in advancing the cause of empire could benefit from it. As Heather Ellis examines, “many scholars who made use of imperial networks in the late nineteenth century with little or no concern for the imperial project.”[[26]](#footnote-25) She posits that John Herschel was among the men who used the connections and opportunities the empire afforded to further their personal scientific ambitions. Though it has been noted that Herschel sought to “advance primitive societies”, such a goal arose not from sympathy towards imperialist rhetoric but from a humanitarian perspective.[[27]](#footnote-26) Herschel even critiqued colonial offices for their brutal treatment of the native Xhosa people of the Cape, who had found themselves attacked and degraded by “civilized men.”[[28]](#footnote-27)

Even with these seemingly noble ideals, there is no question that British astronomers benefitted from the forced and coerced labour of colonized peoples. The Royal Observatory at the Cape of Good Hope was built by slaves and slaves were still purchased to work at the observatory as late as the 1820s.[[29]](#footnote-28) The use of colonized bodies for labour freed astronomers to worry only about their scientific study. The mechanized drudgery of physical labour was placed on the backs of individuals who were excluded from the benefits of the scientific work that their toil supported. It was a tenuous situation to be in for those astronomers who were true imperialists. On the one hand, the civilizing mission was central to imperial rhetoric and on the other hand, it would’ve been impossible to advance astronomy without people relegated to this kind of labour. The logical discrepancies of colonial ideals found themselves realized at the crux of astronomy and empire.

As is exemplified by the material, intellectual, and social connections that spanned the British Empire, scientific practice and the imperial program were inextricably intertwined in the nineteenth century. In this symbiotic relationship, the ideology that pervaded both science and empire often came to a head. The cohesion and clash of ideals made it difficult to gain a clear image of what the British Empire considered its central mission, if there was any to be found. The only moment of clarity that such an exploration can provide is that there was no perfect rationality or clarity to many of the intangible connections that bound empire and astronomy together. This picture of a science that was ethically bound in the norms of the day is an uncomfortable one – lest it remind one that the past is a convoluted and messy place where notions of ideology and practice are forever interwoven.

**Bibliography**

Bhatal, Ragbir. “How Mount Stromlo shed its imperial beginnings.” *Astronomy & Geophysics* 55, no. 6 (2014): 33-35. https://academic.oup.com/astrogeo/article/55/6/6.33/196554.

Chauvin, Michael E. “Astronomy in the Sandwich Islands: The 1874 Transit of Venus.” *The Hawaiian Journal of History* 27, (1993): 185-225. https://evols.library.manoa.hawaii.edu/handle/10524/149.

Ellis, Heather. “Collaboration and Knowledge Exchange between Scholars in Britain and the Empire, 1830-1914.” In *Mobilities of Knowledge*, edited by Heike Jöns and Peter Meusburger (Cham, CH: Springer, 2017), 141-156. https://link-springer-com.login.ezproxy.library.ualberta.ca/chapter/10.1007/978-3-319-44654-7\_8.

Gascoigne, John. “Science and the British Empire from its Beginnings to 1850.” In *Science and Empire: Knowledge and Networks of Science Across the British Empire, 1800-1970*, edited by Brett M. Bennett and Joseph M. Hodge, 47-67. London: Palgrave Macmillan, 2011. https://link-springer-com.login.ezproxy.library.ualberta.ca/book/10.1057/9780230320826.

Herschel, John William. *A Treatise on Astronomy*. Cambridge: Cambridge University Press, 1833. https://archive.org/stream/treatiseonastron00hersuoft#page/n1/mode/2up.

Kochhar, Rajesh. “Astronomy in British India: Science in the service of the State.” *Current* *Science* 60, no. 2 (1991): 124-129. http://prints.iiap.res.in/bitstream/2248/4835/1/Astronomy%20in%20British%20India.

McAleer, John. “’Stargazers at the world’s end’: telescopes, observatories and ‘views’ of empire in the nineteenth-century British Empire.” *The British Journal for the History of Science* 46, no. 3 (2013): 389-413. https://www-jstor-org.login.ezproxy.library.ualberta.ca/stable/43820404?seq=1#metadata\_info\_tab\_contents.

Musselman, Elizabeth Green. “Swords into Ploughshares: John Herschel’s Progressive View of Astronomical and Imperial Governance.” *The British Journal for the History of Science* 31, no. 4 (1998): 419-435. https://www-jstor-org.login.ezproxy.library.ualberta.ca/stable/4027875?seq=1#metadata\_info\_tab\_contents.

Pang, Alex Soojung-Kim. “The Social Event of the Season: Solar Eclipse Expeditions and Victorian Culture.” *Isis* 84, no. 2 (1993): 252-277. https://www.jstor.org/stable/236234?seq=1#page\_scan\_tab\_contents.

