## Contents

1  Gregory Lynall  
   Scriblerian Projections of Longitude: Arbuthnot, Swift, and the Agency of Satire in a Culture of Invention

19  Bernard Lightman  
   Conan Doyle’s Ideal Reasoner: The Case of the Reluctant Scientific Naturalist

37  Steven McLean  
   Revolution as an Angel from the Sky: George Griffith’s Aeronautical Speculation

62  Emilie Taylor-Brown  
   (Re)Constructing the Knights of Science: Parasitologists and their Literary Imaginations

### Article Reviews

80  Emily Bowles  
   Review of Cheryl Blake Price’s “Vegetable Monsters: Man-Eating Trees in Fin-de-Siècle Fiction.”

82  Greg Garrard  
   Review of Emily Horton’s “Reassessing the Two-Culture Debate: Popular Science in Ian McEwan’s The Child in Time and Enduring Love.”

84  Peter Johnston  
   Review of Robert Nathan’s “Why It Matters: The Value of Literature as Object of Inquiry in Qualitative Research.”
Anne M. Thell  
Review of Mary Fairclough’s “The Telegraph: Radical Transmission in the 1790s.”

K. S. Whetter  
Review of Janine Rogers’s “A Compaignye of Sondry Folk: Mereology, Medieval Poetics and Contemporary Evolutionary Narrative in Richard Dawkins’ *The Ancestor’s Tale*.”

Carmel Raz  
Review of John Savarese’s “Ossian’s Folk Psychology.”

Notes on Contributors
The Journal of Literature and Science (JLS) is a peer-reviewed academic journal published twice annually in Summer and Winter. The JLS was founded in 2007, and produced its first issue at the beginning of 2008. It was originally hosted by the University of Glamorgan’s Research Centre for Literature, Arts and Science (2007–12), before moving to its own independent online site in March 2013, with the support of the University of Westminster and the Centre for the Study of Science and Imagination. The journal’s first, and present, editor is Professor Martin Willis, Professor of Science, Literature and Communication at the University of Westminster. The Advisory Board includes leading scholars of literature and science from around the world. The JLS is published in digital format, is entirely open access, and requires no subscription fee.

The journal is dedicated to the publication of academic essays on the subject of literature and science, broadly defined. Essays on the major forms of literary and artistic endeavour are welcome (the novel, short fiction, poetry, drama, periodical literature, visual art, sculpture, radio, film and television). The journal encourages submissions from all periods of literary and artistic history since the Scientific Revolution; from the Renaissance to the present day. The journal also encourages a broad definition of ‘science’: encapsulating both the history and philosophy of science and those sciences regarded as either mainstream or marginal within their own, or our, historical moment. However, the journal does not generally publish work on the social sciences. Within these confines, essays submitted to the journal may focus on the literary and scientific productions of any nation or group.

All essays should be interdisciplinary in focus, offering an original view of both the literary or artistic subject matter and the science or sciences under consideration. While essays on individual examples of literary and artistic production are welcomed, these should also seek to show the wider significance of their analyses and interpretations. The journal does not publish essays focused exclusively on literature or art, or exclusively on the history and philosophy of science.

Submission and Citation Information

Abstracts and articles for submission should be sent to the Editor, Professor Martin Willis by email only: m.willis@westminster.ac.uk

The JLS recommends that an initial email inquiry, including an abstract of the proposed article, should be sent in advance of completed articles in order to ensure that the subject matter is suitable for publication under the JLS’s remit.

All articles should be from 6000–9000 words in length, interdisciplinary in focus, and offering an original view of both the literary or artistic subject matter and the science or sciences under consideration. While articles on individual examples of literary and artistic production are welcomed, these should also seek to show the wider significance of their analyses and interpretations. The journal does not publish essays focused exclusively on literature or art, or exclusively on the history and philosophy of science.

All submitted articles should be presented in MLA Style, with notes kept to a minimum. JLS articles do not use personal pronouns (e.g. “In this article I will…” is not appropriate, while “This article will…” is appropriate). All spellings should follow British English. All submitted articles should include a short abstract (150 words maximum) below the title and author’s name and ahead of the opening sentence. The JLS aims to complete the first stage of peer review (consideration of articles by the editor and advisory board) within 4 weeks of submission and the second stage of peer review (external, blind, double peer-review) within 8 weeks of the completion of the first stage. All authors whose articles reach the second stage of peer review should expect to have a decision on publication within approximately 12 weeks of the date of their original submission of an article.

Citing the JLS: the journal’s full title is the Journal of Literature and Science, and its first issue was Volume 1, Number 1 (2007). All page numbers to individual essays can be found when accessing the PDF file of that essay. The journal’s ISSN is 1754-646X. Citations should give Author, ‘Title,’ Journal of Literature and Science Vol, No. (Year): pp., organised according to the specific style guide being used.
Open Access Statement

The *Journal of Literature and Science* is committed to real and immediate open access for academic work. All of the JLS's articles and reviews are free to access immediately from the date of publication. There are no author charges (commonly known as APCs) prior to publication, and no charge for any reader to download articles and reviews for their own scholarly use. The JLS does not, therefore, operate either a Gold or Green model of open access, but is free to all at any time and in perpetuity. To facilitate this, the JLS depends upon the financial underwriting provided by the University of Westminster's Department of English, the goodwill of its editorial team and advisory board, and the continuing support of its network of peer reviewers.

The *Journal of Literature and Science* also operates under the [Creative Commons Licence CC-BY-NC-ND](http://creativecommons.org/licenses/by-nc-nd/). This allows for the reproduction of articles, free of charge, for non-commercial use only and with the appropriate citation information. All authors publishing with the JLS accept these as the terms of publication. Please note that copyright of the content of all articles and reviews remains with the designated author of the article or review. Copyright of the layout and design of JLS articles and reviews remains with the *Journal of Literature and Science* and cannot be used in other publications. The JLS is a member of PILA (Publishers International Linking Association) and submits all articles and reviews, including all works that these cite, to CrossRef for cross-referral. To find JLS articles and reviews via their DOI numbers, use the URL http://dx.doi.org/[DOI number].

Reviews

The JLS reviews articles on literature and science, or relevant articles in cognate fields such as the history of science, cultural studies or sociology, published in academic journals within the last twelve to eighteen months. Reviews are generally commissioned by the Reviews Editor, but potential contributors are encouraged to contact the Reviews Editor to suggest articles for review.

The JLS does not, at any time, review books or collections of essays. The editors take the view that books within the field are already well covered by reviewing journals while journal articles, often the publication type that offers the most recent scholarship, are never considered in review processes. By doing so, the JLS hopes to offer its readers access to academic dialogue on the most recent advances in literature and science.

Reviews should be approximately 750 words in length, should follow MLA Style (notes generally not allowed), and should aim to describe the content of the article under review as well as offer an analysis of its strengths and weaknesses and conclude by assessing its significance for literature and science scholarship.

Proposals for review and completed reviews should be sent to the Reviews Editor, Dr Michelle Geric by email only: m.geric@westminster.ac.uk

Editorial Board

**Editor**: Martin Willis  
**Reviews Editor**: Michelle Geric  
**Editorial Assistant**: Mark Bennett  
**Web design**: Martin Callanan  
**Logo**: Joel Cooper
Scriblerian Projections of Longitude: Arbuthnot, Swift, and the Agency of Satire in a Culture of Invention

Gregory Lynall

Devising a practical method to determine longitude at sea was the culturally predominant scientific and technical problem of the eighteenth century. Its solution had been raised as a direct concern of the state in other countries previously, but it became the focus of considerable British investment in July 1714, when the Longitude Act appointed Commissioners to judge all related projects and award up to £2000 to experimenters, and pay up to £20000 if a method gave a correct result to within half a degree of longitude, equivalent to 30 geographical miles. The precise reasons for establishing the British reward are still unknown, but the Act is claimed as “testimony of the utilitarianism of those active in the propagation of Newtonian natural philosophy” (Stewart, *The Rise of Public Science* 202). Its ramifications, however, were not only scientific, technological, and navigational, but also cultural; and it had human, as well as economic, costs.

Many “projectors” would soon respond to the reward, and almost immediately a group of intellectuals (including a renowned mathematician and Royal Society council member, and the Tories’ chief ministerial writer) gathered in London to scrutinise the most prominent proposal. This was not the Board of Commissioners assembling at the Admiralty (they would not do so officially until 1737) (Dunn and Higgitt 82), but an alternative band of the brightest thinkers, including Jonathan Swift, Alexander Pope, John Gay, John Arbuthnot and Thomas Parnell. This unofficial club of satirists has become known as the “Scriblerians,” after their collaborative *Memoirs of Martinus Scriblerus* (1741), a mock-biography of a foolish virtuoso and occasional projector, whose name would become a byword for intellectual vapidity and pedantry. Arguably, a “Scriblerian mode” of mock-learned satire was particularly developed by, and remains associated with this group, although they did not always write in this vein (see: Hammond 118; Marshall). In analysing these writings, scholars have traditionally characterised the Scriblerians as “Ancients” who poured scorn upon “Modern” learning of all kinds (see: Kerby-Miller; Levine). More recently, however, critics have challenged this view, acknowledging that the Scriblerian satires on science were often profoundly personal and political in their satirical motivations, and simultaneously revelled in the creative potency of new ideas associated with natural knowledge (see: Shuttleton; Lynall, *Swift and Science*). Continuing this approach, and in the context of new work in the history of science coinciding with the tercentenary of the Longitude Act, it is timely to re-assess Scriblerian responses to the longitude endeavour, especially in order to position them within early eighteenth-century cultures of satire and longitude-projecting more broadly, and not just in relation to the (albeit hugely prominent) Whiston-Ditton rocket scheme. In contrast to the Addison-Steele circle associated with Button’s coffee-house, the Scriblerians have been viewed traditionally as at a distance, both socially and ideologically, from the networks of natural knowledge that facilitated the longitude endeavour (see: Nicolson and Rousseau; Worth). Looking closely at Scriblerian “projections” of longitude within their wider context gives us a new appreciation of what these satirists (especially Arbuthnot and Swift) saw as the purpose and agency of their writings, reveals the close proximity of their satiric work to the expertise of the scientific community, and
identifies how the personal and cultural resonances of longitude and other proposals inflected their parodies and satires.

In using the term ‘projection’, this article will evoke a number of its meanings: project or scheme (of course), but also; creative vision and transformation; the action of targeting something (particularly via satire), and; the formation of images or representations (including caricatures and parodies). To greater or lesser degrees, these meanings apply to both ‘serious’ and ‘parodic’ projects, emphasizing their mutual imaginative capacity and rhetorical power. It is also evident, but hitherto unexplored, that some ‘genuine’ proposals themselves adopted the use of comic and satiric modes in order to disparage other methods. Some of these satiric appropriations were inspired by the ironic posturing of *The Longitudes Examin’d* (1714), recently argued to be a hoax proposal (possibly by Arbuthnot) (Rogers, “The Longitude Impostor”), but others pre-dated this piece. Even John Harrison (1693-1776), whose timepieces would eventually bask in the glory of the reward, would be influenced by the Scriblerians when venting his frustrations with the Commissioners of his time.

**“Malicious Satyr” in Longitude Culture**

The immersion of the Scriblerians within the culture of natural knowledge is perhaps made most apparent when we survey the close links between these satirists and the original Longitude Commissioners, prominent members of the scientific and maritime establishment (although for brevity’s sake not all of the connections will be listed here). Around 1707, Swift had been part of a coterie at Dublin Castle which included Thomas Herbert, Earl of Pembroke (c.1656-1733), the antiquarian, former First Lord of the Admiralty, and ex-President of the Royal Society. Swift was also acquainted with John Keill (1671-1721), Savilian Professor of Astronomy at Oxford, via their connections to Christ Church College (Lynall, *Swift and Science* 32-33, 59). Dr Arbuthnot FRS knew several of the Commissioners well, including Sir Isaac Newton (1643-1727), with whom he had served on a number of committees and boards over the years (Beattie 7-20). Appointed a “Visitor” to the Royal Observatory in 1710, Arbuthnot was instrumental in facilitating the (pirated) publication of Astronomer Royal John Flamsteed’s (1646-1719) star catalogue *Historia coelestis* (1712), the ultimate goal of which was to produce a celestial map capable of determining longitude.³ Moreover, *An Essay on the Usefulness of Mathematical Learning* (1701), traditionally ascribed to Arbuthnot, argued that Edmond Halley’s (1656-1742) two voyages across the Atlantic (1698-1700) would result in a theory of magnetic variation and a longitude method, ensuring national prosperity through increased global trade (Aitken 431).⁴ Given these personal links, it is not surprising that (as will become clear) the Scriblerians’ satires never targeted the Board itself as an entity, but deferred to its expertise, and drew upon its authority.

As the Scriblerians banded together in 1714 to plot the exploits of Martinus, almost inevitably the longitude was not far from their minds, although it was bound up with other public affairs of the time, as parliament was pledging itself to other exorbitant pay-outs. Indeed, Swift joked to Arbuthnot that the government “had better Put out a Proclamation that whoever discovers the Pretender or the Longitude shall have 100000”: the fee that had been set just a few weeks earlier, for the apprehension of the uncrowned James III (3 July 1714, in Woolley 1: 630).⁵ The significance of the state offering a financial incentive for scientific or technological innovation was evidently not lost on the Scriblerians, and like Henry Fielding after them, they joked about the Act’s opportunity cost, with Martinus Scriblerus’s friend Crambe wondering why “there was not a reward for such as could find out a fourth Figure in Logick, as
well as for those who shou’d discover the *Longitude*” (Kerby-Miller 124; see: [Fielding] 23, and Fielding 11). Moreover, *The Humble Petition of the Colliers* (1716), which for satiric effect associates the Whiston-Ditton longitude solution with a project apparently seeking to monopolise the Sun’s energy (Pettit 4: 72-78; see also: Lynall, “Bundling up the Sun-beams” 482-83), suggests that whilst the payment to a worthy solution might not have been an issue for the Scriblerians, they perhaps believed that the Act was giving encouragement to a deluge of poorly designed schemes from crack-pots claiming to be working for public benefit, whose botched (and fraudulent) projects might diminish public or private investment, and “bring People to run needless and unusual hazards” (as Daniel Defoe put it) (11).6

The passing of the Act was partly the result of lobbying by the former Lucasian Professor of Mathematics William Whiston (1667-1752), and his collaborator Humphrey Ditton (1675-1714), mathematical master at Christ’s Hospital, London, who published their method on 14 July 1714, just days after the reward was established (Whiston and Ditton, *A New Method for Discovering the Longitude*). Joseph Addison, who along with Richard Steele and the “Buttonian” circle was a known supporter of (fellow Whig) Whiston’s public lectures, said that the scheme “deserves a much higher Name than that of a Project, if our Language afforded any such Term” (Addison n.p.; see also: Nicolson and Rousseau 142-45, 167-68; Worth 355-59; Stewart, *The Rise of Public Science* 94-95). Meanwhile, Arbuthnot was less than complimentary, writing to Swift:

*Whetstone has at last publish’d his project of the longitude the most ridiculous thing that ever was thought on, but a pox on him he has spoild one of my papers of scriblerus’, which was a proposal for the longitude not very unlike his to this purpose, that since ther was no pole for East & west that all the princes of Europe should joyn & build two prodigious poles upon high mountains with a vast light house to serve for a pole Star. I was thinking of a calculation of the time charges & dimensions. Now yow must understand his project is by light houses & explosion of bombs, at a certain hour. (17 July 1714, in Woolley 2: 11-12)*

Arbuthnot knew that Whiston and Ditton’s project (despite making such a public fuss) was unworkable practically, not least because, as Flamsteed noted, the rockets “will be little or no use at sea both because of the short duration of the appearances and that the *seamen will want to know where and at what Moment to look*” (“Flamsteed to Abraham Sharp. 1 February 1714/15” in Forbes, Murdin and Willmoth 3: 723). Moreover, Newton observed that the method was “rather for keeping an Account of the Longitude at Sea, than for finding it, if at any time it should be lost” (Hall and Tilling 6: 161). Arbuthnot was aware too that another problem with this proposal was not only scientific and technological, but also political, requiring international cooperation for a fleet of stationary vessels to be maintained around the globe (a point emphasised via irony in the *Memoirs of Scriblerus*) (see: Kerby-Miller 168). Swift’s reply to Arbuthnot offered artistic encouragement to a friend he recognised had a unique position in the group, as a published mathematician, Fellow of the Royal Society, and successful satirist: “It was a malicious Satyr of yours upon Whiston, that what you intended as a Ridicule, should be any way struck upon by him for a Reality, – Go on for the sake of Witt and Humor, and cultivate that Vein which no Man alive possesses but your self” (25 July 1714, in Woolley 2: 26; see also: “Swift to Arbuthnot. 3 July 1714” in Woolley 1: 630).
The significance of this exchange has not been sufficiently appreciated. If his complaint at being beaten to the idea is taken at face value, it reveals that Arbuthnot was indulging in the vagaries of his projecting imagination to create an indiscriminate parody for comic purposes rather than seeking to achieve particular satire, drafting the piece in order to give vent to a flight of fancy that could satisfy his humorous, mathematical and inventive inclinations. Whilst the misspelling of Whiston’s name is perhaps an intentional pun suggesting Arbuthnot’s creative frustration at being outdone in practical absurdity by a serious proposal (a “whetstone” being used to sharpen blades, with the connotation of sharpening one’s wit upon an embodiment of error), it does not seem to strike him that the similarity of his intellectual labours to those of Whiston and Ditton is something that can be exploited satirically. Swift, however, immediately recognises that Arbuthnot’s idea could be framed as a fortuitous, prophetic parody of the bomb-vessel proposal (which was almost satirical in itself), and re-classifies the literary mode of the piece as a “malicious Satyr.” Swift seemed unable to persuade Arbuthnot to continue with the intricate mathematical calculation he had initially envisaged: the light-house idea “to supply the defect of Nature, and to make the Longitude as easy to be calculated as the Latitude” would only re-surface in its abbreviated form, along with the “Bomb-Vessels” method, in a list of schemes censured merely via attribution to Martinus (Memoirs, 168, 167). However, a method involving signalling from systematically-positioned light-houses was genuinely proposed later that year (see: An Essay Towards a New Method To Shew the Longitude at Sea).

But perhaps Arbuthnot then conceived the greatest hoax of them all? Jeremy Thacker’s The Longitudes Examin’d (1714) has been considered by some scholars to be a serious proposal for a timepiece at the “cutting edge of horological technology” in its conception and detail (Betts and King 6), and is credited with the first usage of the word “chronometer” (Thacker 23; see also: Andrewes 192; Glennie and Thrift 388-95). However, its ironic prefatory sections, which mock rival inventors and the economic incentive of the reward, led Pat Rogers to argue that the whole work, probably by Arbuthnot, is a spoof made to look like the real thing through its mock-mathematics and accompanying diagrams (Rogers, “Satire as Mock-Science” 51). The resulting debate in TLS allowed Rogers to nuance his argument by conceding that the proposal may well contain passages of “innovative science,” but that this does not preclude its being a hoax (Rogers, “Jeremy Thacker”). If Longitudes Examin’d was a Scriblerian spoof, there is no evidence any of its initial readers noticed. The scheme was certainly seen as genuine by John Ward, chief surveyor and gauger to the Excise, who also proposed a timepiece kept in a vacuum, and accused Thacker of plagiarising his idea (although William Derham had published accounts of experiments with pendulums in vacuo ten years’ previously) (see: Ward, “The Preface”; Derham; Glennie and Thrift 391-92; Turner 124-26).

With its references to Keill and others, Longitudes Examin’d must have been written by someone immersed in the scientific community, and Arbuthnot was certainly as well-connected as they come. Arbuthnot also possessed the mathematical knowledge, but – if the piece is as accomplished as the historians of horology say – whether he had the technical expertise to write the treatise on his own (without assistance from within the Royal Society or London clockmakers) is uncertain. It is therefore not inconceivable that the work was collaborative. Even so, it is difficult to imagine a natural philosopher or horologist allowing his genuine, innovative proposal to be compromised via its coupling with ironic passages mocking the mercenary culture established through the instigation of the reward. However, if Arbuthnot was
the author, and on his own or in collaboration had embedded a legitimate method within a squib, this intention would certainly fit with his plan that the light-house idea would include a “calculation of the time charges & dimensions.”

Whether Longitudes Examined was serious or satiric, by Arbuthnot or not, this debate has yet to take into account that some proposals genuinely seeking the reward also incorporated ironic, comic and / or satiric prefatory passages which sought to deride other methods: more sparingly than in Longitudes Examined, but present nevertheless. For instance, the entrepreneur Case Billingsley, who himself proposed using a long-pendulum timekeeper, was sceptical about magnetism offering an answer, remarking that “we may with as much reason hope e’er long to see the Heavens drawn with curious Black Meridians through every Tenth Degree of the Equator, which shall meet in the Poles, as to find a Stone that shall help us” (Billingsley 12-13). This ironic vision of a divinely-revealed solution shows how rhetorically useful it is to imagine a fantastical ‘straw man’ against which one can make a case for the credibility of one’s own suggestion. Billingsley’s method predates Thacker’s: indeed, Thacker lampoons “Bill—y” (Thacker 3). So the author of Longitudes Examined was aware that irony was already part of the longitude-proposer’s arsenal of rhetoric, and it was not a huge generic leap to twist the proposal form into a full-blown satiric critique of others’ work. Where Longitudes Examined innovates is in its ironic posturing. The usual pose of serious proposals was to acknowledge one’s humbleness before the gentlemanly Commissioners: Robert Browne and Francis Haldanby (both mentioned by Thacker) are notable examples of this politeness (Browne n.p. sig. A1v; Haldanby 2). The boastful Longitudes Examined therefore seeks to expose the faux humility of projectors through shamelessly emphasizing its own economic motivation and placing itself confrontationally amidst the proliferation of self-promoting texts.

Subsequent proposers were provoked to reply to Longitudes Examined in a suitably ironic fashion. John Ward, mentioned above, responds to Thacker proclaiming “the Secret that Nature had Confess’d to ME” by asserting “you’ll find your Mistake, in presuming to be Natures only beloved Darling” (n.p. sig. A3r). Similarly inspired by Thacker’s boldness, another projector (James Clarke) brashly claims that his own suggestion will “cool those Mens Brains, whose Heads have run so much upon Wheels ever since the Commencement of a late Act of PARLIAMENT, and put them upon thinking of new Methods for getting the Twenty thousand Pounds” (5). Clarke’s acknowledgement that the reward has cultivated a culture of mercenary madness and desperation perhaps extends to accepting (half-ironically) his own hot-headedness.

The competitive environment that the Longitude Act created, together with the reward’s open remit, was seemingly ripe for irony, lampoon and caricature to be used as rhetorical devices against rival schemes. Meanwhile, Newton’s exasperation with one unworkable method he had been sent resulted in his only known joke:

His Project for the Longitude is as impracticable as to make a perpetual motion like that of the heart but much more uniform or to observe the Sun’s meridional altitude to a second or to deduce the Longitude from the complement of the Latitude, or to find that complement by burning brandy.

(“Newton to —. [22 March 1715]”, in Hall and Tilling 6: 211)

The projectors themselves, recognizing the distinctive power of wit and laughter over mere invective, placed fellow proposals under satiric scrutiny. Those involved were
not normally from the scientific establishment with (gentlemanly) reputations to maintain, but entrepreneurs (of a middling, but aspirational sort) (see: Cummings and Stewart 239-40) prepared to engage in the cut and thrust of satiric print culture. Knowledge of this new context might muddy the waters even further with regard to determining the authorship of Longitudes Examin’d, but it emphasises that we cannot marginalise satire, nor dismiss lightly its efficacy, as a mode within the culture of longitude.

**Newton’s F—t**

Returning more firmly to the Scriblerians, this section will place their satires on the Whiston-Ditton scheme (particularly the “Ode for Musick, on the Longitude”) alongside the works of others, to highlight variation in the methods of, and reasons for, its satiric censure. These comparisons allow us to see that in many instances the Scriblerians’ collective satires were moderate, considered acts of discrimination rather than reactionary diatribes.

The brilliantly excremental “Ode for Musick” (1728), however, was their most flippant response to Whiston and Ditton, and over the years has been variously attributed to Parnell, Gay, and Swift. This bombastic, overtly-ludicrous, mock-operatic ode (audaciously rhyming “Whiston” and “Ditton” with “bep-st on” and “besh-t on”) (Pettit 3: 172) seems particularly appropriate for a sonic-based scheme Arbuthnot thought was the most ridiculous thing he had ever heard (on the ode’s authorship see: Osborn, Rawson, “Parnell on Whiston”; Nicolson and Rousseau 177-78). This lampoon, which Gay and Pope called ironically an “extraordinary copy of verses” (“Gay and Pope to John Caryll. April 1715” in Sherburn 1: 288; “Gay and Pope to Congreve. 7 April 1715” in Sherburn 1: 290), finds the Scriblerians at their most playful, gives us some early evidence of their interest in music (especially as a satirically adaptable form, that would flourish in Gay’s Beggar’s Opera [1728]), and in its scatology perhaps captures the kind of school-boy humour that would have pervaded their homo-social gatherings. Behind this squib (and the other Scriblerian satires on Whiston), however, lay genuine intellectual and moral concerns about (what Pope called) his “wicked” anti-Trinitarian ideas: although Ditton had a good name for rhyming, his satiric worth was far less (he had not courted religious controversy, and died in October 1714) (“Pope to Henry Cromwell. 12 or 13 July 1707” in Sherburn 1: 26).10

The ode was not published for over a decade, but its circulation in manuscript seemed wide, and found an audience receptive to the Scriblerians’ worries about “Whistonism” (see: Rawson, “Parnell on Whiston” 92). However, it was the Scriblerians’ imitators who went much further in explicitly connecting Whiston’s longitude ambitions to his controversial theology. These co-conspirators also highlighted the economic motivation, which (Longitudes Examin’d excepted) the Scriblerians refrain from censuring, despite Whiston and Ditton blatantly demanding a “considerable Reward” before they “disclose so important and beneficial a Secret” (Whiston and Ditton, “Letter to Mr. Ironside”). Will-with-a-Wisp (1714), an attack on Whiston as a “false Fire who shakes the very Foundations of the Christian Faith,” and apparently written by “A Gentleman formerly of Queen’s College, Oxon,” argues that the project “look[s] as yet only like a Trick to get Money, [. . .] A Sum of ten or twenty thousand Pounds would do fine Things, fill his Coffers, or his primitive Library with Arian Books” (n.p. sig. A2’, 59). Again, unlike the Scriblerians’ responses at this time, Will-with-a-Wisp is also suspicious of the utility of successfully determining longitude at sea: “we should find out the shortest Passage to the East
Indies; in order to enrich our own native Country, by sending out our Money in Specie, and fetching Home Trinkets, Fanfarons, or worse Drugs in Exchange,” while “All our Tars […] would be steering their Course for Terra Australis incognita in Multitudes, and unerringly making the pacifick Ocean, to ransack the rich Mines thereabouts for hid Treasure” (60).

Whiston’s heresy was sometimes suspected to have developed directly from his adoption of Newtonian metaphysics (indeed, Newton himself attracted suspicion from High Church quarters, especially after his death in 1727), and this connection with the longitude was also exploited satirically by Scriblerian imitators. For instance, Whistoneutes (1731), by “Simon Scriblerus,” characterises Whiston as a sycophantic dunce who tacitly accepts Newton’s heterodox ideas, and idolises anything else that comes out of him:

When this grand Sir Isaac let a F—t, was it not more than ordinary and common in your Nose and Ears; in the one more savoury, in the other more sonorous, than the like you ever, in all your Life-time, heard from the rest of his fellow Creatures? And, when you went sometime since on Ship-board to angle for the Longitude, why did not you borrow Sir Isaac’s A—e? The Reports of which might have been far more serviceable to you in that Experiment, than the Ecchoes of the great Guns you made use of. (20)

Whilst the elegies of James Thomson and others had been celebrating the unprecedented, “amazing Mind” of Newton, sending his soul out to “mingle with his Stars,” “Simon Scriblerus” drags him back down to earth via scatological satire (Thomson 6, 5; see also: Glover). This vulgar reduction highlights how Whiston and Ditton’s proposal was a discernible source of mockery that could be used to target (by association) Whiston’s other forms of ‘innovation’ (see also: [Welchman] 28). Another serious longitude proposer with satiric inclinations, “R. B.” (probably Robert Burleigh, secretary to Admiral Sir Francis Wheeler), even makes this equation between technical and theological transgression (and gross self-promotion) explicit:

To impose so much upon the World, as to make People believe Longitude is to be Discover’d […] by a Propagation of Sounds […] without taking any Notice of their fixing Hulls at certain Distances in the Sea, they may as well persuade our Country-men, that White is Black, and Black’s White: But never an Arrian in this Kingdom, shall seduce me to hold with him in so great an Error. (15)

For the Scriblerians (and their imitators and accomplices), Whiston was an open goal that galvanised their satiric enterprise, especially given that 1714 brought forth into print not only the bomb-vessel proposal, but also (as G. S. Rousseau points out) another of Whiston’s millenarian theories of cometary apocalypse (329). Previous critics have underplayed, however, the fact that Whiston was not only a supreme satiric object, but also the source of considerable imaginative potency, because he brought together so many different kinds of ‘innovation’ in thought and activity. “Whistonism” was a vehicle as well as a target: an anchor-point from which they could not only measure a multiplicity of malpractice, but also secure their own whimsical fantasies. ‘Whistonian’ mock-catastrophe, for instance, often caused (or at least, heralded) by celestial phenomena, became an occasion for social satire (see: Gay, A True and Faithful Narrative, in Dearing and Beckwith II: 473; Lynall, Swift
and Science 141-42). However, the sheer proliferation of satires on Whiston inevitably skewed attitudes to discovering the longitude, making it the province of fools, but dangerous ones at that.

Despite originating as throwaway productions for a small coterie, the Scriblerian satires lived on in the culture of longitude in manifold ways. What is little known, however, is that despite, or perhaps because of the crudeness of the “Ode,” it had many admirers, including the composer Benjamin Cooke (1734-93), who indeed set the verses to music, for which he earned a “Noblemen and Gentlemen’s Catch Club” prize medal in 1767 (Cooke 1-8). Moreover, in 1775 John Harrison directed the sentiments of the poem towards the current Commissioners (including Astronomer Royal Nevil Maskelyne), scathingly remarking that “Whiston was pissed on, and Ditton shit on, but surely these Men ought to be besmirch’d or bespatter’d with both” (67n): once again, a “projector” took up the weapon of satire. It would have delighted the Scriblerians to know that their jeu d’esprit, signed “Da Capo” (a musical term for “repeat”), had such an afterlife, including its appropriation by the most prominent solver of the longitude problem.

Jo’s Throat

Whilst the collaborative Scriblerian satires on longitude had focused on the anti-Trinitarian Whiston, Swift had other (and more personal) reasons to be wary of the effects of the reward, which made an impression upon his greatest work. To put this later experience into context, however, we need to venture back to March 1712, when Swift was at the height of his influence in English political affairs, working for Robert Harley’s administration as a propagandist, and writing to his close friend Esther Johnson (Stella):

A Projector has been applying himself to me to recommend him to th Ministry, because he pretends to have found out te Longitude. I believe He has no more found it out, than he has found mine a[---]. However I will gravely hear what he says, and discover him a Knave or Fool. (28 March 1712, in Swift 9: 418-19)

In a more polite letter on the topic written the next day, to Archbishop William King, Swift supplied further details (that the “Projector” had petitioned the Queen via Henry St John regarding his “Invention”), and confessed: “I understand nothing of the Mathematicks, but I am told it [a longitude solution] is a Thing as improbable as the Philosopher’s Stone, or perpetual Motion” (29 March 1712, in Woolley 1: 421). Critics have long proposed that this “Projector” was none other than Whiston, but as Larry Stewart points out, there are plenty of other possible candidates (The Rise of Public Science 209). If the man was the notorious Whiston, it seems strange that Swift would not identify him by name. Certainly, just a few months later, Swift’s Mr. C—ns’s Discourse of Free-Thinking (1713) specifically targets Whiston for his controversial theology (Davis 4: 31).

Whatever the projector’s identity, Swift’s reactions are significant particularly because, in the letter to King, Swift mentions his own Proposal for Correcting, Improving and Ascertaining the English Tongue (1712). Swift recognises that his attempt to regulate the English language has a parallel with longitude solutions, noting, “Your Grace sees I am a Projector too” (Woolley 1: 421; see also: Davis 4: 20). This self-conscious acknowledgement of his own compulsion for projecting is present throughout his career: evident in his serious pamphlets about Irish economics,
and in putting forward (at least ironically) that his satires are kinds of reformative project (see: Treadwell). The longitude as a conventional satiric trope for impossible enterprise was even used against Swift himself, with his intellectual enemy the Whig historian John Oldmixon scoffing that “The Doctor may as well set up a Society to find out the Grand Elixir, the Perpetual Motion, the Longitude, and other such Discoveries, as to fix out Language beyond their own Times” ([Oldmixon] 25).

Swift’s use of “projector” highlights the word’s multiple meanings. This polysemic term had been around for more than a century, and came to refer to many kinds of emerging scientific, financial and political professional (see: Ratcliff 343-48). Whilst some of the literary conflations were partly borne out in reality (see: Stewart, The Rise of Public Science), it is utterly apparent that at various times Swift uses the pejorative connotations of the term (as private profiteer, even fraudster) for evocative purposes, as a kind of pre-loaded shorthand that could be easily deployed to achieve considerable satiric effect, often by associating one type of “projector” with another. Swift characterises the South Sea Bubble and William Wood’s Irish halfpence, for instance, as the work of opportunistic “projectors,” and connects both to kinds of economically-exploitative colonial and alchemical enterprise. In The Drapier’s Letters, Swift’s narrator even makes a direct link between the Longitude Act and the Crown’s controversial payment to the coinage manufacturer and “PROJECTOR” Wood, asking: “Hath he discovered the Longitude, or the Universal Medicine? No; but he hath found out the Philosopher’s Stone after a new Manner, by Debasing of Copper, and resolving to force it upon us for Gold” (Davis 10: 35-36). This analogy is particularly pertinent given the role played by Newton, as Master of the Mint, in endorsing Wood’s copper currency: an action that incurred Swift’s satiric wrath (Lynall, Swift and Science 94-119). The reputation of the longitude endeavour would therefore itself suffer through association with ludicrous or corrupt projects of other sorts in Swift’s satiric imagination.

Swift also witnessed how the reward affected real lives. Appointed vicar of Laracor, County Meath, in 1700, Swift there became the friend and customer of Joseph Beaumont, a local linen draper and general merchant (see: Ehrenpreis 2: 94-95, 365). Swift’s go-to practical man, Beaumont was interested in mathematics and natural philosophy, and put his expertise to use: proposing improvements to Dublin harbour, and publishing geometrical tables for textile manufacture (Beaumont, A Proposal; Beaumont, Mathematical Sleaving-Tables); and for the latter, through Swift’s contacts, he secured a government reward of £200 in 1711 (see: Swift 9: 8, 11, 14, 17, 27, 203, 205, 319, 334, 354). Buoyed by this success, Beaumont turned his attention to other schemes, principally longitude solutions, and this started possibly as early as 1712, when Swift writes to Johnson of a recent request: “Jo is a Fool; that sort of Business is not at all in my way: Pray put him off it. People laugh when I mention it” (8 March 1711-12, in Swift 9: 404; see also: 412) (this is within days of the anonymous “Projector” petitioning the Queen). Unfortunately, Beaumont seemed to become a real-life example of the ‘longitude lunatic’ frequently present in satirical trips to Bedlam (see: Bedlam 16-17; Lyttelton 14; Paulson 1: 169-70). By 1715, Beaumont was experiencing mental health problems, which some contemporaries attributed directly to his fixation with the longitude, with one mutual friend imploring Swift: “for God sake do somehow[ha]t to comfort Jo: [. . .] help him in his Longitude, do any thing to keepe him alive” (“Knightley Chetwode to Swift. 25 April 1715”, in Woolley 2: 120; see also: Woolley 3: 141, 195, 220, 221, 222, 418, and Deane Swift 4: 2n). Not much is known about his treatment, recoveries and relapses, but in 1722 Beaumont was “mad in London riding thro the streets” and Swift tried to send him to
Given this sad experience, it is not surprising that little help was forthcoming when another Irishman, John Wheldon, sought his advice in 1727 regarding a potential lunar-distance method he had already sent to prominent persons, including “Dr. Halley at Greenwich” (to no avail) (“Wheldon to Swift [Sept. 1727].” in Woolley 3: 239-40). Swift replied, offering sincere advice about the threat of plagiarism, acknowledging the Board of Longitude’s role, and name-checking three of its members:

I understand not Mathematicks, but have been formerly troubled too much with Projectors of the Longitude to my great Mortification and some Charges by encouraging them. [. . .] Newton, Halley, and Keil have all told me they doubted the Thing was impossible. [. . .] there is, I hear, a course taken that you may discover it in London without being defrauded of your Invention. One of my Projectors cut his Throat, and the other was found an Imposter. This is all I can say; but am confident you would deceive others, or are deceived yourself. (27 Sept. 1727, in Woolley 3: 240; see also Davis 5: 206)

The letter confirms that Swift was interested enough in the longitude endeavour to consult with some of the Commissioners (or Commissioners-to-be), perhaps on behalf of Beaumont, or when approached by the anonymous “Projector” in 1712. Moreover, Swift’s apophasis (“doubted the Thing was impossible”), and his suspicion of longitude projectors’ motives, chance of success, and state of mind is indeed consistent with the opinions of Newton, Halley and Keill, who knew what the possible methods were, but saw it as extremely difficult to achieve practically with the astronomical techniques and / or technology available. In his published lectures, Keill laments that:

Many, tempted by so great a Reward, [. . .] much in Love with their own Inventions, [. . .] have demanded the Reward promised to the Discoverer, but yet most of these Men have been so ignorant that they have scarce known what it is to find the Longitude. (Keill 188-89)

Both Newton and Halley believed that a refinement of the lunar distance method was the most likely solution. Newton was particularly abrupt with those who considered otherwise, and in one letter-draft even entreated an un-named recipient to concern him no “further with Projectors”: a sentiment Swift well understood (see: “Newton to —. [c. end of 1714]”, and “Newton to —. [22 March 1715]”, in Hall and Tilling 6: 197, 212n5; “Newton to Burchett. [October] 1721”, and “Newton to the Admiralty. 26 August 1725”, in Hall and Tilling 7: 172, 330; MacPike 212, 238).

We can assume that the “Imposter” Swift refers to is the same person he met in 1712, and the suicide is Beaumont, but the nature of Swift’s “encourag[ement]” of the “Projectors” is uncertain. Supplementary to payments for goods, Swift gave Beaumont around £6 per year for an unknown reason. In addition, Beaumont owed
£100 (for which Swift had a mortgage on Beaumont’s house in Trim), and £60 (for which Swift had arranged securities with Bishop Stearne of Clogher) (Thompson and Thompson, 316). Perhaps Swift saw Beaumont’s money troubles, and consequently his own expensive donations, as a direct result of the longitude obsession and resultant madness? Nevertheless, the letter to Wheldon confirms Swift suspected that “Projectors” could be a problem both to society and to themselves: a belief played out in the narrative of the “Voyage to Laputa,” Book III of *Gulliver’s Travels* (1726).

As I have argued elsewhere, Beaumont’s psychological characteristics seem to be reflected in the introspected and anxious Laputians, who each require a bash to the head to wake them up from their “intense Speculations” in mathematics (Lynall, *Swift and Science* 92-93). However, the figure of Beaumont should also inform our readings of the Academy of Lagado, where a legion of projectors are at work on hare-brained schemes. Previous scholarship on Swift and projecting has never mentioned Beaumont, perhaps because there is no longitude projector at work in the Academy, nor any other direct allusion in the *Travels* to Beaumont’s predicament. However, it has been noted recently that the Academy is reminiscent of not only Crane Court, then home of the Royal Society, but also Bethlehem Hospital (see: Rivero 151n6). Gulliver’s tour of the facility at times does seem more like an inspection of Bedlam’s inmates, some of whom are quite literally doing brown “Vessel” (261) rather than ‘blue sky’ research. Projects are inevitably products of creative vision, which in parodic form can be twisted to border on wild fantasy and insanity. Indeed, when Swift was at work on the *Travels*, Arbuthnot connected scientific creativity with mental illness by offering to acquaint him “w’ some new improvements […] Mankind has an inexhaustible source of invention in the way of folly, & madness” (“Arbuthnot to Swift. 17 October 1725”, in Woolley 3: 615), whilst Swift’s own *A Tale of a Tub* (1704) associated “great Introducers of new Schemes in Philosophy” with the “Academy of Modern Bedlam” (Swift 1: 107-08). The misdirection of talent in the Academy therefore evokes tragi-comic potential: there is something desperately sad about some of the projectors Gulliver meets, who are “driven equally on by Hope and Despair” (257), hinting at Beaumont’s coexistent struggles with devising a longitude solution and living with mental illness. Moreover, there are some telling comments about the projectors’ “Practice of begging from all,” with Gulliver appeasing the cucumber experimenter’s madness with coins Lord Munodi had “furnished” him with for that very purpose (260). As we have seen, Swift admitted longitude projectors had cost him “some Charges,” perhaps almost as much as £160 in bailing out Beaumont at times of crisis.

Correspondingly, although the possible targets of the Lagadan projects have been documented by critics (some identifying Royal Society experiments, others the commercial schemes of Exchange Alley) (for the Royal Society see: Nicolson and Mohler; for Exchange Alley see: Case 89-91; Rogers, “Gulliver and the Engineers”), a case can be made for a more comic (and perhaps sympathetic) than satiric tone in relation to some of the individual fictional projects: with the corollary that Swift was inspired by, but not necessarily always disparaging, some of the specific experiments and inventions he burlesques. There is, however, a more serious argument made about state encouragement of innovation, and the inability of projectors to live up to their utilitarian claims: while the Academy incubates an array of ‘improvements’ which are at best impractical, and at worst medically or environmentally irresponsible, outside its walls the citizens of Balnibarbi are generally poverty-stricken, financially-exploited and politically-subordinated. £20,000 would not go far in alleviating the ills afflicting a whole population, but something is better than nothing.
Although the problem of reliable navigation at sea was preoccupying many minds, including some close to Swift, it was perhaps creatively advantageous to him for a credible longitude solution to lie undiscovered. Swift’s geographical imagination had made the most of navigational and cartographical inaccuracy, projecting fictional lands onto uncharted spaces (almost like an explorer-entrepreneur promising a share of *Terra Australis Incognita*). If the indeterminate areas around Australasia and the Pacific had been adequately measured and mapped, then the *Travels* might have been a very different work (for a graphic illustration, see: Case, 54 ff.). In the story itself, Gulliver is perennially lost at sea, and is understandably frustrated with orientational imprecision. But when banished from the land of the Houyhnhnms in a canoe made from Yahoo skins, and without any instruments, Gulliver is still somehow able to calculate that the “Maps and Charts place [New-Holland] at least three Degrees more to the East than it really is; which Thought I communicated [. . .] to my worthy Friend, Mr. Herman Moll” (Swift 16: 427-28; on Herman Moll’s *A New & Correct Map of the Whole World* (1719) as a source for the *Travels* see also: Bracher, and Case 50-53). This navigational correction of the most popular contemporary map-maker forms part of the narrative’s mock-impulse for authenticity.

It is inevitable that when the habitually-marooned Gulliver hears about the immortal Struldbruggs, and contemplates what eternal life would be like, he thrillingly imagines seeing “the Discovery of the Longitude, [. . .] and many other great Inventions brought to the utmost Perfection” (314). Unlike his narrator Gulliver, Swift himself may have been suspicious about the advantages of a fully-mapped, navigable world. His writings on Irish economics suggest that he was doubtful that increased international trade brought national prosperity, unless the country happened to be the head of an empire (see: Davis 12: 12). Moreover, at the end of the *Travels* is a crushing indictment of colonialism. Gulliver, at this point in a voice indistinguishable from Swift’s own, describes that when a new land is discovered, “Ships are sent out at the first Opportunity; the Natives driven out or destroyed, their Princes tortured to discover their Gold; a free Licence given to all Acts of Inhumanity and Lust; the Earth reeking with the Blood of its Inhabitants” (441) (on this passage as part of a long anti-colonial tradition, see: Rawson, *God, Gulliver, and Genocide* 17-24). In his more misanthropic moments, Swift may have wondered (like the author of *Will-with-a-Wisp*) whether the principal effect of a longitude solution would be to increase the efficiency of such cruelty.

The liminal position of the Scriblerians within the networks of natural knowledge meant that from a unique vantage point their writings reflected and shaped intellectual, moral and cultural questions associated with the longitude and other projects, particularly concerning the validation and commodification of technological improvement. The satiric trajectories of their works often had an authoritative basis in the expertise of the scientific community, yet these were also modulated according to the Scriblerians’ own experiences and prejudices, and could even elicit some sympathy for the plight of the despondent projector. The cultural prominence of longitude proposals also gave the Scriblerians license to pursue their own projecting imaginations, inhabiting the project-genre parodically for satiric, but also whimsical purposes. The longitude projectors, moreover, also recognised the value of ludic discourse and rhetorical trickery in refuting the credibility of competing schemes. In a number of ways, therefore, the satiric mode made a distinctive, and at times decisive, contribution to the longitude endeavour (and, ultimately, to debates about the agency and authority of natural knowledge), despite the Scriblerians’ suspicion of any attempts to measure, control or mend the world.
Notes

1. Department of History and Philosophy of Science, University of Cambridge, and National Maritime Museum, Greenwich, “The Board of Longitude 1714-1828: Science, innovation and empire in the Georgian world” project. I was honoured to speak at the “Longitudes Examined” Tercentenary Conference (Greenwich, July 2014) and developed my paper into this article. I am especially grateful to Simon Schaffer, Katy Barrett and Paul Baines for their suggestions and encouragement.

2. Pope, Gay and Parnell say little about the longitude outside the collaborative satires.

3. See Royal Society MSS. 2: 229-32 (14 December 1710), and the exchange between Arbuthnot and Flamsteed, and Arbuthnot and Newton, in Ross 128-40, 145, 147-48. Given this involvement, it is no wonder that the Memoirs emphasises the extent to which navigation was at the forefront of the practical application of natural knowledge (168). See also Gay, “The Pin and the Needle,” 41-44, in Dearing and Beckwith 2: 322-23.

4. The BL copy of An Essay on the Usefulness of Mathematical Learning (1701) [618.c.28] is ascribed to Arbuthnot by a contemporary hand. Halley suggested Arbuthnot as his replacement as Clerk to the Royal Society whilst on one of the voyages, but this request was refused (Cook 271).

5. See also Swift’s The Publick Spirit of the Whigs (1714), which refers to the political machinations behind the Pretender’s exile from France to the neighbouring duchy of Lorraine: “I thought indeed we should be Safe from all Popish Successors as far as Italy, because of the prodigious Clutter about sending the Pretender thither. But they will never agree where to fix their Longitude” (Swift 8: 279).

6. The Humble Petition was re-published in the Pope-Swift Miscellanies. Aitken (88), Beattie (303), Kerby-Miller (339), and Teerink and Scouten (440) all ascribe its authorship to Arbuthnot, and “by Dr Arbuthnot” is handwritten on the British Library copy (816.m.19). On the satiric targets of the work, see: Rousseau 333, Viner 99, Steensma 42, and Nicolson and Rousseau 175-76.


8. The Scriblerians’ next virtuoso was the unenlightened Dr. Fossile, who when asked about the longitude problem remarked, “I deal not in impossibilities. I search only for the grand Elixir”: Three Hours After Marriage (1717), II, 262, in Fuller 1: 237.

9. One (not insurmountable) reservation about ascribing Longitudes Examin’d to Arbuthnot: Thacker argues that an astronomical answer to the longitude problem will only be possible if “the great Mr. L—, with an Industry equal to his Candour, should join the Fluxions and Series, which he invented, to his known Skill in the Laws of Centripetal and Centrifugal Forces” (8). The passage is probably ironic, but it is hard to believe that Arbuthnot, who knew Newton well, and served on the Royal Society committee concerned with the priority of calculus’ discovery, would wish to make this brazen attribution even ironically via his putative author Thacker: it seems too close to the bone, and was too likely to be taken seriously. On Arbuthnot and calculus, see Beattie 7-20.

10. Pope, however, would be inspired by Whiston’s astronomy, and attended his coffee-house talks. See “Pope to John Caryll. 14 August 1713” in Sherburn 1: 185; Nicolson and Rousseau 137-49; Force 165n77. The satires on Whiston include: God’s
Revenge Against Punning (1716), The Humble Petition of the Colliers (1716), (arguably) parts of Gulliver’s Travels (1726), and A True and Faithful Narrative of What Passed in London (1732). See Pettit 4: 53-56, 72-78; Swift 16: 236; Dearing and Beckwith 2: 464-73. For discussion of these works, see especially: Nicolson and Rousseau 174-87, Rousseau 325-41, Leonard, and Peterson.

11. See especially: Stewart, “The Trouble with Newton” 224. By the time of the Longitude Act, Newton had fallen out with Whiston, and probably would have endorsed the Scriblerians’ satires.


13. Conflating the longitude problem with those other standard chimeras, Swift adopts the charges long used in relation to alchemists: see, for instance, his former employer William Temple’s “Some Thoughts upon Reviewing the Essay of Ancient and Modern Learning”, in Temple 87.

14. Swift was elected a governor on 26 February 1713/4. See Bridewell and Bethlem. I am much obliged to Colin Gale, Bethlem Hospital Archive, for searching the committee and admission notebooks on my behalf.
Works Cited


*An Act for providing a Publick Reward for such Person or Persons as shall Discover the Longitude at Sea*. London: John Baskett, 1714.

*An Essay Towards a New Method To Shew the Longitude at Sea; Especially near the Dangerous Shores*. London: E. Place, 1714.


Billingsley, Case. *The Longitude at Sea, Not to be found by Firing Guns, nor by the Most Curious Spring-Clocks or Watches*. London: Richard Mount and John Morphew, 1714.


Browne, Robert. *Methods, Propositions and Problems, for Finding the Latitude; With the Degree and Minute of the Equator upon the Meridian. And The Longitude at Sea*. London: R. Hookey and J. Harrison, 1714.


Harrison, John. *A Description Concerning Such Mechanism as will afford a Nice, or True Mensuration of Time*. London: T. Jones, 1775.


R. B. *Longitude To be found out with A new Invented Instrument, both by Sea and Land*. London: F. Burleigh, 1714.


Royal Society MSS., Council Minutes (Copy), vol. 2 (1682-1727).


---. *A New Method for Discovering the Longitude both at Sea and Land*. London: John Phillips, 1714.


Conan Doyle’s Ideal Reasoner: The Case of the Reluctant Scientific Naturalist

Bernard Lightman

Sherlock Holmes is one of the most, if not the most, durable of Victorian icons drawn from the world of fiction. Holmes seems to have taken on a life of his own long after the death of his creator in 1930. Over two hundred films have featured Holmes as a character. Currently, the sleuth of Baker Street has his own movie franchise, starring Robert Downey Junior. The first film was produced in 2009, followed by a successful sequel in 2011. A third movie is in the works. Two popular television shows grace the small screen. The British television show Sherlock starring Benedict Cumberbatch, first aired in 2010. The American television show, set in New York and titled Elementary, began its first season in 2012. Contemporary audiences seem to be just as fascinated by the character, as were the Victorian readers who were transfixed by the detective’s adventures and his uncanny ability to solve crimes by using his heightened powers of reasoning.

In one of the Sherlock Holmes stories, “The Five Orange Pips,” published in November 1891, Conan Doyle includes a fascinating discussion between Watson and Holmes on the qualities needed for the “ideal reasoner.” Holmes insists that two chief qualities are the most useful to the detective: a highly developed deductive mind and a command of scientific facts. Holmes tells Watson that “the ideal reasoner would, when he has once been shown a single fact in all its bearings, deduce from it not only all the chain of events which led up to it, but also all the results which would follow from it.” That is the deductive mind component. Then Holmes asserts, “to carry the art, however, to its highest pitch, it is necessary that the reasoner should be able to utilise all the facts which have come to his knowledge, and this in itself implies [. . .] a possession of all knowledge, which, even in these days of free education and encyclopedias, is a somewhat rare accomplishment. It is not so impossible, however, that a man should possess all knowledge which is likely to be useful to him in his work, and this I have endeavoured in my case to do.” Holmes recalls that in the early days of their friendship, Watson had made a list of Holmes’ factual knowledge. “It was a singular document,” Watson replies. The list put Holmes’ knowledge of philosophy, astronomy, and politics at zero; botanical knowledge was variable; geological knowledge profound as regards the mud stains from any region within fifty miles of town; eccentric knowledge of chemistry; and unsystematic knowledge of anatomy. The rest of the list read: “sensational literature and crime records unique, violin player, boxer, swordsman, lawyer, and self-poisoner by cocaine and tobacco.” Holmes remarks that a man should keep his “little brain attic stocked with all the furniture that he is likely to use, and the rest he can put away in the lumber-room of his library, where he can get it if he wants it” (128).