Warner, Brian. *Royal Observatory, Cape of Good Hope, 1820-1831: The Founding of a Colonial Observatory.* Dordrecht, NL: Springer Science+Business Media, 1995. https://www.springer.com/gp/book/9780792335276.

1. John Gascoigne, “Science and the British Empire from its Beginnings to 1850,” in *Science and Empire: Knowledge and Networks of Science Across the British Empire, 1800-1970*, ed. Brett M. Bennett and Joseph M. Hodge (London: Palgrave Macmillan, 2011), 61, https://link-springer-com.login.ezproxy.library.ualberta.ca/book/10.1057/9780230320826. [↑](#footnote-ref-0)
2. Gascoigne, 47. [↑](#footnote-ref-1)
3. Rajesh Kochhar, “Astronomy in British India: Science in the service of the State,” *Current Science* 60, no. 2 (1991): 127, http://prints.iiap.res.in/bitstream/2248/4835/1/Astronomy%20in%20British%20India. [↑](#footnote-ref-2)
4. Brian Warner, *Royal Observatory, Cape of Good Hope, 1820-1831: The Founding of a Colonial Observatory* (Dordrecht, NL: Springer Science+Business Media, 1995), 113, https://www.springer.com/gp/book/9780792335276. [↑](#footnote-ref-3)
5. John McAleer, “’Stargazers at the world’s end’: telescopes, observatories and ‘views’ of empire in the nineteenth-century British Empire,” *The British Journal for the History of Science* 46, no. 3 (2013): 392, https://www-jstor-org.login.ezproxy.library.ualberta.ca/stable/43820404?seq=1#metadata\_info\_tab\_contents. [↑](#footnote-ref-4)
6. McAleer, 400. [↑](#footnote-ref-5)
7. McAleer, 395. [↑](#footnote-ref-6)
8. McAleer, 398. [↑](#footnote-ref-7)
9. McAleer, 403. [↑](#footnote-ref-8)
10. Ragbir Bhatal, “How Mount Stromlo shed its imperial beginnings,” *Astronomy & Geophysics* 55, no. 6 (2014): 33, https://academic.oup.com/astrogeo/article/55/6/6.33/196554. [↑](#footnote-ref-9)
11. Heather Ellis, “Collaboration and Knowledge Exchange between Scholars in Britain and the Empire, 1830-1914,” in *Mobilities of Knowledge*, ed. Heike Jöns and Peter Meusburger (Cham, CH: Springer, 2017), 61, https://link-springer-com.login.ezproxy.library.ualberta.ca/chapter/10.1007/978-3-319-44654-7\_8. [↑](#footnote-ref-10)
12. McAleer, 392. [↑](#footnote-ref-11)
13. Rajesh Kochhar, “Astronomy in British India: Science in the service of the State,” *Current Science* 60, no. 2 (1991): 124, http://prints.iiap.res.in/bitstream/2248/4835/1/Astronomy%20in%20British%20India. [↑](#footnote-ref-12)
14. McAleer, 404. [↑](#footnote-ref-13)
15. Michael E. Chauvin, “Astronomy in the Sandwich Islands: The 1874 Transit of Venus,” *The Hawaiian Journal of History* 27, (1993): 204, https://evols.library.manoa.hawaii.edu/handle/10524/149. [↑](#footnote-ref-14)
16. Gascoigne, 48. [↑](#footnote-ref-15)
17. Alex Soojung-Kim Pang, “The Social Event of the Season: Solar Eclipse Expeditions and Victorian Culture,” *Isis* 84, no. 2 (1993): 275, https://www.jstor.org/stable/236234?seq=1#page\_scan\_tab\_contents. [↑](#footnote-ref-16)
18. Bhatal, 33. [↑](#footnote-ref-17)
19. Elizabeth Green Musselman, “Swords into Ploughshares: John Herschel’s Progressive View of Astronomical and Imperial Governance,” *The British Journal for the History of Science* 31, no. 4 (1998): 419, https://www-jstor-org.login.ezproxy.library.ualberta.ca/stable/4027875?seq=1#metadata\_info\_tab\_contents. [↑](#footnote-ref-18)
20. Pang, 253. [↑](#footnote-ref-19)
21. Musselman, 420. [↑](#footnote-ref-20)
22. Gascoigne, 61-62. [↑](#footnote-ref-21)
23. Kochhar, 128. [↑](#footnote-ref-22)
24. Chauvin, 213. [↑](#footnote-ref-23)
25. Pang, 261-262. [↑](#footnote-ref-24)
26. Ellis, 145. [↑](#footnote-ref-25)
27. Musselman, 420. [↑](#footnote-ref-26)
28. Musselman, 429. [↑](#footnote-ref-27)
29. Warner, 180-181. [↑](#footnote-ref-28)