In his recently published The Scientific Sherlock Holmes (2013), James O’Brien has provided us with an exhaustive study of the furniture in Holmes’ “little brain attic,” or what I have referred to as the second quality required for the ideal reasoner, the command of scientific facts useful to the detective. O’Brien’s aim is to demonstrate that Conan Doyle “blazed a new trail” in his use of science and forensic methods in the detective genre long before television shows like CSI made them so popular. He notes that every one of the Sherlock Holmes stories has some mention of
science, and that in some of the stories science is the most important factor (iv). But to understand Conan Doyle’s complex relationship to science it is necessary to go beyond the Holmes stories and consider them as part of the development of a new literary genre: detective fiction. Ronald Thomas’s *Detective Fiction and the Rise of Forensic Science* (1999) locates the Holmes stories within the history of detective fiction, demonstrating that this history is deeply connected to the history of new forensic technologies focused on the fingerprint, the mug shot, and the lie detector (3). In his *Victorian Detective Fiction and the Nature of Evidence* (2003), Lawrence Frank also treats the Holmes stories as an integral part of the development of detective fiction as a literary genre. However he goes much further than Thomas in exploring the larger relationship of detective fiction to scientific developments, not just new forensic technologies. He argues that Conan Doyle, along with Poe and Dickens, “presented a new, emerging worldview that was secular and naturalistic in opposition to nineteenth-century scriptural literalism, Natural Theology, and the vestiges of an Enlightenment that were often conservative in their political perspectives” (3). For Frank, the world of the Holmes stories is a Darwinian one that discards teleological speculations while, nevertheless, finding purpose and meaning in the great chain of life (143). However, there is still much more to be said about Conan Doyle’s relationship to nineteenth century science and his emphasis on inductive and deductive reasoning in the Holmes stories. If we bring the dynamic scholarship on Victorian science and culture to bear on this theme, the connection between Conan Doyle and an important group of Victorian scientists comes into focus. This group included such figures as Thomas Henry Huxley, biologist and ‘Darwin’s bulldog’, Herbert Spencer, the philosopher of evolution, and John Tyndall, the physicist. My goal in this article is to place Conan Doyle into his cultural context by examining how Huxley, Spencer, and Tyndall played a role in his intellectual development at a particular time in his life just prior to the publication of the first Sherlock Holmes story.

An examination of this theme should begin with the question: What intellectual influences were streaming into Conan Doyle’s mind from the time he left Stonyhurst, a Jesuit high school, in 1875, to the time that he finished the first Sherlock Holmes story, *A Study in Scarlet*, toward the end of April, 1886? This is obviously the key period in Conan Doyle’s life for understanding how he came to create a character that was intended to be the “ideal reasoner.” This is also the time when Conan Doyle was an impressionable young man, between the ages of sixteen and twenty-seven. While at the Jesuit schools of Hodder (1868-1870) and Stonyhurst (1870-1875), he was immersed in the environment of dogmatic Catholicism. At Stonyhurst, the conservative headmaster followed a firm papal line in seeking to stem the tide of materialism in post-Darwinian Britain (Lycett 32). The harsh, intolerant environment at Stonyhurst repelled Conan Doyle (Booth 59). How far he drifted from his Catholic upbringing while at Stonyhurst is unclear. But after he left Stonyhurst he spent a year at a Jesuit college in Feldkirch, Austria, which was less strict. There he had the opportunity to read more widely, including some of the works of Edgar Allen Poe. At the secular University of Edinburgh, where he began his medical studies in 1876, and received his Bachelor of Medicine in 1881, he was exposed to new influences, which eroded his faith in traditional Christianity. A family meeting in London in 1882 to discuss his future revealed how far he had moved from his Catholic roots. His uncles, Richard, Henry, and James, had money and influence. They could help Arthur get his start in medicine. Despite their unwillingness to help Arthur’s alcoholic father, they thought that he himself had promise. Once he decided where he would practice, they
offered to use their influence with Catholic families to help him find patients. Though he realised it might cost him their support, Arthur thought it only fair to tell his uncles that he no longer believed in the family’s traditional Catholicism and that he was an agnostic. This admission shocked his uncles and led to a permanent breach with them (Lycett 85; Nordon 29-30; Stashower 49-50). In that same year, 1882, instead of setting up his medical practice in London, he went to Southsea, Portsmouth, where he remained until 1890. It is therefore important to start by looking closely at Conan Doyle’s time as a medical student at the University of Edinburgh. It is here where he was exposed to new ideas that undermined his Catholic faith and moved him towards a more scientific worldview.

Conan Doyle and the University of Edinburgh
Fifty-one years before Conan Doyle began his studies as a medical student at the University of Edinburgh, another famous nineteenth-century figure also entered medical school at Edinburgh. Charles Darwin was also sixteen years of age, and although he never completed his degree, it was a formative experience for him. He learned chemistry, botany, and geology. He was exposed to evolutionary theories from the continent, which later had a tremendous impact on him. Robert Grant, a radical evolutionist and an expert on sponges, became his mentor. Grant took him on long walks on the seashore and explained the relationships between primitive marine invertebrates and more complex creatures. But the young Darwin hated anatomy and surgery. The sight of blood at the operating table caused him to faint. Clearly, medicine was not for him, and, after two years, he left for Cambridge, where he planned to obtain a degree and become a clergymen. As Darwin’s experiences at the medical school at Cambridge illustrate, long before Conan Doyle arrived there it was seen as a home of radical scientific thinking. Here I will discuss the University of Edinburgh in the larger landscape of British universities, and then examine the teachers Conan Doyle would have encountered there, focusing on Joseph Bell. I will finish this section by identifying the intellectual heroes worshipped by Conan Doyle and his fellow students.

The radicalism of the University of Edinburgh can only be understood in the context of the entire system of British universities in the nineteenth century. Although Cambridge was seen as being somewhat more progressive than Oxford, both were Anglican universities. You could not graduate from either without professing your adherence to Anglican articles of faith. The science taught at these universities was informed by what was known as natural theology. William Paley’s book, *Natural Theology* (1802), was the canonical text. In it, Paley argued that the existence of an omnipotent, omniscient, and benevolent God could be proved through a study of the design in nature. Understanding nature therefore meant understanding what God had in mind when he had created the organic and inorganic world. Natural theology had a political and social message as well. It was often used to defend the status quo by presenting the social world as divinely designed. British science was dominated in the first half of the century by Oxford and Cambridge professors, or individuals trained at Oxford or Cambridge, who constantly brought the intentions of a divine being into their scientific explanations. The geologist William Buckland, the astronomer John Herschel, and the polymath William Whewell, all influential scientists in this period, were Oxbridge men.

Until the founding of the secular London University in 1826, Nonconformists (non-Anglican Protestants) who wanted a university education had to leave England. Many, like Darwin, whose father was Unitarian, went to the University of Edinburgh.
The University was a hotbed of radical evolutionary thought, open to new developments in anatomical and biological thought from the continent. Even after Grant left Edinburgh to take the London chair of zoology in 1827, Edinburgh retained its radical reputation (Desmond 62). The radicals rejected natural theology, and its implied hierarchical view of nature. They saw nature and society as progressing through cooperation, education, emancipation, technological advance, and democratic participation. Lamarck’s notion that an animal could, through its own exertions, transform itself into a higher being – all without the help of a deity – appealed to those who repudiated the status quo (Desmond 4).

When Conan Doyle began his studies at the medical school at the University of Edinburgh in 1876, he was coming to a university that had retained its progressive reputation. Whereas Cambridge and Oxford were centers of resistance to evolutionary theory, since they were still largely Anglican institutions, Edinburgh was far more open to new ideas. By the time Conan Doyle entered medical school, the required courses included anatomy, physiology, medical chemistry, materia medica (drugs), morbid anatomy (pathology), surgery, midwifery, therapeutics, gynecology, children’s diseases, vaccination, teeth, mental diseases, and hygiene (Rodin and Key 6). Conan Doyle later complained that at the Edinburgh medical school he was subjected to “one long weary grind at botany, chemistry, anatomy, physiology, and a whole list of compulsory subjects, many of which have a very indirect bearing upon the art of curing” (Memories and Adventures 18). But he acknowledged that the training he received there was more practical than at other colleges. Edinburgh had a long tradition of outstanding medical practitioners. The members of the medical faculty included Dr. James Young Simpson, Sir James Syme, and Baron Joseph Lister. Charles Wyville Thomson, William Rutherford, and Joseph Bell were among his teachers. Thomson, who taught natural history, had recently returned from a three and a half years at sea studying the oceans aboard the HMS Challenger. His physiology professor, William Rutherford, became Conan Doyle’s model for the explorer Professor Challenger in his novel The Lost World (Lycett 55). But perhaps it was Bell who was his most influential teacher. Conan Doyle refers to him as “the most notable of the characters whom I met” while he was at Edinburgh (Memories and Adventures 20).

Dr. Joseph Bell (1837-1911) was a poet, naturalist, sportsman, surgeon and editor of the Edinburgh Medical Journal for twenty-three years. Bell graduated with an MD from the University of Edinburgh in 1859. He became a demonstrator in anatomy and at the age of twenty-six he set up his own classes of systematic and operative surgery. He was selected to be special assistant to Professor James Syme, and then in 1872 he took on the job of senior surgeon to the Royal Infirmary of Edinburgh. Later he became the first surgeon to the Royal Hospital for Sick Children. Bell was not a faculty member at the Edinburgh University Medical School. Conan Doyle paid to attend the surgery classes that Bell taught at the Royal Infirmary (O’Brien 12; Edwards, “Doyle, Sir Arthur Ignatius Conan (1859-1930)”). Bell selected Conan Doyle to become his outpatient clerk at the Royal Infirmary in 1878, giving him the opportunity to examine what Bell was most famous for, producing instant diagnoses from minimal evidence. He was impressed that Bell had “often learned more of the patients by a few quick glances than I had done by my questions” (Memories and Adventures 20). There is widespread agreement among scholars that Bell was the model for Sherlock Holmes in the sense that Conan Doyle applied Bell’s diagnostic techniques to detective fiction. (O’Brien 14-16; Edwards, The Quest for Sherlock Holmes 201; Stashower 77-78).
It is important to note that Bell’s technique was purely secular, although he was religiously devout. Born into the Free Church faith, he went without fail every Sunday morning to St. George’s United Free Church, where he was a senior elder (Liebow 198; Edwards, “Doyle, Sir Arthur Ignatius Conan (1859-1930)”). But most of the medical courses that Conan Doyle took would have been taught from a secular perspective rather than one informed by natural theology. In 1910 Conan Doyle recalled in an article titled “The Romance of Medicine” that Edinburgh medical education was thoroughly materialistic. “I was educated in a materialistic age,” he observed. “We looked upon mind and spirit as secretions from the brain in the same way as bile was a secretion of the liver. Brain centres explained everything… That was, roughly, the point of view of the more advanced spirits among us” (459).

Stashower, one of the eminent Conan Doyle scholars, attributes Conan Doyle’s loss of faith to his unhappy religious schooling, his scientific training, and to his “careful reading of Darwin and his followers” (50). Conan Doyle’s account in his autobiography of the “constant struggle” that confronted him during his student years at Edinburgh confirms Stashower’s interpretation and especially the final point about Darwin and his followers. Conan Doyle states that his Catholic faith was being eroded by the “new knowledge that came to me both from my reading and from my studies.” The “whole Christian faith,” not just Catholicism, “as presented to me in nineteenth century theology, was so weak that my mind could not build upon them.” Then Conan Doyle specified those thinkers who most upset his faith. “It is to be remembered,” Conan Doyle declared, “that those were the years when Huxley, Tyndall, Darwin, Herbert Spencer and John Stuart Mill were our chief philosophers, and that even the man in the street felt the strong sweeping current of their thought, while to the young student, eager and impressionable, it was overwhelming.” Conan Doyle characterised his position as “agnosticism, which never for an instant degenerated into atheism” (Memories and Adventures 26-27). Conan Doyle joined in the general admiration at the University of Edinburgh for Thomas Huxley, who was closely identified with agnosticism (Stashower 50).

The roots of Conan Doyle’s loss of faith, which he revealed to his uncles in 1882, can be traced to his time at the University of Edinburgh. Although one of his favorite teachers, Joseph Bell, was a devout Christian, there is no evidence to suggest that his influence countered the materialistic environment at Edinburgh. His private religious views do not seem to have entered into his classroom. The diagnostic technique that so fascinated Conan Doyle was completely secular in method. At Edinburgh Conan Doyle found himself immersed in a radical, materialistic environment for which Edinburgh had been famous since the early nineteenth century. There he encountered Huxley, Tyndall, and Spencer. These Darwinians shaped Conan Doyle’s thinking in this period of his life.

The Scientific Naturalists
From February to August of 1880 Conan Doyle spent six months at sea aboard the Hope on a voyage to the Eastern Arctic, serving as the ship’s surgeon. He enjoyed interacting with the sailors and he was impressed by how they had educated themselves. He wrote to his mother in February 1880, “the chief engineer came up from the coal hole last night and engaged me upon Darwinism, in the moonlight on deck” (Lellenberg, Stashower and Foley 123). The controversy over Darwin’s theory of evolution was not only a hot topic at the University of Edinburgh. It was debated on the deck of British ships. Born in 1859, the year of the publication of Darwin’s Origin of Species, Conan Doyle grew up in a society where the ramifications of
evolutionary theory were endlessly discussed. Huxley, Tyndall, and Spencer, whose works Conan Doyle had been reading, played a key role in the evolutionary debates.

Spencer, Tyndall, and Huxley all met in London during the 1850’s when they were young men trying to establish themselves. They found that they shared a lot in common. They all came from humble middle class backgrounds. They all came from outside the Oxbridge environment. Whereas most members of the scientific elite of the first half of the nineteenth century were firm supporters of natural theology and the Anglican establishment, Spencer, Tyndall, and Huxley aimed to reform science by secularizing nature, professionalizing science, and promoting expertise. Huxley had a catchy name for this vision of an emancipated science: scientific naturalism. He argued that proper science excluded any reference to a divine being – scientists should stick to studying observable causes and effects in nature. Huxley, Tyndall, and Spencer became leaders of a significant group of intellectuals, many of them scientists, which forcefully pushed for a redefinition of science in the latter half of the nineteenth century. The power of the scientific naturalists within British science was at its peak from the 1860’s to the early 1880’s. They dominated the important scientific societies, including the British Association for the Advancement of Science and the Royal Society.

But the scientific naturalists were not just aiming at a reform of scientific theories and institutions. They were also interested in transforming British culture as a whole. They put forward new interpretations of humanity, nature and society derived from the theories, methods, and categories of empirical science, especially evolutionary science. They attempted to create a new scientific worldview for an evolutionary age that was not based on Biblical principles or religious intuition. This brought them into conflict with Christianity. Not only did they try to push devout Christians who argued for the validity of natural theology out of science, they also challenged the cultural authority of the Anglican establishment by claiming that they provided the best intellectual leadership for a modern, industrialised Britain.

No doubt Conan Doyle was attracted to the scientific naturalists. They offered him a thought out critique of Christianity, which would have interested him after his experiences at Jesuit schools. Moreover, they provided a scientifically informed substitute faith for the one that he had lost, though it did not satisfy him for the rest of his life. Stashower has argued that Huxley’s views “helped to shape Conan Doyle’s agnosticism” (92). Many of the scientific naturalists adopted agnostic arguments in their criticisms of Christian theology. The essence of the agnostic position was that the human ability to know was limited by the very nature of the mind. Knowledge of the transcendental was beyond those limits. Christian theologians routinely claimed to have knowledge of transcendental things, including God. For the scientific naturalists, agnosticism proved to be a very effective position to take when trying to deflate the pretensions of Christian theologians (Lightman).

At the same time that they debated with Christian theologians, the scientific naturalists also claimed that they accepted the value of religion, as they defined it. They made a rigid distinction between the spheres of science and religion. For Huxley, while religion belonged to the realm of feeling, science was a part of the world of intellect. This conception of the relationship between science and religion had several advantages. Huxley could maintain that there was no conflict between science and religion. If rightly conceived, Huxley believed, science and religion pertained to distinct realms and were without authority outside their proper sphere of interest. Huxley could also claim that he saw an important role for religion in the present and the future. Huxley, as well as the many of the other scientific naturalists,
believed that religion was intrinsic to the human experience. Religious feelings and emotion, expressed in art and poetry, were valid responses to the impenetrable mystery found in the world (Lightman 128-31). But theology, which belonged to the realm of fact, since it tried to embody religious truth in fact, could be in conflict with science. Theology’s claims could be scientifically tested and they were often found wanting.

If scientific naturalism did not destroy all forms of religion, then Huxley and his allies could claim that that science provided the basis for a spiritually satisfying alternative to the outmoded Christian creed. Science, Huxley pointed out, “has found the ideas which can alone still spiritual cravings” (Huxley, “Advisableness” 631-32, 636). Scientific naturalists recognised that they could not merely reject the Christian creed they opposed. They had to offer a new vision of a scientifically inflected creed to replace it if they aspired to supplant the clergy as the new cultural authorities. It was a creed that offered real hope for the future, since science was the driving force behind all genuine progress. This line of thinking must have been tremendously appealing to young medical students like Conan Doyle.

The Huxley Connection
The intellectual environment at the University of Edinburgh had an enormous impact on an impressionable, young Conan Doyle, who was searching for a substitute for his family’s Catholicism. The medical school was steeped in materialism and the students there admired T. H. Huxley. In his autobiography, Conan Doyle recalls reading Huxley and other scientific naturalists while at Edinburgh. This moved him towards agnosticism. Although we know that Conan Doyle was reading the scientific naturalists as a medical student, and that he says that their agnosticism shaped his thinking on religious issues, do we have more evidence as to what, exactly, he was getting out of their writings? There are two answers to this question. Here I will explore one answer by following up on an obscure reference made in one of the Sherlock Holmes stories that links Conan Doyle, Bell, and Huxley.

Finding concrete connections between the scientific naturalists and Conan Doyle is a challenge. This isn’t the case with literary figures that were Conan Doyle’s friends and contemporaries. Whereas Conan Doyle never seems to have met Huxley, Spencer, or Tyndall in the flesh, H. G. Wells and Grant Allen did. Wells was a student in Huxley’s biology class at the Normal School of Science in South Kensington. He found Huxley to be an inspiring teacher and the impact of evolutionary themes in such novels as The Time Machine and War of the Worlds is obvious. Grant Allen, a populariser of science and sensation novelist, was a self-proclaimed disciple of Herbert Spencer. He and Spencer were close friends.

If Conan Doyle had no personal relationships with Huxley, Tyndall, or Spencer, we need to look at his writings for clues as to what attracted him to their scientific naturalism. Frank has argued that Conan Doyle was interested in how Lyell and Darwin saw knowledge as being “informed by a belief in fixed natural laws working in and through time that can lead to the reconstruction of the past even from fragmentary evidence” (Frank 155). But an obscure reference in the Holmes story, “The Five Orange Pips,” reveals the key figures for Conan Doyle when he created a fictional character who embodied the attributes of the ideal reasoner. Those figures were Huxley and Georges Cuvier, the French naturalist, zoologist, and paleontologist, rather than Lyell and Darwin. In the section of this story where Holmes discusses the ideal reasoner, he refers to Cuvier’s almost magical ability to reconstruct accurate
models of the entire structure and correct proportions of extinct animals from the discovery of a single bone:

The ideal reasoner would, when he has once been shown a single fact in all its bearings, deduce from it not only all the chain of events which led up to it, but also all the results which would follow from it. As Cuvier could correctly describe a whole animal by the contemplation of a single bone, so the observer who has thoroughly understood one link in a series of incidents, should be able accurately to state all the other ones, both before and after. (128)

Cuvier, then, is an ideal reasoner who has mastered the powers of observation and deduction in his particular area of knowledge.

This passage from “The Five Orange Pips” contains a clue to an important connection between Conan Doyle and T. H. Huxley. In 1880 Huxley delivered a lecture titled “On the Method of Zadig,” which was subsequently published in the periodical the Nineteenth Century. During the 1880’s Conan Doyle was an avid reader of the Nineteenth Century. He saw it as a progressive journal suitable for the intellectually advanced. In 1888 Conan Doyle also contributed an article to the Nineteenth Century titled “On the Geographical Distribution of British Intellect.” It is therefore highly likely that Conan Doyle read Huxley’s “On the Method of Zadig,” and that the first Holmes work, A Study in Scarlet (1886), was informed by it and some of the other articles in the journal (Lellenberg and Stahower 3-8). The subtitle of Huxley’s essay was “Retrospective Prophecy as a Function of Science.” The epigram under the subtitle is taken from Cuvier, and it refers to Voltaire’s philosophical novel Zadig (1747) (Science and Hebrew Tradition 1). Huxley reminds the reader that Cuvier cites Zadig in one of the most important chapters of his greatest work (1). This highlights the importance of Cuvier’s reference to Zadig. In this essay Huxley draws on Voltaire’s novel to discuss Zadig’s scientific method. Zadig, who may only be a fictional character created by Voltaire, lived in ancient Babylon. According to Voltaire, Zadig withdrew from the turmoil of Babylon to a secluded retreat on the banks of the Euphrates, where he studied nature. Patient observation sharpened his naturally good powers of observation, until, “at length, he acquired a sagacity which enabled him to perceive endless minute differences among objects which, to the untutored eye, appeared absolutely alike” (Science and Hebrew Tradition 3). One day, he was stopped by a troop of the Queen’s officials, asking if he had seen the Queen’s dog. Zadig replied, did they mean a small spaniel that had recently had puppies, who limped with the left foreleg, and who had very long ears? Ah, the Queen’s men said, you have seen her. “‘No,’ answered Zadig, ‘I have not seen her; and I really was not aware that the Queen possessed a spaniel!’” (3).

By an odd coincidence, at exactly the same moment, the King’s favorite horse had broken away from his groom in the Babylonian plains. The grand huntsman and his staff were seeking the horse with as much anxiety as the Queen’s men were searching for her dog. The grand huntsman asked Zadig if he had seen the horse. Zadig replied, “‘A first-rate galloper, small-hoofed, five feet high; tail three feet and a half long; cheek pieces of the bit of twenty-three carat gold; shoes silver?’” Yes, the grand huntsman, answered, which way did the horse go? Zadig claimed that he had not seen anything of the horse. Zadig was accused of stealing both the King’s horse and the Queen’s spaniel, and he was condemned to be flogged and then transported for life to Siberia. But just as the sentence was pronounced the lost horse and spaniel
were found. The judges then decided to fine Zadig four hundred ounces of gold for saying he had seen that which he had not seen. After he paid his fine he had an opportunity to defend himself. Zadig explained that he had not seen the dog or the horse. He described how he had deduced the physical characteristics of the dog and horse from their tracks, and other minute markings they had left behind. The judges, the King and the Queen admired Zadig’s inductive and deductive abilities, and the gold was restored to him (Huxley, *Science and Hebrew Tradition* 3-5).

Huxley used Voltaire’s story about Zadig to outline the method that became the foundation of the historical sciences, including archaeology, geology, and paleontology. The basis of Zadig’s abilities was “the coarse commonplace assumption, upon which every act of our daily lives is based, that we may conclude from an effect to the pre-existence of a cause competent to produce that effect” (*Science and Hebrew Tradition* 7, 23). These are themes that Huxley had sounded before in his essays. In his “On the Educational Value of the Natural History Sciences,” from 1854, Huxley declared, “Science is, I believe, nothing but trained and organised common sense…” The results of science, Huxley wrote, were won through the use of faculties and mental processes possessed by all humans and applied in all walks of life. As an example, Huxley pointed to “a detective policeman” discovering a burglar from the marks made by his shoe “by a mental power identical with that by which Cuvier restored the extinct animals of Montmartre from fragments of their bones.” This was a “process of induction and deduction” open to all, Huxley insisted, not just the scientist (*Science and Education* 45-46). Note the similarity of Huxley’s evaluation of Cuvier and Zadig’s wonderful abilities and Holmes’ description of the skill of the ideal reasoner. They all use induction and deduction to trace the chain of cause and effect in order to understand events.

The Huxley-Zadig-Cuvier-Holmes link can be taken one step further, adding Joseph Bell. In a short article on “The Adventures of Sherlock Holmes” published in 1892, Bell observed, “Voltaire taught us the method of Zadig and every good teacher of medicine or surgery exemplifies every day in his teaching and practice the method and its results” (Bell 79). Huxley’s *Nineteenth Century* article was published in 1880 and the first Holmes story was written six years later. It is a tantalizing possibility that Bell read Huxley’s article on Zadig, and that he brought it to Conan Doyle’s attention, or that Bell mentioned it in one of his medical lectures. In any case, it is significant that Bell and Huxley agree that Zadig’s method is the proper one for the scientist and the doctor to cultivate. It shows that reading the scientific naturalists gave Conan Doyle some ideas for the creation of the character Sherlock Holmes.

There is a tremendous irony to this story of the link between Huxley, Zadig, Cuvier, and Holmes. It concerns Huxley’s relationship to Cuvier, and, by implication, Conan Doyle’s relationship to Huxley. It is puzzling to see Huxley praising Cuvier. After all, Cuvier was an upholder of natural theology, and closely associated with Huxley’s enemy, Richard Owen. Owen, in fact, was often called the ‘British Cuvier’, since he was seen as Cuvier’s champion in Britain. In his forthcoming book *Show Me the Bone*, Gowan Dawson has explained the seeming discrepancy in Huxley’s behavior. Huxley pursued two inconsistent strategies when he discussed Cuvier. When he wrote research papers for fellow anatomists he rejected the validity of Cuvier’s law of correlation, but when writing for a popular audience he pretended to support it, since the notion of reconstructing the entire form of prehistoric creature from a single bone had caught the public imagination. Conan Doyle may have thought that he was following what Huxley had said in his article on Zadig, but he had actually misunderstood Huxley, in part because of Huxley’s confusing strategy.
The Narrative of John Smith

Understanding the connections between Huxley, Zadig, Cuvier, Bell, and Holmes supplied the first answer to the question: What was Conan Doyle getting from his reading of the scientific naturalists. Through this reading Conan Doyle picked up ideas about induction and deduction. The second answer takes us to Conan Doyle’s first attempt to make the transition from being a short-story writer to being a novelist, and it involves the agnosticism of the scientific naturalists. Conan Doyle wrote The Narrative of John Smith in 1883 at the age of twenty-three as he was establishing his medical practice in Portsmouth. When he sent the MS to a publisher it was lost in the mail. Conan Doyle wrote his mother in February 1884, “of course it was the best thing I ever wrote. Who ever lost a manuscript that wasn’t?” But all joking aside, Conan Doyle was not particularly proud of the work. “I must in all honesty confess,” he told his mother, “that my shock at its disappearance would be as nothing to my horror if it were suddenly to appear again – in print” (Lellenberg, Stashower and Foley 225). He later reconstructed the MS from memory but chose not to publish it. It was found among his papers in 2004, and deposited in the British Library (Lellenberg, Stashower and Foley 225). It was first published in 2011. Since the book is considered by scholars to be semi-autobiographical, an analysis of it reveals what Conan Doyle thought about science and religion in 1883. However two considerations must be kept in mind in examining this text for traces of his reading of the scientific naturalists. First, since the book was later reconstructed from memory, it is possible that Conan Doyle subtly changed it in accordance with his later intellectual development. The Narrative of John Smith cannot be treated as a totally accurate reflection of his state of mind in 1883. Second, semi-autobiographical works can be extremely difficult to interpret. It is not always clear what truly represents the author’s own thoughts.

The Narrative of John Smith consists of a series of reflections on the issues absorbing Conan Doyle when he was in his early twenties. John Smith, a man of fifty confined to his room for a week due to illness, is the protagonist, given to brooding about contemporary intellectual debates (5). Smith’s room contains “four squat oak cases” stocked with books that “are the collection of a lifetime” (19). There are books by Ruskin, Goethe, Emerson, Darwin, and Winwood Reade, among others. Smith prizes his library. He is amazed by the technological, artistic, and scientific and progress that he has witnessed over the course of his life. “It is not too much to say that in ten years now we make as much progress as in a thousand years then,” he remarks, “not on account of our finer intellects but because the light we have already gained helps us on to more.” Smith believes that if knowledge grows then so does virtue. Moral progress has been just as striking as the other types of progress. Although Spencer is not mentioned by name, John Smith shares the utopian vision of the future envisioned by the philosopher of evolution. Humans will navigate the air with the same ease and certainty with which they now do the water, and ships will travel under as well as over the waves. “Life will be rendered more refined and more pleasant by countless inventions,” Smith predicts, “and [. . .] preventative medicine and sanitary science will work with such wonders that accident and old age will be the only causes of death” (41). War will be abolished and crime diminished.

Smith also believes that current forms of religion will be abandoned while their essence will be retained in a universal creed that would “embrace the whole earth” (41). He sees a “purer and simpler creed” based on an elemental religion that can be established through the use of human reason and the internal consciousness.
An all-merciful and omnipotent creator can be found in nature without the help of a bible or a church (47, 49). Huxley, Tyndall, and Spencer’s conception of a religion not based on theology share much in common with Smith’s vision of a new religion. Smith also echoes the scientific naturalists’ criticism of the Christian clergy. The clergy should preach a code of morality but they should “leave dogma alone.” Smith rails against the clergyman’s pretension to greater wisdom. “Every one of you would like to write ‘all rights reserved’ across the covers of your own particular Bibles,” he declares. “Why pretend to be infallible exponents when you know that the meaning is obscure and that every man may fairly put his own interpretation upon it?” (45). It was a dark day when religion “as taught by Christ was changed into religion as understood by Christians” (46). Smith’s rant on Christianity is driven by his rejection of the narrow tenets of modern churches – their creeds, articles and dogmas – that prevent the inclusion of “the whole human family in one comprehensive faith” (46). Smith’s views on how institutionalised religion blocked human progress are of a piece with the position of scientific naturalists. The Narrative of John Smith demonstrates how the scientific naturalists shaped the way Conan Doyle thought in 1883 about the benefits of advancing scientific knowledge, about the pernicious influence of the Christian clergy, and the need for some kind of religion apart from theology.

Between Science and Religion
Conan Doyle’s Catholic faith was shaken by what he experienced from the time that he left Stonyhurst in 1875 up until when he wrote the first Sherlock Holmes story in 1886. Following out the chronology of his intellectual journey provides a coherent picture of the impact of scientific naturalism on his thinking. Conan Doyle was searching for a creed to replace his Catholic faith during his days as medical student at the University of Edinburgh, which began in 1876. Edinburgh had a tradition of radicalism since the early nineteenth century. It is no surprise, then, that his fellow medical students worshipped T. H. Huxley and that he was reading works by the scientific naturalists, which were likely new to him. Even though the teacher who influenced him most, Joseph Bell, was a devout Free Churchman, the impressive diagnostic technique that he taught to his students was part of a larger scientific worldview and easily reconciled to scientific naturalism. Indeed, Bell, or even Conan Doyle, may have come across an articulation of the deductive method through a reading of Huxley’s work or through reading his 1880 article on Zadig. Conan Doyle received his Bachelor of Medicine in 1881. He began to look for ways to establish a medical practice. The painful family meeting in 1882 concerning his future made it clear how far Conan Doyle had drifted towards agnosticism, a central tenet within scientific naturalism. The Narrative of John Smith, written originally in 1883 while Conan Doyle was establishing his practice at Portsmouth, contains a criticism of the Christian clergy that resonated with the views of the scientific naturalists, and it celebrated the contributions made by science to human progress. In sum, Sherlock Holmes, who was conceived in 1886, was the product of a period during which Conan Doyle had been substantially influenced by scientific naturalism. The Sherlock Holmes stories, at least initially, reflect Conan Doyle’s encounter with scientific naturalism. As Frank has argued, the Holmes stories satisfied Conan Doyle’s desire to render in detective fiction “a coherent vision of the universe in a post-Darwinian moment” (Frank 155).

But during the early 1880s Conan Doyle was also exposed to another way of thinking that, long after, overwhelmed his commitment to scientific naturalism. Conan Doyle began observing psychic phenomena in 1880. He was skeptical, though
curious. The scientific naturalists were utterly opposed to spiritualism. Huxley and Tyndall considered all mediums to be frauds. Nordon believes that by 1888 Conan Doyle’s attraction to spiritualism was due to his attempt to synthesise the rational and the religious elements he had been unable to find in Catholicism (151). This led to a lengthy unresolved spiritual conflict that ended with his conversion to spiritualism in 1915 or 1916. In the end, scientific naturalism was unable to provide him with the spiritual balance he had lost when he rejected Catholicism (152, 156, 166). When Conan Doyle referred to the scientific naturalists after his conversion, it was usually to criticise their rejection of spiritualism as unscientific. In his The New Revelation (1918), for example, Conan Doyle recalled that his skepticism towards spiritualism was sustained “by the consideration that many famous men, such as Darwin himself, Huxley, Tyndall and Herbert Spencer, derided this new branch of knowledge.” But when he learned that “their derision had reached such a point that they would not even examine it, and that Spencer had declared in so many words that he had decided against it on a priori grounds, while Huxley had said that it did not interest him, I was bound to admit that, however great they were in science, their action in this respect was most unscientific and dogmatic” (18-19). It was the scientific naturalists who were being unscientific.

Conan Doyle was just beginning to move away from scientific naturalism shortly after he began writing the Holmes stories. It means that Conan Doyle’s time as a scientific naturalist likely lasted from the time he arrived at Edinburgh to the end of the 1880’s, and that from that time until his conversion to spiritualism about fifteen years later, he should be placed alongside a different group of intellectuals. The late historian Frank Turner wrote a wonderful book titled Between Science and Religion: The Reaction to Scientific Naturalism in Late Victorian England (1974). The book contained six case studies – of Cambridge philosopher Henry Sidgwick, Cambridge psychologist, James Ward, spiritualist Frederic Myers, spiritualist and co-founder of the theory of natural selection, Alfred Russel Wallace, the novelist and populariser of science Samuel Butler, and the biologist George Romanes. All six were critical of scientific naturalism but they could not accept conventional religion. From the late 1880’s on, Conan Doyle should also be considered a part of that group. He too was caught “between science and religion.”

The move away from scientific naturalism at the end of the 1880’s created a new set of intellectual tensions for Conan Doyle. These tensions manifested themselves in his writing. Conan Doyle wrote about the odd and the bizarre in some of his early fictional works. According to Tietze, his stories about monsters and ghosts in these works revealed a conscious intention to create an uncertain world in which ghosts might exist and in which the convictions of modern science might be inapplicable (Tietze, “Other Worlds Part One”; “Other Worlds Part Two”). Conan Doyle’s interest in the supernatural eventually found its way into a Sherlock Holmes story. The first installment of The Hound of the Baskervilles appeared in the August 1901 issue of the Strand Magazine. This was the first time that Conan Doyle had written about Holmes in eight years. The last time the readers of the periodical had seen Holmes was in “The Adventure of the Final Problem” (1893), where he had supposedly died while locked in mortal combat with Professor Moriarty (Frank 154). In his Hound of the Baskervilles, Conan Doyle focuses the entire novel on a supernatural theme. The mysterious circumstances surrounding the death of Sir Charles Baskerville raise the possibility that a spectral hell-hound is haunting the Devonshire moors.
Dr. Mortimer, a doctor and close friend of Sir Charles, is reluctant to reveal to Holmes that he believes that something supernatural is afoot. Mortimer saw the footprints of a gigantic hound near Sir Charles’s body, but he withheld this information fearing that it would damage his reputation. “My motive for withholding it from the coroner’s inquiry,” Mortimer explained to Holmes, “is that a man of science shrinks from placing himself in the public position of seeming to indorse a popular superstition.” Holmes chastises Mortimer for failing to call him in immediately so he could inspect the crime scene. But Mortimer replies, “there is a realm in which the most acute and experienced of detectives is helpless.” When pushed by Holmes, Mortimer refuses to admit that he is referring to the supernatural. But he points to the occurrence of “several incidents, which are hard to reconcile with the settled order of Nature.” Local peasants have reported seeing a huge, luminous, ghastly creature. The doctor cross-examined those who saw the creature and believed them to be reliable. Holmes remained unconvinced. “And you, a trained man of science,” he asks Mortimer, believe it to be supernatural?” Mortimer tells Holmes that he does not know “what to believe.” Later, when Holmes is discussing Mortimer’s statements with Watson, he tells his loyal friend that if Mortimer is correct that a supernatural being is involved then “we are dealing with forces outside the ordinary laws of Nature, [and] this is an end of our investigation. But we are bound to exhaust all other hypotheses before falling back upon this one” (The Hound of the Baskervilles 410, 418-419, 428). According to Holmes, all detective work – indeed, all science – comes to an end if the supernatural exists. Holmes, like Huxley and Tyndall, refuses to believe in the reality of a supernatural event because it destroys science.

Watson shares Holmes’s position, at least at first. Holmes claims he is too busy with other cases to go to Devonshire and he sends Watson with Mortimer and the young heir to the Baskerville fortune to conduct an investigation. While on his own, Watson attempts to use Holmes’s methods to uncover the truth. When Miss Stapleton, who lives near Baskerville Hall, warns Watson about the hound, he tells her “I do not believe in such nonsense.” But later Watson hears the moans and howls of an animal on the moor and the next day he feels an indefinable sense of “impending danger.” Watson tries to reason out why he has such a feeling. He reviews “the long sequence of incidents which have all pointed to some sinister influence which is at work around us.” There is the death of Sir Charles; its fulfillment of the condition of a family legend; sightings of a strange creature on the moor; and the eerie sounds of a baying hound that Watson had heard himself. “Holmes would not listen to such fancies, and I am his agent.” Watson reminds himself. “But,” as Watson struggles to retain his rational approach to the case, “facts are facts, and I have twice heard this crying upon the moor” (487, 521-22). Despite his admiration for Holmes’s scientific methods, and his own medical training, the evidence that points towards the existence of some supernatural demon shakes even Watson. Without Holmes there to reinforce Watson’s commitment to scientific naturalism, Watson is slowly moving towards Mortimer’s position. Watson, like Mortimer, is caught between science and religion. The Hound of the Baskervilles is concerned with the tension between rational and supernatural explanations, and, although Holmes eventually explains the gothic mysteries empirically, the supernatural theme is clearly more interesting and seductive in the story. In 1901 Holmes is still depicted as being a scientific naturalist. But by then his creator was raising questions about scientific naturalism as a fully satisfying philosophy of life.

If the character of Sherlock Holmes was an embodiment of scientific naturalism, and of Conan Doyle’s earlier thinking during his time as a medical
student, and he later found himself caught “between science and religion,” then could there be a connection between his determination to kill off the detective in 1891 and his joining of the Society of Psychical Research two years later? (Lycett 200, 204). Was his wish to be done with Holmes an indication that the Sleuth of Baker Street reflected a narrow scientific worldview that he no longer agreed with? Conan Doyle scholars have shown that he wanted to kill off Sherlock Holmes because it became increasingly difficult to come up with new plots and because he saw the detective genre as “a lower stratum of literary achievement” (Conan Doyle, Memories and Adventures 99). Conan Doyle wanted to spend his time writing historical novels, plays, and poems (Stashower 84). On November 11th, 1891, Conan Doyle wrote to his mother that he was thinking of “slaying Holmes [. . .] and winding him up for good and all. He takes my mind from better things” (Lellenberg, Stashower and Foley 300). In the end, writing Holmes stories may have become too lucrative for Conan Doyle to give up (Lellenberg, Stashower and Foley 510, 512, 514). But the scientific naturalism that originally inspired the creation of the character became increasingly at odds with Conan Doyle’s fascination with spiritualism.
Notes

1. The author would like to thank two anonymous referees for their helpful suggestions, which led to significant revisions that considerably strengthened the article. The author is also grateful to Cliff Goldfarb for sharing his broad knowledge of Conan Doyle. Versions of this paper were presented at the British Society for Literature and Society at the University of Surrey in April, 2014, and as the Cameron Hollyer Memorial Lecture to the Friends of the Arthur Conan Doyle Collection in May, 2013.

2. Not that Thomas ignores detective fiction’s link to the sciences (see Thomas, Detective Fiction, 237). But his main focus is on the forensic devices that enable the detective to read the clues to mysteries written in the body of suspects and victims.

3. Although Frank emphasises Lyell and Darwin, he acknowledges the roles of Huxley, Tyndall, and Spencer. His discussion of how Conan Doyle picks up on Tyndall’s notion of the scientific use of the imagination is interesting, though the evidence is not fully convincing. However Frank argues that the nebular hypothesis was particularly important for Conan Doyle, and that this can be traced back to his reading of Winwood Reade’s Martyrdom of Man (1872), as well as to his engagement with the works of the scientific naturalists. But the nebular hypothesis was never a key scientific theory for Huxley or Tyndall (see: Frank 134, 182).

4. I am indebted to Cliff Goldfarb for drawing this article to my attention.

5. The epigram reads: “Une marque plus sûre que toutes celles de Zadig.” Translated, it means, “An observation more reliable than all the ones made by Zadig.” My thanks to Danielle Beausoleil for providing the translation.

6. Huxley’s positive reference to Cuvier is somewhat curious. Cuvier was a well-known anti-evolutionist.

7. In his The Name of the Rose, Umberto Eco draws upon the story of Zadig at the beginning of the “First Day,” when Brother William of Baskerville deduces the whereabouts of a lost horse (31-33). My thanks to Cliff Goldfarb, who pointed this out.

8. I am not the first scholar to notice the link between Huxley’s essay on Zadig and how Conan Doyle envisions Holmes’ superior deductive abilities. In a short article on “Huxley, Holmes, and the Scientist as Aesthete,” Phyllis Rose argues that the method of Zadig discussed in Huxley’s essay “was precisely the method which Sherlock Holmes was to follow when his fictional adventures began in 1886.” However her main point is that Conan Doyle was parodying Huxley’s account of scientific method, which emphasised, she claims, the idea of a common sense possessed by all humans. Holmes’ conception of the ideal detective goes far beyond the possession of common sense, and Conan Doyle’s success with Holmes depends on convincing his readers that the sleuth of Baker Street’s abilities are magical and extraordinary. Rose misinterprets Huxley, who argued that common sense was not enough. Only through training could common sense be developed into expertise. Rose also misses the significance of the link to Cuvier. However Lycett does not. He points to the “The Five Orange Pips,” and asserts that in Holmes’ discussion of deduction Conan Doyle was drawing on his knowledge of Cuvier. “If he had not read Cuvier himself,” Lycett declares, “he was probably directed to him by Thomas Huxley, who dubbed the Frenchman’s approach ‘the method of Zadig’ (see: Rose 22-23; Lycett 125). Jonathan Smith points to the connection between Conan Doyle, Huxley and Zadig in his argument that the underlying intention of the Holmes stories was to
popularise scientific method (see: Smith 214, 228). The historian of science Adrian Desmond refers to Huxley, Holmes, and Zadig in a throwaway line near the end of his biography of Huxley. He characterises Sherlock Holmes as the “apotheosis of Zadig’s clinical detective, the scientist-sleuth as a ‘fictional superman’” (see: Desmond 643). Although she does not discuss Zadig, Snyder explores the Huxley, Cuvier, Holmes link (see: Snyder 104).

9. A slightly abridged version of the article by Bell was later used as an introduction to A Study in Scarlet (see: Doyle, A Study in Scarlet). I am indebted to Peggy Perdue, Librarian, Arthur Conan Doyle Collection, Toronto Public Library, for helping me to locate the earliest publications of Bell’s article.

10. Another explanation for Conan Doyle’s misunderstanding of Huxley, beyond Huxley’s own confused message, is the novelist’s lax attitude to reading popular science. As McDonald has pointed out, Holmes’ “theoretical exposition of his scientific methods itself amounts only to an incoherent, even contradictory, store of alluring maxims.” Although Conan Doyle’s interest in science may have been strong, he did not always understand it (see: McDonald 167). I am indebted to Gowan Dawson for bringing this point and McDonald’s book to my attention.

11. For an interesting treatment of Conan Doyle’s attraction to spiritualism, see: Willis, 165-227.

12. I am indebted to Cliff Goldfarb for this reference and the following one.

13. I am indebted to Gowan Dawson for this insight. Frank ignores the significance of the supernatural in The Hound of the Baskervilles. He interprets that elegiac tone of Watson’s narrative as an acknowledgement that the fictional detective offers no satisfactory resolution to the mysteries of life. Darwinian nature, Frank argues, presents only signs of unending change in a universe of chance and necessity (see: Frank 206). However the mood of mystery, despite the revelation that the hound is no demon from hell, can also be seen as a sign of Conan Doyle’s dissatisfaction with scientific naturalism.

14. Lycett agrees with this explanation for why Conan Doyle wanted to kill off Holmes (179).

15. Two months later Conan Doyle wrote to his mother that Holmes still lived thanks to her “entreaties” not to kill him off. But he later wrote to her, on April 6th, 1893, that he was “weary of his name” (Lellenberg, Stashower and Foley 305, 319).
Works Cited


Revolution as an Angel from the Sky: George Griffith’s Aeronautical Speculation

Steven McLean

There will be fights in the air with wind-guns, and bows and arrows.

(Horace Walpole, “On Air-Balloons”)

Heard the heavens fill with shouting, and there rain’d a ghastly dew
From the nations’ airy navies grappling in the central blue;
Far along the world-wide whisper of the south-wind rushing warm,
With the standards of the peoples plunging thro’ the thunder-storm;
Till the war-drum throb’d no longer, and the battle-flags were furl’d
In the Parliament of man, the Federation of the world.

(Alfred Lord Tennyson, “Locksley Hall”)

Though hugely neglected in modern criticism, George Chetwynd Griffith (1857-1906) was an enormously popular author of the 1890s. Griffith shot to prominence when his romance, The Angel of the Revolution: A Tale of the Coming Terror (henceforth Angel), was serialised in Pearson’s Weekly between January and September 1893. In the words of one critic, this archetypal aeronautical romance “attracted more attention than any other story that ever appeared in [. . .] a popular periodical” (Hampshire Advertiser). The Dundee Courier similarly remarked on how “[t]his wonderful story” enjoyed “a most successful career in the pages of Pearson’s Weekly” (6). Following its publication in book form by the short-lived Tower publishing in October 1893, it soon became the first best-selling scientific romance, quickly passing through a number of editions (Moskowitz 18; see also: Stableford). A globe-trotting tale of aerial warfare and world conflict influenced by Jules Verne’s The Clipper of the Clouds (1886) and Edward Bellamy’s Looking Backward (1888), Angel typifies the way in which scientific romance synthesises the elements of adventure, discovery and widespread devastation found in its precursors – the medieval romance, the utopian fantasy and the future war story – with imaginative possibilities suggested by science. Griffith quickly capitalised on Angel’s success by penning a sequel, Olga Romanoff; or the Syren of the Skies (serialised in Pearson’s Weekly between December 1893 and August 1894 and published in book form by Tower in November 1894), in which aerial fleets battle for world domination. Griffith published a further aeronautical story, The Outlaws of the Air, in 1895. Another of his significant scientific romances was A Honeymoon in Space (1901), which follows the adventures of a newly-wed couple who use a spacecraft powered by anti-gravity to tour the solar system and discover that the planets are characterised by different stages of evolution. Griffith was a varied and prolific author whose literary output also included poetry (under the pen name “Lara”), short stories (sometimes under the pseudonym “Levin Carnac”) and adventure novels. He wrote travel narratives too, and urged on by Cyril Arthur Pearson – for whom he was now a staff writer – he proceeded to circumnavigate the globe in 65 days and published an account of his adventures under the title “How I Broke the Record Round the World” in fourteen instalments in Pearson’s Weekly
Griffith’s work has exercised a considerable influence on modern science fiction, most notably on Michael Moorcock and novels in the ‘Steampunk’ tradition. Yet, for all his popularity during his lifetime and subsequent influence, Griffith remains an obscure figure in literary studies. Griffith’s obscurity in academic circles mirrors his displacement in the latter half of the 1890s by the most famous of all authors of scientific romance, H. G. Wells. (Though ironically, Griffith’s commercial success undoubtedly made it easier for Wells to find a niche for his work in a crowded literary marketplace (Moorcock 197).) The demise of Tower publishing and his premature death meant that Griffith’s star soon faded altogether from view. His work is long overdue sustained critical attention, and offers fertile ground for scholars working in the field of literature and science. Though he did not possess Wells’s formal scientific education, Griffith’s work for Pearson undoubtedly made him aware of developments in science and technology. For example, he interviewed the inventor of the machine-gun turned aeronautical investigator Hiram S. Maxim about his experiments with aeroplanes for the August 13 1892 issue of *Pearson’s Weekly*. Like Wells, Griffith consistently explores the potential for science to revolutionise human existence while sometimes acknowledging the threat posed to humanity by natural disasters (his short story, “The Great Crellin Comet” (1897) was the first to articulate the idea that human intervention might prevent a comet colliding with the earth and to introduce the notion of a ten-second countdown). Indeed, Griffith’s preoccupation with aeronautics – which is particularly evident in *Angel* – reminds us of the need for literature and science to broaden its compass and investigate those sciences (and technologies) that have received little critical attention from scholars working in the field. As well as being Griffith’s best work, *Angel* most invites renewed study, not least because it contains a plethora of *fin de siècle* preoccupations, including apocalypse, a hint of millennialism and the promise of regeneration. Central to the story’s plot is a young English inventor’s discovery of a solution to the problem of aerial navigation. Set in the near future (this 1893 romance commences in 1903), the narrative follows the adventures of the so-called Brotherhood of Freedom, a band of socialist revolutionaries led by the mysterious Natas, as they strive to use a fleet of newly invented airships to end capitalist oppression amid a cataclysmic world war between the Anglo-Teutonic Alliance (Britain, Germany and Austria) and the Franco-Slavonian League (France, Russia and Italy). The protagonist, and inventor of these aerial marvels, Richard Arnold, is especially motivated to accomplish this great deed by his desire to win the hand of Natasha, the angel of the romance’s title. Griffith’s conception of a secret society emerging to use aeronautical technology to enforce a new world order is undoubtedly original. Yet his portrayal of aerial navigation and world revolution is deeply immersed in aeronautical speculation.

The cultural history of aeronautics – and more especially balloons – is the subject of a number of recent studies (see: Keen; Brant; Holmes). There has, however, been very little work that specifically investigates the relationship between literature and aeronautics. The dominance of Darwinism in discussions of nineteenth-century literature and science has undoubtedly obscured the contemporary importance attached to the emergence of disciplines like aeronautics. Another possible cause of its omission is the perception that aeronautics is a technology rather than a science. In the
introduction to their collection of essays on *Literature and Technology*, Mark L. Greenberg and Lance Schachterle argue that technology has been neglected in literary studies because, unlike “science” and “art,” it is not considered to occupy the realm of “pure knowledge”: “The reason for this lack of attention to technology, we think, lies in the Arnoldian identification of technology with craft or skill – learned practices with measured objectives, rather than with the open-ended pursuit of pure knowledge for its own sake, as in science” (15). The OED defines aeronautics as “the science or practice of building or flying aircraft” – it is both a science and a technology and might thus be posited as an ideal discipline of study in terms of breaking down any lingering hint of the hierarchal division identified by Greenberg and Schachterle.

Once subject to ridicule and accusations of irrelevance (particularly in the immediate aftermath of the balloon’s invention in 1783), by the late nineteenth century aeronautics was (in the minds of many) poised to revolutionise the world. The possibility of directed flight promised to irrevocably alter transportation. Indeed, some observers insisted that aeronautics was about to supplant railways, and that, for example: “The Londoner of the future will go down to his Business in the City, not in a stuffy compartment of an underground railway train [. . .] but will be wafted rapidly and noiselessly to his destination on the wings of the wind” (Vane, 303). As the passage from Tennyson’s “Locksley Hall” cited in the epigraph confirms, aeronautics had long been a key feature of the Victorian preoccupation with the future. (It seems wholly appropriate that the word aeronautics literally means “sailing through the atmosphere,” since the analogy between aerial navigation and maritime travel was commonplace during the nineteenth century.) Aeronautics is a persistent feature of late-Victorian speculation on the future of warfare. Indeed, a successful ‘flying machine’ was regarded as the most important imminent development in warfare, since a nation in exclusive possession of it could impose its will on others – thus marking the beginnings of the now familiar association of ‘air superiority’ with political influence. At the same time, though, aeronautics was seen as a potential catalyst for global peace, since it was thought that in transcending national territories controlled flight would foster mutual understanding. Indeed, the somewhat utopian hopes attached to aeronautics suggest parallels with the telegraph, another Victorian technology expected to facilitate globalisation and harmony.

What little work specifically investigates the literary response to aeronautics tends to focus on how fiction reflects developments in flight (see: Paris; Goldstein). What is required, however (especially in relation to the late Victorian era), is the emphasis on the reciprocal relationship between literature and science popularised by Gillian Beer. Once examined in the context of aeronautical developments, *Angel* assumes a whole new importance. Indeed, Griffith’s scientific romance is the most sustained and influential of all literary engagements with late-nineteenth century aeronautics.

This article examines how *Angel* contributes to discussions about aeronautics conducted in the periodical press and scientific publications more generally. (The importance of the periodicals as a context for understanding Griffith’s romance is confirmed by the fact that the romance’s protagonist Arnold has published on aerial navigation in the *Nineteenth Century.*:) Griffith’s depiction of heavier-than-air airships appropriates the principles of experimental heavier-than-air mechanisms like Gustave de Ponton d’Amécourt and Gabrielle de La Landelle’s hélice. Griffith also draws on the Scottish naturalist J. Bell Pettigrew’s account of the model provided by natural flight and on the aeroplane experiments of Samuel P. Langley and Maxim. The article demonstrates that, rather than merely appropriate the principles demonstrated by the
aforementioned researchers for verisimilitude, Griffith assesses the merits of different heavier-than-air mechanisms and even suggests the most likely means of accomplishing controlled flight given the constraints of current technology. The analysis further investigates how Angel adds to speculation on the potential for controlled flight to revolutionise warfare and instigate radical social and political change. Angel modifies the invasion fiction genre established by George Chesney’s The Battle of Dorking (1871), making aerial technology – or, more specifically, the French-invented war-balloons, a second solution to the problem of aerial navigation envisaged by Griffith – the key innovation enabling an invasion and occupation of southern England. The article relates the romance’s depiction of the war-balloons to discussions of the potentially devastating impact of the dirigible on war – and more especially to periodical speculation on the potential for a combination of the navigable balloon and submarine to cripple a nation’s coastal defences. The even more destructive capacity of the Brotherhood’s airships is informed by Maxim’s conjecture on the use of the aeroplane in warfare. The discussion relates Griffith’s portrayal of aerial combat between the airships and war-balloons to the influence of Verne’s The Clipper of the Clouds. Angel continues – and is in fact the culmination of – a nineteenth-century literary tradition in which aeronautical inventions symbolise revolution and the end of tyranny and poverty. The analysis examines how the socialist utopia enforced by Arnold’s airships incorporates late-Victorian proposals designed to eradicate both extreme poverty and excessive wealth, specifically schemes for land nationalisation and graduated taxation. Other fictions before Angel had explored the potential for a particular nation or group to use ‘flying machines’ to enforce its political will, notably Tom Greer’s A Modern Daedalus (1885). Yet – as this discussion shows – Griffith’s portrayal of an inherently superior Anglo-Saxon race conflicts with his emphasis on internationalism. Angel demonstrates the important role of popular fiction in raising the public consciousness of the potential of aeronautics, thus creating support for funding of aeronautical research. Indeed, as the article reveals, the text implicitly argues that State funding of aeronautical research is imperative if Britain is to maintain its global imperial hegemony and stave off the threat of aerial invasion.

During the so-called ‘balloonomania’ of the late eighteenth century, numerous attempts were made to steer balloons using paddles or wings. Yet the continued absence of any means of guiding the balloon led to a growing conviction in the second half of the nineteenth century that controlled flight could only be accomplished via a heavier-than-air mechanism. As one article from 1867 put it, “if ever aerial navigation is to assume practical importance, it must be through the agency of some mechanism more manageable and less liable to derangement than an enormous bag filled with a material that has the greatest aptitude for escaping through the minutest pores” (“Flying Machines” 270). The achievement of Henri Giffard and others in constructing dirigibles that returned to their point of origin under favourable conditions meant that proponents of lighter-than-air flight maintained the balloon would prove capable of being steered in normal winds. Heavier-than-air advocates emphasised that neither the balloon nor the buoyancy associated with it had any analogue in nature and that – although light – flying creatures are heavier than the air they displace and control (rather than being controlled by) the wind.

Griffith’s depiction of Arnold’s airships draws on reports of experimental heavier-than-air mechanisms and research on natural flight. A key moment in the emergence of a sustained late-century preoccupation with heavier-than-air flight occurred in 1863 when the Frenchman Gaspard-Félix Tournachon (popularly known
as Nadar) built a giant balloon, Le Géant, which he exhibited to raise funds for a heavier-than-air mechanism. Nadar was part of a group of heavier-than-air enthusiasts with d’Amécourt and La Landelle. Along with La Landelle, d’Amécourt, who is responsible for the word helicopter, made model hélices (or propellers) which ascended into the air by a rotary mechanism. One of d’Amécourt and La Landelle’s models was demonstrated before the Association Polytechnique. According to a report in *Chamber’s Journal* from January 1864, “The screw was made to revolve by means of a spring; and so long as the spring retained its tension, the model worked its way up through the air to the roof of the amphitheatre of the medical school” (38). De Amecourt and La Landelle also made a steam-powered hélice which was photographed by Nadar in 1863. Although there is some disagreement in reports over this model’s effectiveness, the blades at the top rotated in opposite directions. The idea of the hélice was incorporated in La Landelle’s unrealised idea of the steam powered aeronef. As the illustration suggests (Fig. 1), La Landelle’s aeronef uses hélices to ascend perpendicularly and derives its horizontal motion from the aeroplane (there was a recognition that an inclined plane travelling rapidly enough would be supported by the air, with observers making an analogy with the way a kite being pulled quickly along maintains flight because it does not disturb the inertia of the air). If La Landelle’s aeronef seems ship-like, then that is because the analogy between aerial navigation and maritime travel was commonplace in the nineteenth century.

![Fig. 1.](image)  
La Landelle’s Aeronef. Illustration by William Ballingall, from James Bell Pettigrew’s *Animal Locomotion*. Image reproduced by kind permission of The Royal Society.
While aerial navigation was often compared to other forms of transportation, its accomplishment presented an unusual challenge for Victorian engineering. Much progress in Victorian engineering was based on escalating weight, such as making the tonnage of ships greater to allow larger cargos or increasing the size of train engines for improved speeds. The accomplishment of aerial navigation, on the other hand, appeared to necessitate that an efficient heavier-than-air mechanism be as light as possible. The study of natural flight appeared to highlight the necessary characteristics of a successful heavier-than-air flying machine. The combination of lightness and strength secured in the bird’s anatomy suggested to a writer in *Cornhill Magazine* “that it is absolutely essential, that the weight of a machine intended for flight should be as small as may be, due regard being had to strength and completeness” (441–42).

Pettigrew conducted an extensive study of natural flight which forms the basis of his book *Animal Locomotion* (1873) and article “Flight Natural and Artificial” (1881), which summarises his conclusions for a periodical readership. Pettigrew points out that natural wings take the form of inclined planes or true kites: “Wings, to be effective as flying organs, must be made to attack or strike the air as inclined planes and as boys’ kites” (“Flight Natural” 233). Both the kite and the wing are flown in one of two ways: “either by causing their under, oblique surfaces to move rapidly against still air; or conversely, by causing rapidly moving air currents to strike the under, oblique surfaces of the kite and wing, these being more or less stationary” (“Flight Natural” 233). In the autumnal breeze, “the kite is flown principally by the air in motion playing upon its under, oblique surface” and “[i]t is in this way the albatross is flown by the trade winds of the Southern Ocean” (“Flight Natural” 233). Pettigrew stresses that wings, as highly elastic and mobile structures, are “twisted upon themselves [. . .] to form a helice or screw” (*Animal Locomotion* 136).

Unlike the fixed-angle screws employed in maritime navigation, wings are “made to attack the air at a great variety of angles” (*Animal Locomotion* 153). The sheer flexibility and movability of the portions of the wing explain its capacity to seize and utilise air currents: “The wing literally creates the whirlwind on which it rises and progresses, and on which it may be said to ride triumphantly” (“Flight Natural” 234). Pettigrew observes that: “When a bird wishes to fly in a horizontal direction, it causes the under surface of its wings to make a slight forward [upward] angle with the horizon. When it wishes to ascend, the angle is increased” (*Animal Locomotion* 202). He notes that “something like 30° with the horizon [. . .] is the greatest angle made by the wing in flight” (*Animal Locomotion* 177). Pettigrew criticises those aeronautical contraptions that do not embody the principles apparent in nature. Hence, the principle defect of d’Amecort and La Landelle’s hélices is that they “are rigid or unyielding, and strike the air at a given angle” (*Animal Locomotion* 218) – a defect which also characterises the aeroplane designed by William Henson and John Stringfellow. For Pettigrew, the hélice at least possesses the advantage that it, “and the machine to be elevated by it, can be set in motion without any preliminary run” and has “a certain amount of inherent motion, its screws revolving, and supplying it with active or moving surfaces” (*Animal Locomotion* 218). The aeroplane, on the other hand, “must be precipitated from a height or driven along the surface of the land or water at a high speed to supply it with initial velocity” (*Animal Locomotion* 214) and is entirely immobile. Indeed, Pettigrew concludes that the artificial kite is a closer approximation of natural flight than the aeroplane, given its flexibility and the fact the “inclined plane formed by its body strikes the air at various angles – the angles varying according to the length of string, strength of breeze, length

© JLS 2014. Creative Commons CC-BY-NC-ND
Downloaded from <http://www.literatureandscience.org/>
and weight of tail, etc” (Animal Locomotion 214). Pettigrew advocates elastic wings or screws that replicate the flexibility and mobility of natural wings.

Notwithstanding Pettigrew’s objections, Samuel Pierpont Langley and Maxim began their widely publicised aeroplane experiments in the late 1880s. In “The Possibility of Mechanical Flight” (1891), Langley reports how his experiments with small sheets of metal shaped as inclined planes attached to a whirling arm provide experimental verification of the capacity of the air to sustain at great speeds “bodies thousands of times heavier than the air itself” (783). Indeed, the “air can be made to offer support like an elastic semi-solid” to a plane “moving fast enough on it” (785). Langley conveys a somewhat surprising conclusion which applies to a plane in horizontal flight: “the more the speed is increased the less will be the power required to support and advance it, so that there will be an increasing economy of power with each higher speed, up to some remote limit not yet attained in experiment” (785).

Langley is careful to stress that he is not attempting to describe the details of a particular flying-machine, nor is his intention to teach how to steer a horizontal course or descend in safety. However, he is certain the principles “here established for small machines will hold for indefinitely larger ones [. . .] at any rate far enough to enable us to transport, at speeds which make us practically independent of the wind, weights much greater than that of a man”(785). Maxim conducted similar experiments with larger planes and, like Langley, he is confident “that we are within measurable distance of a successful machine for navigating the air” (836).

The potential for navigating the air demonstrated by mechanisms like the hélice and the aeronof (as well as the kite) led to a consensus that heavier-than-air flight would be accomplished as soon as a sufficiently light yet powerful engine was invented. Maxim identifies the absence of an adequate engine as the principal obstruction to the invention of a successful aeroplane: “The reason why all experimenters with aeroplanes have thus far failed, has been because the motors employed to drive them were vastly too heavy in proportion to their weight” (“Progress” 447). Maxim considered the merits of various types of motor including an electrical one, before concluding a modified steam-engine presented the safest means of powering his proposed aeroplane. In 1891 he began construction of an enormous test aeroplane which was designed to run along rails in order to generate the momentum for flight. Maxim’s aeroplane was constrained by an overhead rail designed to prevent it from soaring above the test rig.

Given the consensus that heavier-than-air flight would be accomplished as soon as an adequately light and powerful engine was developed, it is unsurprising that the breakthrough in Arnold’s arduous struggle to solve the problem of aerial navigation occurs when he at last discovers “the true motive power” (3). In order to make Arnold’s discovery of a means of propelling a heavier-than-air airship seem plausible, Griffith makes intelligent use of Maxim’s recognition of the need for a lighter engine. Griffith identifies the same hindrance to early attempts to accomplish heavier-than-air flight: “Like every other inventor who had grappled with the problem, he [Arnold] had found himself constantly faced with that fatal ratio of weight to power” (3). Having been informed that previous attempts to attain heavier-than-air flight failed because the motors employed were vastly too heavy, the reader is more inclined to accept that Arnold’s lighter engine (which does away with “all the ponderous apparatus of steam and electricity” (3)) succeeds. Griffith evades the empirical need to explain the secret of his protagonist’s motive power by having Arnold refuse to disclose the composition of the two gases that fuel his invention.
As Arnold makes explicit, his airship combines the principles “of the aeronef and the aeroplane” (42). Arnold refers to how the aeronef “reached its highest development in Jules Verne’s imaginary ‘Clipper of the Clouds’” (42). Influenced by Robur’s helicopteral Albatross, Arnold’s mechanisms ascend by utilising the principles demonstrated by d’Amécourt and La Landelle. Similar to d’Amécourt and La Landelle, Arnold exhibits a model of his invention before an expectant audience (the executive of the Brotherhood). Like d’Amécourt and La Landelle’s hélice, Arnold’s model rises toward the roof. Whereas d’Amécourt’s hélice fell to the ground once the energy conveyed to it by the spring had exhausted, however, Arnold’s model strains “hard at the piece of cord which prevented it from reaching the roof” (43), because it is supplied with a constant motive power. The screws Arnold employs are revealingly termed “helices,” with “the centre one revolving in an opposite direction to the other two” (43), recalling the counter-rotating blades of d’Amécourt and La Landelle’s model. With the three hélices on its masts “lift[ing] the dead weight of the ship perpendicularly” and the side-planes “used to regulate the vessel’s flight when afloat” (42), Arnold’s model (and the fleet of airships based on it) is highly reminiscent of La Landelle’s aeronef (Fig. 2).

Fig. 2.

Yet while La Landelle refers to a general notion of the aeroplane, Griffith draws specifically on Langley and Maxim’s accounts to create verisimilitude for his depiction of side-planes. Langley’s notion that the air can made to offer support like a
Semi-elastic solid is explicitly recalled in the description of the first airship, the *Ariel*, as gliding “through the elastic medium in which she floated” (76). During the maiden voyage of the *Ariel*, Arnold remarks that “The paradox of aerial navigation is ‘the greater the speed, the less the resistance’” (71) - thus reiterating Langley’s conclusion that aeroplanes would be more economical to power at higher velocities.

Like the aeroplanes envisaged by Langley and Maxim, Arnold’s airships are (largely) independent of the wind. Indeed, the key confirmation that Arnold has been triumphant in his lifelong pursuit of heavier-than-air flight is provided when his model overcomes a strong breeze entering through the window: “In almost agonised suspense he watched it rise from the floor, float motionless for a moment, and then slowly forge ahead in the teeth of the wind, gathering speed as it went” (4). Griffith’s decision to combine the aeroplane with the aeronef – rather than solely employing an aeroplane like Maxim – is explained by the fact that Maxim does not suggest any practical means of ascending and descending (Langley of course emphasises that he does not propose to resolve these difficulties). Indeed, Griffith has Arnold explicitly emphasise the impracticality inherent in Maxim’s reliance on a rail for his aeroplane to ascend initially: “‘You cannot carry a rail-way about with you, or a station to get a start from every time you want to rise’” (42). By emphasising how the usefulness of Maxim’s contraption is negated by the need for it to gather momentum for flight by running along a rail, Griffith is reiterating Pettigrew’s observation that a significant disadvantage of the aeroplane is the need to supply it with initial velocity on the ground. Like Pettigrew, Griffith identifies an advantage in the way the hélice can ascend without any preliminary run - a benefit that enables the *Ariel* to remain ready “to rise into the air at a moment’s notice” (85) during the hazardous rescue of Natasha from Russia.

Griffith’s portrayal of Arnold’s airships draws directly on Pettigrew’s account of natural flight. Similar to the bird’s wing as described by Pettigrew, the *Ariel* is said to ride triumphantly on “the current created by the vessel herself when flying through the air” (73). It would seem, though, that Griffith refers to the *Ariel* creating its own air currents solely as a matter of creating verisimilitude, since the vessel’s side-planes are “as rigid as a plate of solid steel” (41) and thus lack the plasticity that Pettigrew identifies as crucial to the natural wing’s capacity to seize and utilise the wind. (The rigid aeroplanes of Arnold’s model weigh only “a few ounces” each but are “strengthened by means of wire braces” (41), thus substantiating the Cornhill’s observation that a machine intended for flight should be as light as possible, without compromising strength or completeness. Arnold is able to further economise weight and space when building the full-size airships.) While Griffith’s airships employ the type of rigid screws and planes Pettigrew objects to on the basis that they deviate from the principles apparent in nature, he concurs with the naturalist’s insistence that the wings of an aeronautical mechanism must attack the air at different angles after the manner of the kite and the bird. Hence, Arnold’s air-planes work “on an axis amidships” and can “be inclined either way through an angle of thirty degrees” (41) - a maximum that was undoubtedly determined by Pettigrew’s observation that thirty degrees with the horizon is the greatest angle made by the bird’s wing in flight. Just as the bird increases the angle the underside of its wing makes with the horizon when it wishes to ascend, so Arnold inclines “the planes to their utmost” (122) when he wants the *Ariel* to gain altitude as rapidly as possible. Griffith’s description of the *Ariel* flying “over level plains fifty yards from the ground, like an albatross over the surface of a smooth tropic sea” (108) explicitly recalls Pettigrew’s observation that this large bird is flown (kite-like) by the trade winds of the Southern Ocean.
Arnold’s airships are steered “by a wheel, like the rudder of a sea-going vessel” (43). Griffith makes use of the longstanding analogy between aircraft and seafaring vessels. Like La Landelle’s aeronef, Arnold’s invention is highly reminiscent of a sailing ship (as the illustrations contributed to Griffith’s romance by Fred T. Jane make clear). Indeed, the Ariel is explicitly compared to a ship in port:

In this lay, like a ship in a graving-dock, a long, narrow, grey-painted vessel exactly like a sea-going ship, save for the fact she had no funnel, and that her three masts, instead of yards, each carried a horizontal fan-wheel. (72)

Survivors of the assault on the Kronstadt fortress describe this first airship “as looking more like a flying torpedo-boat than anything else” (98). Like a sea-going ship, the Ariel’s deck comprises “a sort of little conning tower forward, a wheel-house aft, and a deck saloon amidships” (73). The Brotherhood’s fleet of airships is organised along the lines of a conventional navy, employing a series of signals and with Arnold appointed admiral of the air. Griffith even refers to this aerial armada as “A Navy of the Future” in one particular chapter heading (undoubtedly inspired by Tennyson’s reference to futuristic “airy navies” in “Locksley Hall” (1842)).

That the Brotherhood – rather than the British government or some wealthy patriot – provides Arnold with the means to construct his aerial navy reflects contemporary anxieties about the funding of aeronautics in the United Kingdom. Griffith uses his romance to support the contention of many writers that British aeronautical researchers are not adequately financed. One such writer is Fred W. Brearey, who, writing in 1876, concludes that “earnest workers” seeking “the solution of the profoundest problem which ever absorbed the brain-power of aspiring man [aerial navigation] should be encouraged by the wealthy to go on and progress in Aeronautics” (374). Famous balloonist Henry Coxwell applauds the generosity of the French toward aeronautical research before confronting the relative paucity he and other aeronauts experience in Britain: “As ‘a nation of shopkeepers,’ not particularly patronised in matters of research, we, in Great Britain, have had to struggle on under disadvantages, and need not be ashamed of the risks encountered and the results obtained” (534). Maxim similarly notes that the French State has endowed aeronautical experiments and hints that the British government should follow suit: “Such experiments are too expensive to be conducted for any considerable time by private individuals” (“Progress” 448).

There is an acknowledgement that the contraptions proposed by researchers themselves have sometimes added to the public ridicule of aeronautics and made it less likely the science will attract funding. Thus Andrew T. Sibbald notes how: “Over and over again the most absurd contrivances have been represented as sure to achieve success” (297). Sibbald continues by mocking the promises made by the inventors of these absurd contrivances: “A little more money was the only thing required; and, if a sympathising public would only find the funds, blundering enthusiasts promised, and believed, that they would fly like jackdaws from the neighbouring steeple, or soar like eagles far above the haunts of men” (297). As if to counter the perception of the blundering enthusiast toying haphazardly with the problem of flight, Pettigrew emphasises that aeronautics is now “being grappled with in earnest by men of the highest scientific attainments” (“Flight Natural” 239). He points to the establishment of The Aeronautical Society in Britain (founded in 1866) and equivalent organisations in other countries as proof of the serious consideration now being given to the science. Undoubtedly intending to generate public sympathy for the funding of aeronautics,
Pettigrew remarks that while the idea of aerial navigation might appear “[u]topian to the great mass of mankind [. . .] [t]here is nothing supernatural about it. It is simply a very complex physical problem” (“Flight Natural” 246). Indeed, Pettigrew insists that “there is no more difficult or important problem before the world at present” than the subject of artificial flight (“Flight Natural” 239).

The severe deprivation Arnold has to endure in order to conduct his initial research acutely emphasises the scarcity of funding for aeronautics in Britain. Having “devoted himself, soul and body [. . .] to the so far unsolved problem of aerial navigation” (1) for nearly six years, Arnold is precisely the type of “earnest worker” who Brearey insists should be encouraged by the wealthy to go on and progress in aeronautics. Yet the only reward the protagonist’s dedication to the fulfilment of his life’s ambition receives from British society is poverty and isolation. Indeed, the sole reason Arnold was able to conduct research on aerial navigation is that “he had inherited a couple of thousand pounds” from his father (2). That Arnold’s “money melted away in costly experiments” substantiates Maxim’s point that aeronautical trials are too expensive for private individuals to conduct for any length of time (3). Arnold’s early hardship is an extreme instance of the struggle with fate that Coxwell says all aeronautical researchers in Britain experience given the lack of funding. Griffith emphasises how in order to continue his research Arnold has had little choice but to clothe and lodge himself meanly and to deny “himself everything but the barest essentials of life” (3). The effects of his long struggle are apparent in the romance’s opening paragraph, where Arnold is introduced as “a pale, haggard, half-starved looking young fellow [living] in a dingy, comfortless room on the top floor of a South London tenement-house” (1). That the protagonist has been able to discover a solution to the problem of aerial navigation while living “for days on bread and cheese” substantiates Coxwell’s claim that British researchers have been able to achieve significant results in the midst of severe disadvantage (3). The paucity of funding for aeronautics in Britain becomes bluntly apparent as, needing thousands of pounds to realise his invention and about to be evicted, Arnold has nowhere to turn for support. Despite Pettigrew’s claim that the establishment of The Aeronautical Society confirms the problem of flight is being treated seriously, there is no indication that Griffith’s protagonist is able to approach this or any other organisation for assistance. More pointedly, the only answer to his cry of despair at having finally triumphed in his life’s research merely to be confronted by the prospect of “be[ing] turned into the street”– “‘God help me? What am I to do?’”– is “‘the silence of the room and the inarticulate murmur’” coming from the pavement below (4-5).

Griffith hints that the type of prejudice towards aeronautics Sibbald attributes to absurd proposals for flying machines compounds Arnold’s desperate situation. That Arnold fears he could “starve to death before he could persuade any one that there was money” (5) in his invention suggests the failed schemes of “blundering enthusiasts” have made it immensely difficult for serious researchers to appeal for funding. Following Pettigrew, Griffith seeks to redress public misconceptions about aeronautics by emphasising the paramount importance of the subject of artificial flight, even calling Arnold’s solution to this problem “the greatest triumph in the history of human discovery” (106). The hallmarks of Pettigrew’s attempt to create public sympathy for funding aeronautics by emphasising how flight is a complex (though solvable) physical problem rather than a mysterious supernatural occurrence is distinctly apparent as Arnold refutes the suggestion his invention is a “miracle”: “‘It is no miracle, but only the logical result of thought and work’” (58), he says. Griffith encourages public support for endowment of aeronautics by creating sympathy for
Arnold’s plight. Thus despite being on the verge of destitution, Arnold is sustained by a “heroic resolution” (5). Later, Colston praises this “hero of science” for choosing to live in squalor to pursue his dream rather than “grow fat on the loaves and fishes of conventionality” (43). The author stresses how the ingenuity of the protagonist’s invention compares favourably to that of other futuristic innovations portrayed in the romance, like the huge tidal-powered “electric suns” that illuminate the Embankment from Westminster to Blackfriars at night: “He was the maker and possessor of a far greater marvel than anything that helped to make up this splendid scene, and yet the ragged tramps [. . .] were hardly poorer than he was” (9). The implication of this comparison is that, rather than Arnold hurtling toward destitution, his invention should be State funded (or at least supported by benevolent investors for the national benefit) as Angel’s electric lights on the Thames appear to have been. Griffith warns that Britain’s continued failure to provide substantial funding for aeronautics could lead to inventions like Arnold’s being lost to the world, or, more worryingly, poached by an international rival – a possibility suggested by the Tsar’s offer of a million sterling for a craft capable of navigating the air in the manner of a ship at sea. Britain’s failure to back the protagonist’s invention leaves it at the mercy of a potentially hostile power (the Brotherhood’s true intentions remain a mystery to the outside world for much of the narrative – indeed the fact they are known as the “Terrorists” pre-empts more recent disputes about the status of armed revolutionaries) and deprives it of an opportunity to enforce global hegemony through control of the sky.

Aeronautics is an integral aspect of the late-Victorian preoccupation with the future of warfare. Indeed, many thought the accomplishment of controlled flight would prove the key innovation in the warfare of the near future. Angel is substantially engaged with speculation on the potential impact of aeronautics on war and exemplifies the importance of fiction in imagining the horrors of aerial bombardment. Griffith remarks that Arnold’s success in solving the problem of aerial navigation makes “the Brotherhood lords of a realm as wide as the atmospheric ocean that encircles the globe” (44). To readers of the periodical press in particular, this statement would not seem hyperbolic. Indeed, one article from 1886 speculates that a mechanism capable of controlled flight will be “lord of the air” and thus “lord of both the grosser and lower elements, earth and water” (“Aerial Navigation” 455). The Brotherhood does not intend to use its vast arsenal and millions of members around the world to prevent the outbreak of war. Indeed, it provokes the outbreak of war, because a cataclysmic clash between the forces of European militarism will facilitate the Brotherhood’s plan to destroy the very fabric of existing civilisation before it emerges with Arnold’s invention to reorganise the world in favour of the oppressed multitudes.

In the absence of the airships, it is the second solution to aerial navigation depicted by Griffith, the French and Russian war-balloons, that determine the course of the war. The cigar-shaped war-balloons recall William Pole’s observation that the dirigible must be elongated and ship-like if it is to travel through the air (Pole). The idea that balloons might be used to drop explosives on enemy lines had been widely mooted and even tried (unsuccessfully) by Austria in 1849. Blackwoods Edinburgh Magazine’s 1886 article on “Aerial Navigation” mentions the devastating possibilities associated with the dirigible balloon in this respect. It is precisely by dropping dynamite and combustibles into enemy lines that the war-balloons turn battles on the European continent into “butcheries” (191), allowing the Franco-Slavonian armies to march triumphantly across Europe, until only the “silver streak” stands between
Britain and certain invasion. The complacent belief that the war-balloons are unable to lead an assault across the English Channel because “‘their effective range of operations is confined to the land’” (186) further underlines the need for Britain to take aeronautics (and the threat of aerial invasion) seriously.

Griffith modifies the invasion fiction genre popularised by Chesney’s The Battle of Dorking, making aerial technology the key innovation in the invasion and occupation of Britain. Whereas Chesney’s antagonists use vaguely described “fatal engines” (13) to sink the Royal Navy, two specific technological innovations enable the Franco-Slavonian league to disable British coastal defences: the submarine and the war-balloon. The combined destructiveness of the submarine and the dirigible had already been conjectured in the aforementioned Blackwoods article, where the author states that:

There is a weirdness in the methods of attack, both of the submarine boat and of the balloon waging war from out of heaven, which almost shocks the imagination. The former approaches her foe, invisible, possibly at a depth of 50 feet below the surface of the water, until within range for the deadly Whitehead torpedo wherewith she is armed – and after firing which she invisibly retires – while ironclads, mercantile shipping, arsenals, fortifications, and every architectural structure, all will be at the mercy of the aerial monster sailing high out of the reach of harm, and at night invisible, like the Angel of destruction over them. (454)

The assault on the English coast in Angel demonstrates the terrible combined effectiveness of the methods highlighted in this passage. It begins with the war-balloons stationing themselves over fortifications and raining down explosives upon their helpless adversaries. With night fast approaching, the submarines of the French navy join the attack. Sinking to about 20 feet, rather than the fifty estimated by Blackwoods, these “insignificant looking craft” are equipped with searchlights which enable “them to find the hulls of hostile ships in the dark” (298). Like those described by Blackwoods, the French submarines retreat after they launch their torpedoes, “head[ing] away at full speed in an opposite direction out of the area of the explosion” (299).

The notion that ironclads will be at the mercy of dirigibles is substantiated as the war-balloons “soon [. . .] take their part in the work of destruction and death” at sea (299). Griffith introduces an interesting innovation: angled mirrors which enable the crew of the war-balloons to drop dynamite on the most vulnerable part of a ship with deadly precision. That the submarines and dirigibles continue the work of destruction into the night is emphasised as the last warship protecting the British coast is sunk before dawn.

There is considerable overlap between the projected capabilities of heavier-than-air and lighter-than-air mechanisms. Indeed, Maxim’s assessment of the likely application of the aeroplane to warfare reveals marked similarities to Blackwood’s appraisal of the impact the dirigible will inevitably have on armed conflict:

When the first flying-machine succeeds, its first great use will be for military purposes. It will at once become an engine of war, not only to reconnoitre the enemy’s positions, as has been attempted with the so-called dirigible balloons, but also for carrying and dropping into the enemy’s lines and country large bombs charged with high explosives. It does not require a prophet to foresee that successful machines of this character would at once
make it possible for a nation possessing them to paralyse completely an
enemy by destroying in a few hours the important bridges, armouries,
 arsenals, gas and water works, railway stations, public buildings, etc., and
that all the modern means of defence both by land and sea, which have cost
untold millions, would at once be rendered worthless. (“Aerial Navigation”
836)

Given that a perfected dirigible and the aeroplane were both expected to dominate
warfare in near identical ways, it is perhaps unsurprising that the invading war-
balloons have the same decisive impact on warfare Maxim envisaged for the
aeroplane. As well as carrying out aerial reconnaissance, the effectiveness of these
highly advanced dirigibles for dropping explosives into enemy lines is emphasised as
they reduce “the magnificently disciplined and equipped armies of Germany and
Austria [. . .] into fragmentary and isolated army corps” (192) – a tactic repeated when
the war-balloons rain death on the valiant defenders of London. The capacity of the
war-balloons to paralyse an enemy is emphasised by the fact that “[t]he havoc
wrought by the bombardment on the public buildings of the great city had been
terrible” (323). The control over indigenous infrastructure that the war-balloons grant
the invaders is revealed when “[a] chain of war-balloons between Barking and
Shooter’s Hill closed the Thames” (303).

While the war-balloons possess a deadly effectiveness, the airships are the real
“angels of destruction” in the romance. There are indications that Angel continues the
longstanding fascination with the potential of aeronautics to revolutionise
transportation, with the airships able to cross “‘oceans and continents in a few hours’”
(189); Colston is at first incredulous when he learns he is to travel at 120 miles an
hour aboard the Ariel, while the Russian who assists in Natasha’s rescue initially
refuses to believe that Colston has arrived from London in little more than a day. For
the most part, though, the airships substantiate Maxim’s contention that the first great
use of the heavier-than-air flying machine will be for military purposes. Maxim’s
assertion that “[b]ig ships armed with big guns will not be able to protect themselves,
much less the country they belong to, from attack” (“Progress” 449) is recalled as
Arnold predicts no “‘fleet could exist for twelve hours with two or three’” airships
“‘hovering above it’” (24). Whereas the war-balloons cripple warships, the airships
annihilate an entire squadron of them in a mere instant.

Griffith’s depiction of the battles between the airships and the war-balloons is
informed by heavier-than-air advocate Verne’s The Clipper of the Clouds. The
portrayal of the world’s first aerial battle in Chapter 28, “A Skirmish in the Clouds,”
reveals the influence of a passage of Verne’s novel in which Robur demonstrates the
superiority of his airship, the Albatross, to the Go Ahead and all other lighter-than-air
contrivances. In Verne’s novel, the Go Ahead seeks to evade the Albatross by
travelling in a vertical direction, “seeking a zone where she could not perhaps be
reached” (230). Similarly, in Griffith’s romance, the one advantage the war-balloons
have over the airships is the ability to rise to a greater height. The way in which
Colston is able to extract a prisoner by hovering alongside a Russian war-balloon
recalls Robur’s success in forcibly rescuing Uncle Prudent and Phil Evans by
descending next to the helpless aerostat after its envelope has burst. In The Clipper
of the Clouds, the likening of aeronef hunting the aerostat to “the swordfish and the
whale” suggests the potential for the Albatross to pierce the gas envelope of the much
larger Go Ahead (230). In Angel, this potential is fulfilled as the incomparably speedy
airships ram the gas-holders of their slow and cumbersome adversaries (Fig. 3).
Of course, the crucial role the war-balloons play in the Franco-Slavonian conquest of Europe confirms that Griffith is not as sceptical about the potential of lighter-than-air contrivances as Verne. Rather, Griffith’s position is encapsulated in Arnold’s remark that the Tsar is “‘a good deal too cock-sure about these old gas-bags of his, and it’s time to give him a lesson in real aerial warfare’” (209-10): the dirigible of the near future will be an efficient engine of destruction, but will dominate warfare only in the absence of a comparable heavier-than-air mechanism. There is a significant difference between the Brotherhood and the Franco-Slavonian league in terms of the ethics governing the use of aeronautical mechanisms. There were hints of a consensus that balloons and other aerial contraptions should not be used to bombard civilians. Despite the enormous power of its aerial fleet, the Brotherhood is especially careful not to blow “‘perfectly innocent people to pieces’” (80), reserving its wrath instead for the aggressively expansionist French and Russian armies. The Franco-Slavonian League, on the other hand, intentionally uses dirigibles to bombard civilians, as Natas reminds Tremayne: “‘You read this morning in the Times how one of the Russian war-balloons went the night before last and hung in the darkness over a sleeping town on the Austrian frontier, and dropped dynamite shells upon it, killing and maiming hundreds who had no personal quarrel with Russia’” (144). In a chapter excised from the final version, “The Fall of Berlin,” the danger of exposing “the inhabitants of Berlin to the horrors of an aerial bombardment, and the city to probable destruction” prompts the surrender of the German Empire to Russia (Angel, 2012
During the invasion of southern England, the war-balloons set houses and entire towns ablaze. Interestingly, Griffith stresses how the use of (what would now be called) anti-aircraft fire in Dover “was even more disastrous to the town than it was to its assailants” (297). For the remains of the four war-balloons whose envelopes are pierced by fire from Maxim and Nordenfelt guns plunge downwards, detonating their cargo as they strike the earth causing “frightful explosions” which spread death and destruction across Dover: “The emmensite and dynamite tore whole streets of houses to fragments, and hurled them far and wide into the air, to fall back again on other parts of the town, and at the same time the fire-shells ignited, and set the ruins blazing like so many furnaces” (297).

Contemporary reviewers thought the relentless detail Griffith employs in his depiction of warfare excessive. The Dundee Courier commented: “The descriptions of the annihilation of towns and nations gets a trifle wearisome, and the extravagance of these detracts from the value of the story” (6). The Saturday Review, which roundly condemned Angel, declared: “We are sick of reading about blood – and still more sick of Mr. George Griffith – long before we have got near the end” (151). Yet Griffith’s purpose in providing such descriptions is to emphasise the destructiveness and futility of war. Griffith’s anti-war message is eloquently articulated in a passage that describes the aftermath of a major continental engagement:

As the sun rose and shed its midsummer splendour, as if in sublime mockery, over the scene of suffering and desolation, hideous features of the landscape were brought into stronger and more horrifying relief: the scorched and trampled fields were seen to be strewn with unburied corpses of men and horses, and ploughed up with cannon shot and torn into great irregular gashes by shells that had buried themselves in the earth and then exploded. (217)

For Griffith, the horrors of armed conflict must be realised before lasting peace can be attained. Angel was influenced by Bellamy’s Looking Backward, which recounts the oppression fostered by outwardly Christian society and the transition to socialist co-operation. In Angel, the passage from oppressive competition to co-operation cannot be smooth. The social Darwinist “jungle must be cleared” forcibly before the promise of regeneration is realised (145). (Revealingly, the revolutionaries base themselves in Aeria, a utopian paradise untouched by the “struggle for existence.”) The romance’s Apocalypse has definite religious connotations. As Stableford notes (46), Natas is something of a reversed Satan: an avenging angel directing his wrath at those responsible for creating oppression and poverty through their own luxuriance. The vision of an avenging angel is suggested more explicitly by Natasha’s christening the Terrorist flagship “the Ithuriel, after the angel who was sent to seek out and confound the Powers of Darkness in that terrific conflict between the upper and nether worlds” (133). Natas remarks that even Britain, the “‘Mother of Nations [. . .] must pass through the fire’” (147) – suggesting that humanity must be cleansed through a form of purgatory.

With French and Russian forces on British soil, the newly-founded Anglo-Saxon Federation (or International) – formed in North America after the Ring of Capitalists at the centre of the United States government is exposed – launches a counter-invasion of Britain. Tellingly, the romance’s “Armageddon” is precipitated by an aerial signal, as the Ithuriel flashes a blood-red light over Edinburgh, Glasgow and towns in northern England to inform adherents of the Brotherhood to descend on
London by train now the hour of the revolution is at hand. ( Appropriately enough, the signal is operated by Natasha, the angel of the revolution herself.) The airships initiate and lead the assault on the invaders as Griffith imagines the disturbing possibilities associated with virtually unstoppable heavier-than-air mechanisms. Like other aeronautical fictions of the long nineteenth century, Angel emphasises the natural beauty apparent from the sky and the insignificance of human activity when seen from an aerial perspective, such as the instance where innumerable crowds of people are likened to “tiny ants upon the ground” (202-03). Yet Griffith also cleverly emphasises the apparent insignificance of hitherto unimaginably destructive aeronautical mechanisms viewed from the ground, underlined by the fact that none in the Russian camp notices the “twelve little points of shining light hanging high in [the] air over the batteries of the besiegers” (328). Almost instantaneously, however, the significance of these “little points of light” becomes forcefully apparent as the airships flit “hither and thither wherever a battery got into action, and destroyed it before the second round had been fired” (328). Along with the airships, the war-balloons commandeered by the International play an important role in establishing aerial supremacy. Walpole’s half-facetious prophecy that there will be fights in the air with bows and arrows assumes a serious aspect in Griffith’s identification of these archaic instruments as “the strangest weapons that had yet been used in the war” (340). The effectiveness of the “curious anachronism” that is the bow and arrow “amidst the elaborate machinery of destruction evolved by the science of the twentieth century” (340) is highlighted as the occupants of the war-balloons piloted by the members of the International discharge a barrage of arrows at the gas-holders of those still occupied by the invaders:

Considering the apparent insignificance of the means employed, the effects were absolutely miraculous. The explosion of the fulminate on striking either the hard cordage of the net or one of the steel ribs used to give the gasholder rigidity, broke the two tubes full of liquid. Then came another far more violent explosion, which tore great rents in the envelope. The imprisoned gas rushed out in torrents, and the crippled balloons began to sink, at first slowly, and then more and more rapidly, till the cars, weighted with crews, machinery, and explosives, struck the earth with a crash, and exploded, like so many huge shells, amidst the dense columns of the advancing army corps. (340-41)

The full horror of direct aerial bombardment is distinctly evident as Arnold uses a new fire-shell to rain death on his adversaries:

Wherever one fell a blaze of intense light shone for an instant upon the earth. Then this burst into a thousand fragments, which leapt into the air and spread themselves far and wide in all directions, burning with inextinguishable fury for several minutes, and driving men and horses mad with agony and terror. (335)

Under such an intense aerial barrage and with Federation troops closing in, the Russian army is completely annihilated. ( The dominance of the airships over other, earth-based, new technologies is emphasised when the Ithuriel destroys a detachment of French submarines with casual ease.) The danger posed by Arnold’s airships is not restricted to the rank and file. Maxim’s assertion that the aeroplane will make warfare
“quite as dangerous and disagreeable to the rulers themselves as to the common soldier” (“Progress” 449) is recalled as Generals le Gallifet and Cosensz hold a council of war aware that “[e]ven the building in which the council was being held might be shattered to fragments at any moment by a discharge of their [the airships’] irresistible artillery” (347). Griffith emphasises his conviction that the next war will end war by making even leaders of nations denounce mechanised conflict. Maxim’s belief that war will cease “when all the great nations find out how to fly successfully” (449) is invoked as General le Gallifet renounces warfare: “‘I have seen enough of modern war, or, as I should rather call it, murder by machinery, for such it only is now. They spoke truly who prophesied that the solution of the problem of aerial navigation would make war impossible’” (370).

The conspicuous part Arnold plays in the world revolution enables him to attain his “heart’s desire” and marry Natasha (384). Barbara Arnett Melchiori points out that Angel is “a variant of the chivalric quest motif of the medieval romance” (140). The protagonist of the medieval romance undertakes an extraordinary quest. The knight’s love for his lady is an important aspect of medieval romance, and the hero’s triumph benefits his race. Arnold, as “the central hope of the revolution” (53), is the pivotal figure in the Brotherhood’s quest for peace. His duty towards the Brotherhood is inextricably bound with his love for Natasha, a peerless beauty who can be won only by “great deeds” (53). Arnold is able to accomplish such deeds because he is “armed with almost supernatural powers” (55) (traces of the magical and supernatural elements found in the medieval romance are apparent in the description of the Ariel as a flying demon and in Colston’s feeling that “he had been suddenly transported into fairyland” after stepping onto its deck (76)). He is then able to claim his right to marry Natasha. Arnold’s deeds benefit his nation and race, and are crucial to establishing an Anglo-Saxon world federation.

One problem Griffith creates for himself in the establishment of a global federation is that he assumes its leaders will not abuse their power. As Melchiori points out, internationalism is another problem for Griffith, since “[i]n theory he accepts it, but in practice he is very strongly pro-British” (142). Griffith’s internationalism is emphasised as Arnold’s Englishness is described as “nothing but the accident of his birth” (226). He resists Eurocentrism by locating the Brotherhood’s base in Africa. Yet Griffith undercuts his own emphasis on internationalism by making the Anglo-Saxon race the dominant factor in the new world order. Thus the new European constitution recognises “the supremacy of the Anglo-Saxon Federation in all matters of international policy” (386). This statement reveals the further probable influence of Maxim, who foresees the emergence of a “congress of nations” at which “the Anglo-Saxons, on account of our immense numbers, our vast possessions, and our enormous wealth, will be permitted to occupy a front seat” (“Progress” 449). The dominance of the Anglo-Saxon race Griffith portrays is such that even outsiders recognise the superiority of the “mother race.” Hence Natas abdicates power in favour of Tremayne, “‘the flower of this splendid race’” (146), while Mazanoff, a Russian “‘without a drop of English blood’” in his veins, looks “‘upon the British race as the real bulwark of freedom’” (312). For the archaeologist John McNabb, Angel is about “race war and Social Darwinism,” with the Anglo-Saxons having “earned their destiny as the pre-eminent race in Europe” (314).

That it requires the Brotherhood to gift the “mother” country of the Anglo-Saxon race the means to dominate the globe encapsulates Griffith’s emphasis on the need for Britain to invest in aeronautical research. Maxim makes explicit his belief
that Britain should focus on the heavier-than-air mechanism to excel the French (a nation he identifies as master of the dirigible) in aerial navigation:

If we in England wish to excel the French in aerial navigation, I think we should turn our attention to the aeroplane, which alone is capable of being driven through the air at a speed which makes it independent of the wind, and which if driven at such a speed will lift and carry a load quite equal to that of the so-called “dirigeable” balloon. Complete success may be a long and expensive task, and all the points necessary to success may not be the work of any one man, but I do believe that a staff of engineers and scientists could be found among the Anglo-Saxon race, without going outside of England, who, if provided with unlimited means, could produce a machine a machine that would actually fly without a gas-bag, and in much less time than it took the French engineers to evolve their present “dirigeable” balloon, and render it quite as unsafe to attempt the invasion of England through the air as it is now by water. (448-49)

Maxim’s dictum is substantiated in so far as it is a young Englishman who invents the heavier-than-air mechanisms that drive the French-invented war-balloons from British soil (as if to emphasise Maxim’s point that the performance of the dirigible can be affected by wind, the progress of the war-balloons across Europe is – albeit temporarily – impeded by a succession of violent storms and gales). The implicit message conveyed in Angel, however, is that had it not been for the unlimited means made available to Arnold by the Brotherhood, Britain would have been left at the mercy of its aerial invaders. Hence depicting an aerial invasion of southern England occurring in the near future is Griffith’s most forceful way of impressing on his popular readership the urgent need for Britain to invest substantially in talented aeronautical engineers and scientists like Arnold. As David Trotter puts it, “Without airships, Britain and Germany would have been defeated; without the Brotherhood, there would have been no airships” (173).

The Pax Aeronautica established with the protagonist’s invention is essentially utopian socialist in character. Angel continues – and is in fact the culmination of – a nineteenth-century literary tradition in which aeronautical innovation acts as a catalyst for freedom from want and oppression and the establishment of world peace. Griffith’s indebtedness to Tennyson’s “Locksley Hall” in his depiction of a new world order is acknowledged by the reviewer in the National Observer, who remarks on how the potency of the airships makes the act of “establish[ing] the Parliament of Man, the Federation of the World [. . .] the work of a moment” (668). Another possible influence on Griffith’s socialist Federation is Victor Hugo. In his “Letter on Flight” (1864), Hugo speculates on the benefits that navigable flight will bring to the human race: “Armies will vanish, and with them the horrors of war, the exploitation of nations, the subjugations of populations. [. . .] It will bring a sudden golden dawn, a brisk flinging open of the ancient cage door of history, a flooding in of light. It will mean that liberation of all mankind” (qtd. in Holmes 175). The Federation essentially fulfils Hugo’s prophecy, having successfully “plotted the destruction [. . .] of a civilisation and a social order that it had taken twenty centuries to build up” and ushering in a new enlightened era (45). Armies are disbanded, warships are consigned to the bottom of the sea and “the fleet of air-ships [. . .] remain[s] the sole effective fighting force in the world” (391).
The new world order established in *Angel*’s final chapters is highly characteristic of the late-Victorian political utopia. As well as abolishing all laws which are difficult to understand, the Brotherhood implements two key measures to eradicate the gulf between excessive wealth and grinding poverty. As with Bellamy’s *Looking Backward*, land nationalisation is an essential characteristic of the future landscape. In his “Land Nationalisation” (1892), Clement M. Bailhache argues that land ownership conflicts with the paramount right of every human being to live. Land nationalisation would destroy “the undue wealth and grinding poverty, which are a perpetual menace to the happiness of men and the safety of society” (517). Bailhache stresses that land should be reserved “for all who want to occupy and cultivate” (515). In *Angel*, the soil of each country becomes “the sole and inalienable property of the State” (387). Furthermore, “the only rights to the possession of it that will be recognised [by the Federation] will be occupation and cultivation” (368). Echoing figures like Bailhache, Tremayne remarks how “Experience has shown that the holding of land for mere purposes of luxury or speculative profit leads to untold injustices to the general population of a country” (368). The Federation also imposes progressive taxation rising to fifty per cent on incomes reaching £10,000 a year, recalling proposals for progressive taxation like John Robertson’s “A Scheme of Taxation” (1886). Those subject to increased taxation are offered the chance to undertake equivalent work in the community, but, without exception, agree to pay the tax. Griffith’s vision of world free of oppression and poverty found support in the *Dundee Courier*, which noted that “the story somehow suggests an undercurrent of truth,” since: “Everything in these fin-de-siècle days points to the sore need of some power that is to sweep from the face of the earth the tyranny, the sin, the selfishness of the few in power under whose yoke the multitude groan” (6).

Griffith’s radicalism is seemingly confirmed when he depicts an English king abdicating his throne because he concludes being an English gentleman under an Anglo-Saxon Federation is preferable to being monarch of an invaded country. Yet Griffith undercuts his own radicalism and emphasis on equality by endowing the leaders of the revolution with inherently aristocratic characteristics. Arnold is described as “an aristocratic and decidedly good-looking man” (17), while Louis Holt, the discoverer of Aeria, greets the members of the Brotherhood with “a well-bred gesture” (125) and gives them tours of the colony “as though it were a private estate to which the[y] [. . .] had come by his special invitation” (134). Treymane’s noble ancestry is said to make him incapable of dishonesty and his wife, the daughter of a Cornish nobleman, is “alike by lineage and nature” (150). So readers might detect a conservative element to Griffith’s portrayal of a social revolution led by the aristocracy.

George Griffith’s *The Angel of the Revolution*, then, assumes a renewed significance examined in the context of late-nineteenth century aeronautics. Griffith makes intelligent use of aeronautical speculation in order to create verisimilitude for his protagonist’s discovery of a solution to the problem of aerial navigation. Griffith does not merely appropriate contemporary aeronautics to create verisimilitude, however. Rather he uses fiction to intervene in debates concerning the means to accomplish aerial navigation. Though clearly influenced by Maxim and Langley, Griffith identifies the difficulty inherent in enabling the aeroplane to take off and land. Hence the author suggests that – granting the invention of a sufficiently light yet powerful engine – combining the aeronef and the aeroplane is the most probable means of accomplishing aerial navigation with current technology. While Griffith departs from Pettigrew’s insistence that artificial wings must incorporate the elasticity
of their natural counterparts, he concurs with the naturalist’s resolve that the inclined planes of aeronautical contraptions need to attack the air at various angles. *Angel* affirms the importance of popular fiction in imagining the horrors of aerial bombardment. By showing how the war-balloons and the airships have a comparable impact on armed conflict, Griffith implicitly intervenes in debates between advocates of lighter-than-air and heavier-than-air flight – suggesting that both types of mechanism will be realised in the near future, but that the latter will manifest a distinctive advantage in aerial combat given its speed, manoeuvrability and independence from the wind. For his portrayal of aerial combat between the war-balloons and airships, Griffith is indebted to Verne’s *The Clipper of the Clouds*. By emphasising how Arnold’s remarkable invention is almost lost to the world because this nearly destitute investigator has nowhere to turn, Griffith underlines the urgent need for Britain to provide substantial funding for aeronautics. Indeed, his text implies that the invasion of Britain could have been avoided had Arnold’s project been funded by the British State. Though curiously Anglo-Saxon, the “Pax Aeronautica” established by the newly-founded International Federation is the culmination of a nineteenth-century literary tradition in which aeronautical innovations act as a catalyst for world peace and freedom from want and oppression – a tradition encapsulated in Tennyson’s “Locksley Hall” and Hugo’s “Letter on Flight.” Griffith’s world federation is clearly socialist and incorporates late-Victorian proposals for land nationalisation and graduated taxation. Yet, for all his emphasis on the need to create equality through schemes to redistribute wealth, Griffith perhaps undercuts his own radicalism by making the leaders of the revolution inherently aristocratic. Overall, with its deep engagement with contemporary aeronautics and portrayal of a world transformed by controlled flight, George Griffith’s *The Angel of the Revolution* deserves to wing its way into the modern critical consciousness.
Notes

1. For more on the publishing history of *Angel* and on the scant details of Griffith’s life, see Sam Moskowitz’s Critical Biography.

2. Griffith’s influence is apparent in the Aerial Board of Control represented in Rudyard Kipling’s stories, “With the Night Mail” (1905) and “As Easy as ABC” (1912) and in the Basra airmen of H. G. Wells’s *The Shape of Things to Come* (1933).

3. Edward Douglas Fawcett’s *Hartmann the Anarchist* (1893) is another significant late-century engagement with aeronautics, and the serialisation of Fawcett’s romance overlapped with *Angel*’s. However, *Angel* is the more complete engagement with aeronautics, not least because it depicts political transformation effected through aeronautical invention (Hartmann’s plot to enforce anarchism is foiled).

4. Langley’s conclusions were summarised for British readers in an article on “Artifical Flight” published in the *Saturday Review*.

5. Natas refers to Tennyson’s “Crossing the Bar” (1889) in a discussion with Tremayne.

6. There were, of course, wider anxieties about the funding of science in nineteenth-century Britain. As Martin Willis points out, the Devonshire Commission on the State of science proved that: “Britain’s European counterparts – most significantly Germany and France – held the same values as the British but also supported their scientists through state funding” (210).

7. Griffith’s fascination with submarine warfare forms the basis of his 1901 short story, “The Raid of Le Vengeur.”

8. Significantly, *The Portsmouth Evening News* of 25 November 1893 uses Griffith’s war-balloons as a point of reference in assessing a report detailing the construction of a dirigible - armed with “bombs [which] have been prepared for its special use” and powered by “an electric motor by means of which the balloon, it is said, can be steered perfectly” – for use against insurgents in Brazil. The newspaper remarks that “[a] few weeks ago this [report] might have been taken for the commencement of a chapter in ‘Hartmann, the Anarchist,’ or ‘The Angel of the Revolution,’” but “[t]oday we are asked to accept it as a sober fact” (2). While no evidence suggests this dirigible succeeded (claims exaggerating the success of navigable balloons were commonplace), fact eventually imitated fiction when German Zeppelin and Schütte-Lanz airships began bombing raids against Britain in the First World War.


10. As Richard Holmes points out (175), there is a certain naivety in the assumption that controlled flight would lead necessarily to the liberation of all mankind, particularly since many would argue it has led to the subjugation of some nations by others. Another globalising technology believed to act as a catalyst for global peace was the telegraph. In his study, *The Victorian Internet*, Tom Standage points out how Sir John Pender “suggested that telegraphy had ‘prevented diplomatic ruptures and consequent war, and been instrumental in promoting peace and happiness [. . .] no time was allowed for the growth of bad feeling or the nursing of a grievance. The cable nipped the evil of misunderstanding leading to war in the bud’” (149).

11. Interestingly, *Looking Backward* contains a reference to balloons that anticipates the aerial reconnaissance evident in Angel: “It is easier for a general up in
a balloon, with perfect survey of the field, to manoeuvre a million men to victory than for a sergeant to manage a platoon in a thicket’” (154).
Works Cited


© JLS 2014. Creative Commons CC-BY-NC-ND
Downloaded from <http://www.literatureandscience.org/>


(Re)Constructing the Knights of Science: Parasitologists and their Literary Imaginations

Emilie Taylor-Brown

When parasitologist Joseph Dutton died of African Relapsing Fever on 27th February 1905, his obituary in the British Medical Journal read:

He was a true Knight of Science... the Galahad of that Group of enthusiastic young men who, with so little recompense for themselves, have pushed forward the cause of tropical medical science at such a rapid rate. (Ross 1020-21)

The accolade “Knight of Science” reflects tellingly on the author, fellow parasitologist Ronald Ross, and gestures more broadly to the romanticised construction of scientific expeditions. The implication here is that Dutton, who helped elucidate the aetiology of relapsing fever and discovered one of the causative agents of African Sleeping Sickness (Trypanosoma Gambiense), fought on behalf of science, risking his own life to propagate and advance tropical medicine as a discipline. The further appellation “Galahad” posits Dutton as Sir Galahad and scientific discovery as the holy grail of Arthurian legend. Colonial administrator Sir William MacGregor similarly lionises the profession in an address given at the London School of Hygiene and Tropical Medicine in 1900, “you will in all probability be able to establish the existence of maladies at present unknown [. . .] can any man desire greater glory?” he asks (978). The “glory” associated with scientific research, particularly research in the colonies, is a concept propagated by its association with the broadening of frontiers (both figurative and literal), but, for parasitologist Ronald Ross, an unfulfilled ideal that he struggles with his entire career. How far is this “glory” a true reflection on scientific pursuits or a constructed cultural image?

In his Memoirs (1923) Ross recalls that “a witty friend of [his] once remarked that the world thinks of the man of science as one who pulls out his watch and exclaims: ‘Ha! half an hour to spare before dinner: I will just step down to my laboratory and make a discovery!’” (v-vi). This unrealistic image of success is precisely the reason he proposes for writing his Memoirs, which, the subtitle boasts, include a “full account of the great malaria problem and its solution.” However, regarding the public’s delusions surrounding the “man of science” he goes on to say, “who, but men of science themselves are to blame for such a misconception” (vi). He criticises the history of discovery as a “record of results” that eschew “that sacred passion for discovery that leads to them” (vi). However it is just this “sacred passion”
that is constructed in the many discourses related to parasitology and tropical medicine at the turn of the century. In *Membranes* Laura Otis examines the interdisciplinary discourses surrounding the changing concept of selfhood in the nineteenth century, noting a confluence between “political and biological thinking” (4). Following the development of microbiology, scientists, she argues, “assumed the heroic role of soldiers, the creators and defenders of empire” (28). The adoption of this heroic persona by parasitologists in the use of Arthurian archetypes and metaphors, as well as those of Ancient Greek and Roman mythology, served to romanticise parasitology by grounding it in literary history. The anxieties surrounding selfhood that Otis examines are pertinent to parasitological research, which necessitates discussions of self and other as host and parasite. The status of parasitologists as “creators and defenders of empire” is particularly fitting given their direct and indirect involvement in imperial expansion. The parasite as both “other” and somatic invader threatens the integrity of British selfhood. Stephen Arata recognises the fear that the “civilised” world might be colonised by “primitive” forces, which he identifies in late-nineteenth century popular fiction, as symptomatic of a widespread anxiety concerning the moral, social and imperial decline of Britain as a global power (622). This notion of reverse-colonisation, of “imperial practices mirrored back in monstrous forms” (Arata 623) articulates a fear that the Western world will fall victim to the dangers of the colonial environment – that Western sanitary science will prove ineffective against tropical disease. The dual fears of national and personal usurpation implicate ideas about national identity in the construction of “self”; parasitologists, who sought to alleviate the infiltration of British (and colonial) bodies, and in doing so strengthen Britain’s position as a global power, recognised the significance of this relationship. The infusion of parasitology discourse with British myths about nationhood enabled parasitologists to create public selves that garnered cultural authority.

The examples outlined at the beginning of this essay gesture toward a stock of metaphors and images that were appropriated by parasitologists and civil servants alike, to delineate the place of parasitologists within the wider political framework of nineteenth century England and her colonies. Consequently, the imagery surrounding Parasitology performed multiple functions, including the legitimizing of western medical authority, the characterization of tropical medicine as a prerogative of the nation, and the encouraging of medical students to specialise in this form of training. The parasitologist was a new and hybrid figure at the turn of the century replete with conflicting ideologies and multifarious cultural meanings. To consider this further this article analyzes the part that parasitologists themselves had to play in this construction, exploring their scientific and literary output in conjunction with the cultural history in which they were situated.

When parasitologists were gaining their professional status at the turn of the century, two significant movements had risen to prominence in popular culture. The first of these, reflected in the proliferation of colonial adventure stories, and the infiltration of empire as a plot device in British horror, Detective, Spy, and Romance fiction, was the shifting power play of England’s imperialist agenda. The prominence of tropical diseases and their function as barriers to Britain’s expansionism led to the forging of associations between the colonies and Parasitology as an emergent discipline. The gathering of knowledge concerning tropical disease etiologies, their interactions with colonial life and landscape, and their medicinal treatment, directly benefitted the workings of empire. Concerns over the health of the British Empire – both in terms of day-to-day living and the impact of parasitic disease on commercial
trade – led to the instigation of the London and Liverpool schools of Tropical Medicine in 1898 and 1899 (the first institutions in the world to specialise in research and training in Tropical Medicine and Parasitology). Consequently the rhetoric of empire became indelibly associated with parasitologists and their research, linking the progress of the discipline with the progress of the Empire at large. Leading parasitologist and mentor to Ross, Patrick Manson asserted in 1897 that the systematic teaching of tropical medicine would soon be universal in Britain “because our country is at the centre of a great and growing tropical empire” (986). The implication that the success of the Empire necessitated knowledge of tropical medicine is clear; indeed the British Medical Journal asserted in 1898 that “the enemy of civilisation and colonisation in Africa is not so much Mahdism as malaria” (“Medicine in the Tropics” 909). The importance of parasitologists as facilitators of empire was constructed in relation to their ability to improve the health, and by extention mental acuity, of its inhabitants:

In this colossal task of grappling with its mighty destiny, the British Empire will require the best efforts of her myriad sons and daughters. Since a very considerable portion of the Imperial territory is either tropical or sub-tropical, and since the inhabitants of those lands will be required to contribute their quota of deliberation and judgement to the solution of the great problem of the race, it follows that he who achieves a triumph in tropical bacteriology is laying one of the stones upon which will rest the everlasting bastions of a strong and vigorous Empire. (“Empire Leading Article” 1)

Furthermore, the work of parasitologists became synonymous with the building of Empire, as McGregor notes in drawing an analogy between parasitologists and construction workers: “It appears to me to be more or less like this: Manson was the surveyor, Laveran made the road, Ross built the bridges and laid the rails, and Grassi, Bastianelli, Bignami, and Celli provided the rolling stock” (980).

The second movement to register its prominence was the, by this time well established, medieval revival, following the publication of Tennyson’s Idylls of the King between 1859 and 1885 (which sold 10,000 copies within the first week) and the first modernization of Malory’s compilation of Arthur’s tales, which had 6 further editions and 5 competitors before the century ended. Many parasitologists consciously negotiated these two movements, appropriating and hybridizing Imperialist and Arthurian rhetoric in order to construct their professional identities. These appropriations serve to imbue research discoveries with a level of cultural investment and legendary significance, a sentiment that finds congruence with George Eliot’s observation that “A remnant of the mythical lurks in the very sanctuary of science” (qtd. in Beer 4). The notion that the mythical is always “lurking” within science suggests that it does not belong there, or is not wanted – left over from the bygone days of pre-science. However, this remnant of the mythical is not just lurking, but fully integrated into the rhetoric of turn-of-the-century tropical medicine. The need to legitimise a newly emerging field of study, in addition to the desire to gain government support and funding, meant emphasis was placed on the need for the profession to engage with wider national interests and to effectively communicate its relevance to medicine – in short parasitologists increasingly needed to sell themselves.

In William McGregor’s address at the London School of Hygiene and Tropical
Medicine in 1900 he noted the importance of malarial research, which had already brought to light “some of the finest examples of human intelligence, perseverance, and observation, and unveiled some of the most wonderful workings of Nature” (980). He continued:

To myself this chain of marvels, full of poetry and religion, nowhere better seen than in the splendid illustrations of Drs. Ross and Fielding-Ould, always recall the words of the second-greatest Teuton of the century:

How it all lives and moves and weaves
Into a whole! Each part gives and receives,
And each to each their golden vessels lend,
Fragrant with blessing, as on wings,
From heaven through the earth and through all things,
Their movement thrusts, and in all harmony it sings! (980)

By likening the “chain of marvels” to Goethe’s Faust, McGregor associates scientific research with religion and the pursuit of divine knowledge. The lines he quoted concern the unity and transcendence of Nature, as represented by the macrocosm, “How it all lives and moves and weaves/Into a whole!” and reinforce the idea that this unity is inherent in scientific observation. What Faust perceives in the philosophical idea of interconnected Nature, McGregor perceives in the diagrams of Plasmodium lifecycles. He goes on to compare the elucidation of the life cycle of the microscopic malaria parasite Plasmodium spp; with the location of the cycle of the “Demon star” Algol⁴, the pinpointing of the position of Neptune⁵ and the discovery of gold in Australia. This sets up a series of points of reference with increasing amplification: cellular, global, planetary and galactic. There is a reinforcement of the unity of Nature in the mirroring of systems at different levels of existence; the microscopic, to his mind, is just as complex and elegant as the orbits of the universe. This microcosmic rhetoric complements the conflation of body and landscape, common to medical cartography and imperial romance, and was increasingly used by parasitologists to visualise and communicate the movements of parasites within the body. Helminthologist T Spencer Cobbold uses the metaphor to describe the lifecycle of parasitic worms:

[Entozoa are] a peculiar fauna, destined to occupy an equally peculiar territory. That territory is the widespread domain of the interior bodies of man and animals. Each animal or “host” may be regarded as a continent, and each part or viscus of his body may be noted as a district. (4)

Parasitologists Ronald Ross and Patrick Manson used the same conflation of body and landscape when talking about their research as a metaphorical journey. In correspondence with Manson, Ross insists he will “follow the flagella” and “pursue the plasmodium,” paralleling symbolically both the parasite’s migration through its hosts, the letters themselves on their travels from Ross in India to Manson in England, and the quests of King Arthur’s knights. Using the trope of the hero’s journey, he compares research to expedition by setting up parallels between the movement of parasites between and within hosts, and the conquest of foreign lands. Manson compounds this use of the quest motif in a letter dated 21st June 1895:

I look forward to receiving [your letters] with the greatest interest and when
a mail passed without getting one the other day I was terribly disappointed
for I thought you had fallen sick, or that you had got a check, or that you
had given up the quest. Above everything, don’t give it up. Look on it as a
Holy Grail and yourself as Sir Galahad and never give up the search. (31).

The quest motif is one that characterised the parasitology narrative; Ross would use
the Galahad reference when eulogizing Joseph Dutton in 1905. Manson’s use of this
rhetoric in private correspondence, and McGregor’s glorification of the profession to
medical students, suggests both a desire to sell the narrative to parasitologists (in
addition to the general public) and an internalization of that narrative by its
proponents.

The success of this narrative relied on the cultural association between
Arthurian legend and British expansionism, and significantly, the idea of an
historically revered homeland from which to govern. Stephanie Barczewski suggests
that supporters of British Imperialism used the King Arthur legend to demonstrate that
“Britons have for centuries looked outwards towards their burgeoning empire and
territorial expansion,” associating a celebrated and venerated history with a promising
Imperial future (201). In a bid to demonstrate this effect, she identifies the prominence
of the sea (fundamental to colonial travel and trade) with nineteenth-century
reinterpretations of Arthurian romances. The popularity of this motif in Arthurian
adaptation connects mythic movements with Imperial endeavor. Furthermore, she
suggests a correlation between the increasing market for tourism in Cornwall
( Arthur’s homeland) with this valorization of the ocean.

The alleged site of King Arthur’s birth at Tintagel and his death at Camelford
both belong to Cornwall, a place where the sea is a constant intruder. In 1851 Arthur’s
castle at Tintagel was turned into a tourist site by Rev. R. B. Kinsman, who renovated
the path to the headland where the castle stood. Kinsman’s renovations meant that it
was made truly accessible to the general public for the first time. This coincided with
an increase in railway infrastructure in the south west, stimulating the development of
a vigorous tourist industry involving a previously isolated part of England, which
came to be known as “the land of King Arthur” (Barczewski 204). This new tourist
derivation helped to compound the association between Arthurian legend and the sea,
influencing nineteenth century reinterpretations, and their connections to current
pursuits of Empire. Parasitologists appropriated and strengthened this connection.
Embarking on ocean expeditions to explore unknown lands, and fighting to protect the
Empire with science, parasitologists inhabited an allied heroic position. Owing to the
allegorical construction of parasitological research, they retained the overtones of
imperial romance, even when not taking part in scientific expeditions. By analyzing
the bodies of patients, already established to parallel allegorically the colonial
landscape, scientists – like explorers – might find “treasures that for ages have been
missed,” wrote one reviewer in the British Medical Journal in 1910 (“Annals of
Tropical Medicine” 880).

Press publications upheld the parasitology identity by situating the field within
a mythic narrative: “Old legends and fairy-tales tell us of battles with giants and
dragons; modern medical science tells us of battles with microbes too small to be
seen,” wrote one author for The West Australian in an article about the “deadly”
mosquito (M.W.G. 5). Furthermore, the Arthurian framing was kept alive through
conscious press characterization, such as in this tribute to Ronald Ross, written by
fellow parasitologist William MacCallum:
Sir Gawain asked the knight if he knew any adventures in that country. “I shall show you some to-morn” said the old knight, “and these marvelous.” So on the morn they rode into the forest of adventures.” The forest of adventures for Sir Ronald Ross – then plain Major Ross of the Indian Medical Service – was the teeming insect life of India. At Secunderabad, on August 20th 1897, he made an epoch-making step into the unknown. (5)

The narration of a valiant knight hungry for adventure had ramifications, not just for the furthering of empire, but for the bravery with which this furthering was portrayed. A correspondent for The Daily News Weekly compounded this construction of bravery: “of a bright and jaunty disposition Major Ross regards a visit to the swamps of West Africa as he would a trip to Paris” (“A Malaria Expedition”). The parasitologist was the valiant knight, the brave explorer, the conquering general, the mythic hero all rolled into one, and bore cultural significance as the facilitator of progress. As Ross insisted in an article published anonymously in the British Medical Journal in 1906: “He [the discoverer in science] serves not only one people but the whole world, and not only one generation but all time. Without him the inventor would not succeed, and the general, very often, not conquer” (“A British Nobel Prize”). The success of Empire was tied so thoroughly to the work of parasitologists that an article concerning “the prosperous and progressive future of the British Empire” even referred to malaria with the adjective “anti-imperial” (“Empire Leading Article”). Ross, by extension, was posited as distinctly pro-imperial; working to conquer Malaria, he was billed as a literal empire-builder:

Mr. Ure, when Lord Advocate, was fond of saying up and down the country that nobody could add an acre to the land originally given to us by the Creator. As a saleable and inhabitable commodity, I wonder how many acres Sir Ronald’s discoveries have added to the map of the empire? […] engaged in his gigantic fight with the pigmy jungle foes of man. (Faulds, “The Reward of Research”)

This characterization of Ross’s adversaries situated malaria firmly in tropical territories, despite its prevalence in Italy, Greece and elsewhere in Europe. The appellation “pigmy” referred to both a race of people of short stature in Central Africa and South East Asia, and to diminutively small objects and animals. This double meaning, and addition of “jungle,” posited Ross’s fight as against the colonial landscape, reinforcing the sanitizing rhetoric of British Imperialism.

At the Nobel prize reception for Ross in 1902, he was described as “a hero from Africa who had been occupied in a war, not against his fellow men, but against a most insidious enemy to mankind” (“Liverpool” 48). The branding of Ross as a “hero” against an “insidious enemy” – that of Malaria – cast Ross as a savior; Alfred Lewis Jones then compounded this image by highlighting Britain’s debt to “all those brave men who had gone into such countries with the object of improving the conditions of life for their fellow-men” (48). He insisted:

Such work is not of a selfish character; it was not merely a national movement, it benefited the whole world; and men such as Professor Ross made the countries better, not only for those who belonged to them, but
better for people of other nations who went to them, and in this way the whole world was benefited (48).

In this high praise we might see another attempt to glorify the profession by connecting the expansion of the British Empire with the improvement of the globe at large. The emphasis on the impact of individual researchers created a story with memorable protagonists who formed the public face of the discipline. These protagonists were in turn part of multiple narratives, be they narratives of colonial medicine, public health or professional development. The construction of the “one-man” narrative was often accompanied in the lay-press by hyperbolic descriptions of adversity, which exaggerated the immediacy of the danger:

His [Ross’s] research took him into the deadliest districts of West Africa, where for months he risked his life, every hour, night and day, for the cause of medical science and humanity. (“Martyrs to Science”)

The bravery of the individual was similarly hyperbolised:

Dr. Sambon, Director of the new [Parasitological] department was one of several scientific heroes who deliberately lived in a hut over an ancient tomb (from which a skeleton was taken) in the swampiest part of Rome. (“Perilous Pets”)

As was the inadequacy of the resources, contributing to the glorification of the individual researcher’s personal strength:

“The best of professor Ross’s work had been done in a hut with a microscope, two needles and a matchbox. (“Correspondence”)

The glorification of the individual allowed – even encouraged – the divulgence of personal details otherwise denied to the reader of scientific research. This facilitated a familiarity with the figure that cultivated a potential for celebrity. Offering commentary on the character of the individual, publications often translocated the researcher’s scientific accomplishment onto their endeavours at large, or else looked for the preconditions of success in their physical and mental constitutions. The Children’s Newspaper for example, under the title: “Men you will hear of when you grow up,” described Ross as “a man of genius whose heart is charged with music and sunshine, as his brain is charged with colossal ideas” (919). The newspaper purported that Ross had single-handedly solved the malaria problem, “while the rest of the world were sleeping,” reinforcing the idea that one individual could change the world. Increasingly the Parasitology narrative blurred into myth, and ever more diverse groups participated in the construction of that myth.

Ross received correspondence from doctors seeking advice, researchers in allied disciplines congratulating him, would-be patients wanting diagnoses, and even fans wanting autographs. One correspondent sent him a poem she had written which alluded to the impressive sight of Ross and colleague Lt. Col. Stephens crossing the Liverpool University quadrangle. As they cross the quad to reach the Thompson-Yates laboratories, they are watched enviously by “haughty arts men” “with noses pressed against the glass,” and engineers shamed by such an “inspiring sight”:
Here come – now, glory be to God!
The colonels twain across the quad
And one is dreamy, pale and long
And one alert, and brown, and strong. (Allman, 1-4.)

Just as fellow parasitologists Kinghorn and Montgomery were described by one newspaper as “fine specimens of British manhood” (“Insect Borne Disease”), Stephens and Ross took on the physical attributes of heroic figures.

In an article concerning the etiology of Kala-Azar Surgeon-Major Giles used a reference to Alexander the Great to lampoon a colleague’s suggestion that the disease was caused by malarial infection complicated by the presence of ankylostomes:

An ordinary man would indeed see at once that such a position is untenable, but Dr. Rogers, like a medical Alexander, cuts his Gordian knot by announcing that Assamese malaria is infectious. In this he places himself at variance with not only the scientific, but the popular opinion of the entire world. (1)

Here Giles characterises Rogers’s solution to the problem of Kala-Azar as analogous to Alexander the Great’s severing of the Gordian knot. This analogy is a poignant one, which requires some unpicking. The theory advanced by Rogers was flawed, owing to its predication on malarial poisoning, which was not infectious, unlike Kala-Azar. However Rogers posits a solution: Assamese malaria is a special variety of the disease, which is infectious. Giles points out the short-sightedness of this position; while it indeed reaches a solution, it is not backed up by evidence and thus is like cutting the knot, rather than untying it. The use of the Gordian myth reinforces the notion that parasitologists understood their profession through mythic narratives. However the departure from Arthurian rhetoric perhaps suggests an imaginative hierarchy. Alexander the Great, leader of the Macedonian Empire, was indeed a figure of imperial might, comparable to the leaders of the Roman, Byzantine and Mughal empires. Reference to such figures invoked past histories as models for the British pursuit of Empire. Significantly, the decline of these great empires was attributed to tropical disease:

The extraordinary collapse in politics, art, literature and morals, and all that constituted ‘the glory that was Greece’ is now believed to have been caused by malaria, which was very probably also the main reason why ‘the grandeur that was Rome’ gradually became dimmed, and the once-potent Roman Empire sank to a level of a tenth-rate power. The sword of the Roman legionary was as sharp as ever, but it could not parry the thrusts of the mosquito’s rapier. (MacCallum, 5)

Where these empires failed Britain would not because the nineteenth-century model is endowed with a secret weapon – Tropical Medicine. Unlike the great empires that came before, Britain’s focus was on successful colonising (rather than simply conquering) and thus on effective and lasting solutions to the problems of parasitic disease. For Giles, this success was analogous to unravelling (rather than cutting) the Gordian knot.
The efficacy of such mythologisation was commented upon by Ross in *Science Progress* in 1916:

The only manner in which science can be taught to men is by way of narratives of events which, though they may not actually have occurred as described, are occurring over and over again in history and in our lives – just as Euclid’s book was the first to crystallise geometry in sets of definite propositions with figures which are never actually found in nature. (“Homer, Dante, Shakespeare, and Cervantes”)

Arguing for the necessity of these kinds of semi-fictitious narratives, he noted: “the constructions of the men of science [. . .] have to be idealised, partly for brevity and partly for fixing the attention of the public,” a sentiment which appeared to justify the widespread adoption of myth in the reporting of Parasitology research. He elaborated on this relationship by suggesting that science relied on art for its “presentment.” He argued that “the great histories and biographies, as well as other epics and novels, belong to the same class of work” as those of science – that is – work that aimed to educate the public. The blurring of these different kinds of writing, or indeed the use of art to facilitate a transfer of knowledge can be seen in the memorandum of Walter Myers published in *The Financial News* in 1913. Myers, a parasitologist, who died of Yellow Fever while working for the Liverpool School of Tropical Medicine was remembered with a brief memorandum of his life and work, which ended with the line: “The Rest is Silence.” Not content with the reference to Hamlet, *The Financial News*, republishing the memorandum, saw fit to add the following lines from Tennyson’s *In Memorium* (LXXV. 20-24):

> So here shall silence guard his fame;  
> But Somewhere, out of human view,  
> Whate’er thy hands are set to do,  
> Is wrought with tumult of acclaim. (qtd. in “How to Assist Tropical Medical Work”)

These literary additions compounded the integral function of art as helping to frame scientific figures and their achievements.

Owing in part to widespread classical education in the nineteenth century, and in part to the preeminence of Classical Greece as providing the foundations for western civilization, ancient Greek mythology formed another reservoir for medical analogy. The mythic Greek hero provided a connection to past civilizations and empires, myth being for the Ancient Greeks “the major formative power of cultural progress” (Burkert xii). Indeed Frank Turner argues that for the Victorians, Greek civilization represented not “the Ancients,” but “distant contemporaries who had confronted and often mastered the difficulties presenting themselves anew to the nineteenth century” (xii). To this end, their myths were repurposed for scientific analogy, the mythic hero often fused with the Knight Errant – a figure associated with Britain’s Arthurian myths of nationhood – to better represent the tribulations of the British Empire. In 1898 Dr Sambon used a figure from Greco-Roman mythology to symbolise what, to his mind, was the greatest obstacle to African colonization.

But there remains the great tropical belt, with its vast and rich territories extending over more than a third of the surface of the globe. This, surely,
must be the Promised Land; but we dare not enter, because at its gates stands a terrible monster - the Cerberus of prejudice. (589)

Sambon used this analogy to dispel erroneous notions that Africa could not be colonised by “the white man” owing to geographical or ecological incompatibility. He was referring specifically to the popularly held connection between tropical climate and disease: “It is the almost universal opinion that the European cannot colonise the tropics, but must inevitably fall, sooner or later, a victim to the influence of their deadly climate” (Sambon 589). However, he went on to point out the folly of this connection, highlighting the importance of new medical knowledge:

One time, undoubtedly, these diseases were attributed to the direct and sole agency of solar heat, just as malarial fevers were attributed to the moonshine; but now they have been inscribed deeply on the tablets of bacteriology, and certainly the demonstration that disease belongs to the domain of parasitism is the greatest advance that medical science has ever made. (590)

Sambon’s use of Cerberus to dispel this notion is intriguing because it is problematic. Cerberus is a familiar character from Greek mythology, the fearsome three-headed, serpent-tailed hound that plays gatekeeper to the Underworld. Certainly, this is an effective metaphor for the obstructions of prejudice. Sambon’s use of Cerberus, however, posits the tropics as the Underworld and the journey across the Atlantic as tantamount to crossing the river Styx (a formidable stretch which separates the Earth from the Underworld). Indeed, the absence of light in the Underworld might find congruence with the naming of the “dark continent.” That said, Sambon does refer to the tropical belt as “the promised land” perhaps to draw an analogy to the belief, expressed in the Aeneid, that Elysium was located in a special region of the Underworld (Hard 117). Thus Elysium symbolises the potential wealth and resources in the tropics, which can only be found by persevering through the barrenness of the African continent, in turn symbolised by the Underworld. However, before the British can find Elysium (or happiness in Africa) they must first lull to sleep the Cerberus of Prejudice – that is dispel the notion that the tropics are uninhabitable. Significantly, Patrick Manson uses the same analogy in 1907, although his Cerberus was not prejudice, but disease: “The Cerberus that guards the African Continent, its secrets, its mystery and its treasure is disease… (which I would liken to an insect)” (qtd. in Watts 213). This final clause suggests that Manson refers specifically to parasitic diseases, many of which have insect vectors.

Manson’s and Sambon’s gatekeepers are effectively one and the same; the prejudiced notion that Africa is uninhabitable to the white man stems from an association between the climate and disease. Both regard the taming of disease as the key to colonization. Uniquely, Sambon advocated a disassociation between heat and disease, which he deemed not to be causatively linked. As the British Medical Journal reported in 1897: “Like everyone else, Sambon recognises two [obstacles to tropical acclimatization] – heat and disease. But he differs from almost everyone else in accentuating the fact that these two are [...] independent of each other; in fact entirely distinct” (“Europeans in the Tropics” 93). This dissociation dispelled the notion that the tropics were noxious and deadly environments in and of themselves, and suggested that a third factor (the parasite) is what caused disease, and thus might be overcome by Europeans. Man could not change the tropical climate, but he might
be able to avoid parasitic infection, and thereby achieve acclimatization. In this way, parasitologists were again indirectly valorised by their insistence that the only thing standing in the way of European acclimatization was parasitic disease, and by extension the only ones able to grant acclimatization were parasitologists.

The transformative powers of parasitology and its allied practices of public health and sanitation are an integral part of the parasitology narrative — a highly political mythology constructed by and about its proponents. This construction can be seen in the correspondence between Ronald Ross and Lord Lever — benefactor of the Liverpool School of Tropical Medicine. Lever wrote to Ross in 1911 to inform him that he had received a drama in one act, anonymously signed, which had St Peter send “a soap-maker,” billed as the chair of the School of Medicine and “a scientist,” who “made a great discovery,” to Hell (Lever, Letter to Ronald Ross. 27 Dec. 1911). He enclosed the play and composed a second act, which he provided under the authorship of “a certain soap-maker” who “often gives rise to reflections” (“The Gates of Paradise”). The scientist is Ross, and the soapmaker, Lord Lever, and given the subtitles: “By a scientist” and “By a soapmaker” respectively, it seems likely that the first act was composed by Ross, and the second by Lever. The gathering of applicants who are “mostly from Liverpool, Ship owners, Professors, Business Men and so on” compounds this by situating the drama in dialogue with the Liverpool School of Tropical Medicine and its proponents. The first act takes place at the “Gates of Paradise” where St Peter is reviewing the applicants for admittance to heaven. After meeting a Parson and sending him to Hell for the insincerity of his prayers and his failure to convert anyone to Christianity, St Peter is met with a scientist:

St Peter: [. . .] Next. Who are you?
Scientist: A poor man of science, Sir.
St Peter: Oh! I don’t understand that lot. What has he done?
Secretary: He made a discovery once, Sir — many years ago.
St Peter: Ah yes, I’ve read about it in our Science Jottings. And what has he discovered since then?
Secretary: Nothing, Sir.
St Peter: Monstrous! Why not? Why haven’t you used your talent?
Scientist: Please, Sir, I have had to spend all my time writing letters, attending committees, and dining with the next applicant; so that I have had no leisure to think and work properly.
St Peter: Rot! Down you go. Fifth class [. . .]. (“The Gates of Paradise”)

These lines can be read as an allegory for the mistreatment of scientists and the lack of understanding on the part of general public, a reading which is supported by Ross’s campaigns for better recognition and remuneration for scientific workers. The speed with which St Peter dismisses the scientist’s discovery suggests both a belittling of the significance of his research, and a lack of understanding of the political nuances of such work. Scottish scientist, Henry Faulds, commenting on Ross’s remuneration campaign, captured the sentiment behind this interaction when he asked:

Why should only well-paid warriors, diplomats and civil servants be additionally required for often purely conventional services, while those who painfully penetrate with ultimate success into the unknown, but fertile
regions receive nothing for their expenses, and often not even the barest form of thanks? (“The Reward for Research”)

Alternatively the interaction might be read as a sincere criticism of the amount of time spent reaping the rewards of discovery at dinners and committees, by someone who, either seriously or teasingly, Lever accuses of “lay[ing] sacrilegious hand on the scientist” (Letter to Ronald Ross. 27 Dec. 1911). Either reading, however, suggests a disconnect between the perspectives of the workers of the Liverpool School of Tropical Medicine and their political reception at large. Faulds’ notion of scientists as penetrating into the unknown and subsequently transforming the tropical landscape, is played out in the second act, which has the scientist, parson and soap-maker descend into the deepest regions of Hades. A conversation with “his Satanic majesty” reveals that the Underworld has been transformed owing to St Peter’s dislike of Scientists, whom he sends to Hell, and who then proceed to improve it beyond recognition.

His Satanic Majesty: The fact is we get so many distinguished scientists that they are improving the place entirely out of my recollection. They introduce Town Planning Schemes, Garden Cities, Art Galleries, Museums; to say nothing of Tropical Wards, Scientific Medical Research and other advancements. (“The Gates of Hades”)

The transformative powers of scientists are here made apparent. Parallels with the tropics are upheld by way of references to “climate,” which has of course been improved by the scientists in Hades, and by reference to other markers of colonial space. The journey to Hades takes place by train, perhaps nodding to the railway infrastructure of the colonies, a seminal factor in the successful colonisation of central Africa. Satan facilitates further comparison when he says:

The very men who invented mosquito proof curtains have introduced here fire proof curtains [. . .] and there is one distinguished scientist connected with the Liverpool School of Tropical Medicine, whom we are expecting here shortly and whom we have good reason to believe has succeeded in inducing a very wealthy Baronet, living in the South of England somewhere near Ascot, to fit up a cold chamber on the Haslam Improved System. (“The Gates of Hades”)

This likely refers to Ross’s work studying the effects of cold on animals (and people) infected with trypanosomiasis (see: Letter to Sir Alfred Lewis Jones). A cold chamber, made by Sir Alfred Haslam, was erected at the University around this time, paid for by Sir Edwin Durning-Lawrence (see: Ross and Thomson 227).

The parallels with recognisable real-life developments, like the implementation of mosquito nets in the tropics and the construction of the cold chamber at Liverpool, situate the drama firmly in dialogue with the politics of the discipline. In their letter correspondence, Lever and Ross exchange veiled compliments, which – given the parallels discussed here – suggest they see British Imperialism or at least the work of the Liverpool school (of which Lever was a benefactor) as a sanitising and transformative force. Their dramatic counterparts bleed into real life, and their public personas are imbued with Underworld mythology: “You
make me blush when you talk about the Ignominious soapmaker improving Hades. It is the new departure in Town Planning being carried out by men of science headed by R….. R…” (Lever, Letter to Ronald Ross. 30 Dec. 1911). The private nature of this mythologisation provides further strengthening for the internalisation of the narrative, suggested earlier by the correspondence between Manson and Ross. However the reality of research is gestured to by the interactions of the first act. The transformative power of parasitologists, exemplified here, is an idealisation; despite providing the keys for prophylaxis against parasitic disease in the tropics, parasitologists do not work in isolation and cannot guarantee the implementation of their findings. Research is hampered by financial restrictions and subject to administrative red tape.15 Ross’s own research was interrupted by his relocations with the Indian medical service, and lack of government support (both Indian and British) (See: “Letter to Surgeon-Major Owen”; Ross, Memoirs). His campaigns for better remuneration, recognition, and pensions for scientific workers (which included widely-read articles in the laypress) resonated with the public and cultivated support: “I have been very struck with your letter in “The Times” […] I should be very pleased to add to such a fund (£500 anonymously)” (Yarrow, Letter to Ronald Ross); “I have just read your letter in today’s “Times,” I wish I could send a cheque worthy of such an object” (Glenny, Letter to Ronald Ross). However the campaign was also met with resistance:

The claims of “research” workers to have benefitted mankind are matched only by their insistent pleading for grants and complaints of inadequate payment […] I fail to see what claim [they have] upon the public purse of this country. (“Sir Ronald Ross and his Petition” 126).

Such scepticism concerning the social value of parasitologists reinforced the need for their imaginative re-construction. The use of heroic discourses and underdog motifs in both private and public correspondence contributed to the dramatization of the discipline – a dramatization that served to glorify individuals and legitimise their fiscal demands. The Northern Star recognised this process, when it stated that “[Ross’s] conquest of Malaria [was] one of the romances of scientific investigation,” (“Sir Ronald Ross, Famous Scientist Ill” 3), while the Brisbane Courier actively participates in this romantic construction, noting:

His fight against the malaria-carrying mosquito has been truly described as more romantic than any story of knight against huge dragon […] this kindly knight was to show himself possessed of patience, imagination, determined and highly-developed reasoning power, and above all faith and courage. (“Sir Ronald Ross” 10)

What started out as an imaginative narrative to frame their research became so invested in turn-of-the-century rhetoric pertaining to imperial epidemiology, that the mythic “knight of science” became an archetypal figure for representing the tropical scientific researcher. The multi-level impact of disease: biological, verbal, political, social and cultural, which Charles Rosenberg discusses in Framing Disease, (xiii-xxiii) was carefully negotiated by parasitologists, who inflected their field in ways that would legitimise it in relation to public policy, as well as cultivate a new professional identity, using the myths the British told themselves about nationhood to their own advantage.
Notes

1. Dutton caught African Relapsing Fever or ‘Tick Fever’ while carrying out autopsies on infested cadavers with friend and colleague John Todd, as part of the Liverpool School of Tropical Medical’s Congo expedition to investigate the parasitic disease Trypanosomiasis or ‘African Sleeping Sickness’. He caught Relapsing Fever toward the end of the expedition in 1904 and died almost a year later at just 29 years of age.

2. Sir Ronald Ross won the Nobel Prize for medicine in 1902 for his research proving that the *anopheles* mosquito is a vector for malaria. He was heavily involved in public health and sanitation campaigns for the colonies, and researched a number of other parasitic diseases include Kala-Azar (Visceral Leishmaniasis). He campaigned for pensions and remunerations for scientist workers, was a poet, mathematician, novelist and playwright, and the Liverpool School of Tropical Medicine’s first lecturer.

3. Two founders of the Liverpool school - Alfred Lewis Jones and John Holt of Elder Dempster and John Holt shipping, both had established main lines between Liverpool and West Africa.

4. Algol, the so called ‘Demon star’ or “blinking demon’, probably gains its name from the fact that the variability in its brightness made it look like a giant blinking eye peering down at the Earth. In 1782 Goodricke advanced the eclipse theory to account for these fluctuations in brightness and in 1880 Pickering reaffirmed the theory. Vogel confirmed it unquestionably in 1889, identifying Algol as a binary pair undergoing mutual eclipses (Olcott 303; “Spectoscopic Binary Star”).

5. Before the discovery of Pluto in 1930, Neptune was considered the furthest known planet and thus its discovery in 1846 was considered to push at the boundaries of the known universe. However, more importantly, the position of Neptune was mathematically predicted before it was observed, suggesting a logical pattern to life, which Benjamin Gould held as “utterly unparalleled in the whole history of science,” a phenomenon imbued with “romance and poetry” (Gould 3-4).

6. A parasitic infection also known as Visceral Leishmaniasis. The cause, protozoan parasite *Leishmania donovani*, was isolated independently by Charles Donovan and William Leishman in 1903. Before this, the disease was thought to be a complication of malarial infection (even a quinine-resistant form of malaria) – a position which many thought untenable owing to the fact that K.A. was infectious, while malaria was not. (Both however were found to be transmitted by insect vectors – sandfly and mosquito respectively – and thus neither truly infectious.)

7. Patrick Brantlinger notes, when discussing Tennyson’s 1892 poem “Akbar’s Dream”, that “Akbar is an Oriental King Arthur,” and suggests that Tennyson uses this parallel to prophesise the triumph of the Empire: “The great work he [Akbar] has begun of civilizing the Indian wilderness will collapse, but the British will take it up again and complete it on a permanent basis” (10).

8. Turner argues that the classical world was at the heart of Victorian intellectual thought (xii).

9. He is in fact so against this climate connection that he insists “sunstroke” is not caused by exposure to the sun, but is an infectious disease!

10. The sibyl accompanying Aeneas on his journey through the Underworld puts Cerberus to sleep by tossing him a drugged honey cake, whilst Orpheus uses a harp to lull Cerberus into submission when he descends to the Underworld to rescue Eurydice (Webber and Feinsilber 107; Cox 20).
11. This may refer to the Liverpool School of Tropical Medicine, owing to the context given by Ross and Lever’s correspondence.

12. William Lever was an English industrialist and philanthropist best known for manufacturing (with his younger brother) “Sunlight Soap” – a business that relied on palm oil supplied by the British Empire.

13. From the tone of the correspondence and the details of the play, which take place “Christmas 19——” and conclude with many LSTM members getting into Heaven “because it is Christmas Day,” the first act may have been sent by Ross to Lever as a private joke.

14. Furthermore, Ross’s assertion that “[Africa] is mostly an empire of graveyards, a kingdom over tombstones” allegorically links the colonies with Hade’s underworld (“A Recent Medical Expedition”).

15. “It seems to me there is far too much red tape in these matters and that an ordinary layman like myself is in much greater danger of damaging the cause he wishes to help [. . .] if he rushes in where angels fear to tread” (Lever 1912).
Works Cited


“Annals of Tropical Medicine and Parasitology by The Liverpool School of Tropical Medicine.” British Medical Journal 2.2595 (1910): 880.


“Correspondence.” British Medical Journal, January 1903.


“How to Assist Tropical Medical Work” Financial News. 23 Jan. 1913.

“Insect Borne Disease.” Cutting from The Daily Graphic. 1907. Ross/113/23/43. The Ross Project. The London School of Hygiene and Tropical Medicine, London.

Letter to Surgeon-Major Owen, medical advisor to the Maharaja of Patiala from the Prime Minister of Patiala State. 2 Feb. 1910. Ross/04/54/03. The Ross Project. The London School of Hygiene and Tropical Medicine, London.


--- Letter to Ronald Ross. 27 Dec 1911. Ross/113/20/05. The Ross Project. London School of Hygiene and Tropical Medicine, London.

---
--- Letter to Ronald Ross. 30 Dec. 1911. Ross/113/20/06. The Ross Project. London School of Hygiene and Tropical Medicine, London.


“Martyrs to Science. Medical Men’s Toll of Life.” *Cape Argus* 14 Dec 1912.


“Perilous Pets: Diseases Which may be Prevented by Mosquito Nets.”” Cutting from *The Daily Dispatch*. n.d. Ross/113/23/42. The Ross Project. The London School of Hygiene and Tropical Medicine, London.


Ross, Ronald. “A British Nobel Prize” 1906. MS. Ross/94. The Ross Project. The London School of Hygiene and Tropical Medicine, London.

--- “A Recent Medical Expedition to West Africa” Liverpool Chamber of Commerce, Liverpool. 27 Nov 1899. Lecture.


“Sir Ronald Ross, Famous Scientist Ill.” *Northern Star*, 16 Aug. 1929.


In this comparative piece, Cheryl Blake Price traces the history of the carnivorous plant trope in the nineteenth century “from passive poisoners [to] active carnivores” (311) before exploring the different uses of man-eating plants in two examples of British Imperial Gothic fiction at the *fin-de-siècle*. Blake Price discusses the role of man-eating plants in Phil Robinson’s “The Man-Eating Tree” (1882) and Frank Aubrey’s *The Devil-Tree of El Dorado* (1897), elaborating on their seemingly paradoxical position as both representatives of a colonial other to be feared, and also as a gothic double for the British protagonist or the British Empire itself. She places this work in the wider context of Simon Estok’s call to investigate ‘ecophobia’ in literature, analysing the presentation of nature in the *fin-de-siècle* moment of British Imperial Gothic.

Blake Price begins with the myth of the Javanese upas and its influence on earlier nineteenth-century writing, before demonstrating the impact of Darwin’s writings on evolution and *Insectivorous Plants* (1875) on the representation of carnivorous plants towards the end of the century. She shows how these authors drew on ‘real’ accounts of man-eating trees and combined elements of these accounts with the conventions of gothic fiction and adventure writing. Arguing that man-eating plant stories form a sub-genre of late-Victorian gothic fiction, Blake Price extends Patrick Brantlinger’s definition of Imperial Gothic and goes on to suggest how the stories draw on imperial concerns regarding colonial influence, and fears provoked by Darwinian evolution and its implications for the natural world. The genre, she suggests, “is perhaps best defined by the anxieties that it engenders”; they are stories that “explore *fin-de-siècle* fears about evolutionary hybridity, aberrant nature, and colonial environments” (312), anxieties that expand “beyond fears of human degeneration to also highlight the threat of an unconquered and highly evolved natural world” (312–313) in which the plants function as a colonial ‘other’.

For Blake Price, Robinson’s and Aubrey’s use of man-eating trees demonstrates “the impact of imperial ambitions on the colonial environment” (313), but not in an anti-imperialist way. She places the stories within the context of narratives critiquing the empire’s practices without objecting to its “overall mission” (320). The trees, for example, are themselves are vampiric, focused on greedy consumption and always hungry, and as such, they double for an expanding and over-reaching empire. Thus, she suggests, the authors express a fear for the native environment as well as of its appetite. The trees come to represent the “darkest aspects of humanity” (319) and, in the case of Robinson’s protagonist, they serve as a gothic double for the British hero. However, the protagonists’ relationship to the ‘natives’, Blake Price argues, is not questioned: modifications to imperial rule are proposed, but in the form of better imperial administration of the colonies. Moreover, the article argues that these stories advocate a better understanding of colonial environments while also highlighting the fear of colonial influence. For example, the use of the ‘devil-tree’ as a form of psychological torture “taps into cultural ecophobia” (322), challenging the Victorian compulsion to collect and catalogue. For Aubrey, the lost civilization of the Manoans demonstrates the danger of overreaching imperial ambition and offers a warning to the British Empire, and Blake Price explores the ‘lost’, white civilization that Aubrey posits, with its history of empire and naval
power, as menaced by a savage Dark Brotherhood and an imported, colonial, devil-tree. While suggesting that the plants in these stories serve similar functions, she draws attention to key differences: where Robinson’s tree is Darwinian, Aubrey’s is an “aberration of nature” (323). The article concludes that, just as gothic doubling permeates these stories, they also encode a double fear, that of the dangers of colonial environments, alongside the fear of the possibility of losing them altogether. Such fears are key components of the Imperial Gothic, leading Blake Price to argue convincingly for the vital role that analysis of the genre has to play in the field of ecocriticism.

Overall, the article’s insightful examination of the tropes connected with nature in these examples of British Imperial Gothic fin-de-siècle fiction provides an excellent contribution to the growing study of ecophobia in literature, anticipating the trajectory of future ecocritical readings of British Gothic writing, and other genres and periods. Blake Price answers Tom Hillard’s call to explore ecophobia and the Gothic, and builds on his suggestion that the Gothic mode of fiction and its dealings with fear gives us a better understanding of such fears. The in-depth discussion of these two pieces makes a convincing argument for the importance of such work and of the prevalence of these tropes in fin-de-siècle writing.

Emily Bowles
University of York
Horton’s objective is to clarify the significance of scientific ideas in two of Ian McEwan’s most successful novels: *The Child in Time* (1987) and *Enduring Love* (1997). No one has ever doubted that theoretical physics and evolutionary psychology are crucial to each novel respectively, but there has been sustained critical debate about the extent to which McEwan relativises, or even undermines, scientific facts and arguments with narrative sleights. Joe Rose, for instance, the narrator and protagonist of *Enduring Love*, is a science writer whose ‘diagnosis’ of a homosexual stalker, Jed Parry, is informed by evolutionary psychology and clinical psychiatry. His fears are ultimately vindicated by Parry’s terrifying behaviour, leading critics such as David Malcolm to read *Enduring Love* as a paean to scientific rationality. On the other hand, Rose’s narration is self-qualifying and, in minor respects, factually unreliable, as well as being counter-balanced by the questions and criticisms of his literary wife Clarissa. The limitations McEwan imposes on Rose’s narration have led critics such as Jago Morrison and Sean Matthews to assert that the novel ultimately, as Horton puts it, “reconfirms the instability of evolutionary psychology as a credible mode of personal and social analysis” (706). Given that McEwan’s public pronouncements favoured the first position over the second, the emphasis on the novel’s scepticism required far greater trust in the tale than the teller.

Horton’s achievement in this essay is to have negotiated brilliantly between the opposing positions regarding each novel, whilst demonstrating equal facility with the texts of both Ian McEwan and his mentors in popular science. In the case of *Enduring Love*, she is inclined to split the difference between the critics who (to put it crudely) side with Clarissa or with Joe. She acknowledges, with the first group, that the novel’s gestures towards narrative unreliability relativise those assertions Rose grounds in 1990s evolutionary psychology, but admits the key point of the second camp: that Joe is much *more* right about Jed than Clarissa, who doubts his very existence until he invades her home with murderous intent. Horton concludes that “McEwan leaves the ending open, positioning the narratives against each other and showing how each invokes a different (and differently problematic) form of reason” (707). Being of the party of Joe myself, I am obviously unsatisfied with this conclusion, not least because it underestimates the extent to which *admittedly* unreliable narration actually strengthens our confidence in a narrator (a fact of human nature discussed in William Flesch’s superb treatment of Darwinism and literature, *Comeuppance* (2007)).

Whereas Horton’s analysis of *Enduring Love* synthesises the existing criticism, her handling of *The Child in Time* is more overtly original and progressive, largely because she really understands David Bohm’s eccentric philosophico-scientific ideas, McEwan’s main intellectual influence in that novel. As she points out, critics have wrongly conflated speculations about quantum physics and the non-linearity of time expressed by Thelma, the novel’s feminist physicist character, with postmodernist ideas about epistemological relativism and temporal fragmentation. Yet McEwan’s ecofeminist ideals at the time, informed by fatherhood, anti-nuclear activism and his relationship with his first wife, Penny Allen, tended much more towards “an aspiration for wholeness of vision that complicates relativist principles”
(697). The novel therefore, on her view, supplants official notions of linear, homogenous time with the real “complexity and integration of temporal experience” (698).

I’m sure she’s right about this, although I’m not convinced that her explanation redeems the desperate implausibility (scientific or literary) of the ‘time travel’ scene in *The Child in Time*. The larger remaining question is why anyone in 2014 should care how Ian McEwan sought to mediate between the ecofeminism of the Greenham Common era and Bohm’s philosophical ruminations, which were considered far out in 1980 and have not improved in scientific standing since then. This, perhaps, is the greatest risk that novelists take when they seek to integrate scientific findings: that their novels will date much more quickly and dramatically than they otherwise might.

For this reader, McEwan is most successful in those novels that work scientific ideas in seamlessly rather than overtly. *Atonement* (2001) and *On Chesil Beach* (2007) are just as deeply informed by scientific psychology as *Saturday* or *Enduring Love*, but are less concerned to advertise the fact. Moreover, as McEwan’s relationship to contemporary science continues to change, he incorporates self-satirising elements in newer novels: Henry Perowne scoffs in *Saturday* (2005) at a time-travelling narrator like Stephen in *The Child in Time*; the anti-hero of *Solar* (2010), physicist Michael Beard, mocks writers who, like McEwan, seek to ‘fight climate change’ with art; and the ostensible narrator of *Sweet Tooth* (2012), Serena Frome, is dismayed by her novelist boyfriend’s misconstrual of a mathematical paradox she has explained to him. While each episode of self-mockery is ironised in its turn (e.g. *Sweet Tooth* turns out to be authored by the very boyfriend who previously seemed unable to get his maths right), it certainly seems that McEwan’s trajectory is very much towards scepticism. Not scepticism towards science itself, though; only towards the ability of writers to effect the constructive negotiation that Horton imagines for him. Coming from the leading exponent of fiction that embodies ‘consilience’, E.O. Wilson’s dream of unified knowledge beyond disciplinarity, that is worrying news indeed.

Greg Garrard
University of British Columbia

According to Robert Nathan’s provocative characterisation, qualitative social science research is in urgent need of a personality inventory: the hybrid offspring of strict empirical observation and creative narrative art, practices such as phenomenology and ethnography seem so directed towards pleasing Father Science that they tend to disavow their essential inheritance from Mother Literature altogether. In “Why It Matters: The Value of Literature as Object of Inquiry into Qualitative Research,” Nathan states an intriguing case for reconciliation, arguing that the unique tools and experience of literary scholars might profitably be harnessed in service of social research, if only the researchers themselves might allow it.

Nathan’s first proposition in support of his overall argument will be familiar to many: qualitative social science texts are fundamentally similar to literary texts, he states, in the sense that they each selectively impose a subjective representational narrative upon the non-narrative, objective infinity of reality. The exclusion of novels from one’s research on the grounds that they distort reality is therefore merely ideological. Citing Hayden White, Nelson Phillips, and John Ziman, Nathan recounts the well-known ‘linguistic relativity hypothesis’, according to which language does not simply represent the categories of reality, but in fact creates them. Consequently, he continues, accepted qualitative practices cannot be distinguished from their literary equivalents, since neither can claim to represent external reality with transparent objectivity.

Rather than use this “discredited objectivity” (77) as a stick with which to beat both literature and qualitative research alike, Nathan spies an opportunity to allow literature into the social sciences fold. While traditional social sciences texts are bound by a false conception of their one-to-one correspondence with a singular ‘real world’, he notes, literature’s freedom to extend beyond the limitations of the realist form enables it to engage with the complexities of reality in a more complex, multivalent manner. In this regard, literature – and particularly the novel – constitutes a uniquely valuable source of insight to social scientists, and ought not therefore to be dismissed so readily as has typically been the case.

Having established some justification for the novel’s potentially singular contribution to social science, Nathan goes on to identify two practical ways in which it might be used: first, as a primary *object* of social inquiry, analogous to any other cultural artefact; second, as a *form* of social inquiry, analogous to an ethnography. In both instances, his test case for the ideal source text is ‘immigrant fiction’: by enabling the migrant to synthesise his or her own experience of migration into a textual form of his or her own choosing, he suggests, the novel might provide a truer account of that experience than, for instance, that same migrant’s responses to an interviewer’s questions.

Recognising some likely concerns with this proposal – deliberate fictionalisation adds another filter between reality and observation; the implication that only ‘insiders’ can speak for a given culture – Nathan asks whether the acceptance of novels as primary objects would require social scientists to engage not only with the texts themselves, but also with literary studies and criticism. Noting that the crudely materialist understanding of novels as static artefacts with singular
‘correct’ readings is clearly to be discouraged, he nevertheless suggests that the ‘mirror’ that literature holds up to the world does indeed reflect some of its ‘contours’.

The challenge of interpreting these reflections, he concludes, requires the skills and experience of the literary scholar, and hence indicates the necessity for interdisciplinary collaboration. Following a brief summary of the dangers of mining fiction for fixed, substantive, quotable evidence, it is upon this general plea for open-mindedness that Nathan settles, urging that “this will be of benefit not only to our understanding of society but also to our comprehension of how that understanding is derived” (85).

While on the whole there is little to dispute in Nathan’s eminently worthwhile initiatory discussion – not least because its conclusions are so open-ended – one cannot help but envision quite severe perturbations in the delicate interdisciplinary ecosystem he hopes to cultivate. The benefits to social science research of a sophisticated, sensitive approach to using novels in qualitative studies seem clear enough; it is less clear, however, how far one might be able to legitimately justify the selection of texts deemed ‘appropriate’ for use within in a given social study, at the expense of other less amenable works. What degree of openness to literary experimentation might a study with pretensions to influencing social policy tolerate, for instance, and how might this degree alter the representativeness of the study? If one were seeking funding for social research, moreover, then how might one’s designation of a particular novel as ‘valuable’ be questionably influenced? Ultimately, and quite contrarily to his admirable intentions, the logical conclusion of Nathan’s proposal might well be the establishment of a canon of worthy, reductive realist novels, steadily calcifying in the reading lists of various social sciences courses, while genuine literary experimentation – and hence the sort of insight Nathan seeks to ‘exploit’ – finds itself retreating to the departmental ghetto from whence it came. Whatever else, though, this kind of receptive, constructive thinking is undoubtedly welcome within the field of literature and science, and one can only hope that Nathan’s article helps bring to an end an identity crisis in the qualitative social sciences that has surely gone on too long.

Peter Johnston
Royal Holloway, University of London.

Mary Fairclough’s recent essay explores the political, social, and epistemological effects of the optical telegraph in late eighteenth-century Britain, focusing in particular on how telegraph imagery appears in conversations about reformist politics and global communication in the 1790s. Fascinatingly, as Fairclough outlines, the optical telegraph “appears to demand recourse to figurative or metaphorical expression in order to describe its effects” (26). To track the deployment of the telegraph metaphor, she focuses on how the aptly named anti-ministerial newspaper, the *Telegraph*, exploits the figurative implications of its namesake – namely the telegraph’s speed, accuracy, and reach – in ways that mobilise radical politics and help mitigate the repression of dissent. First documenting how telegraphic technology moves from France to Britain, Fairclough goes on to discuss the *Telegraph*’s implementation of the telegraph trope, as well as its skirmishes with the law and its connections with the London Corresponding Society. While the *Telegraph* employs the telegraph metaphor as a means of articulating the “radical aspiration to the swift communication of political information,” conservative attempts to curb such aspirations similarly appropriate telegraphic imagery, and thus command over the telegraph trope becomes central to the political discourse of the period. Fairclough also examines the telegraphic metaphor in terms of both its promise (the possibility of “radical communication” across the globe [33]) and its limits (as in the case of exiled radicals in Australia). Despite the practical limitations of telegraphic technology, however, Fairclough concludes that the telegraph comes to demonstrate “the transformative political effects of communicative media” (Abstract).

In “Part One: Le Télégraphe,” Fairclough documents the importation of optical telegraph technology from France, in part through analyzing Charles Dibdin’s musical extravaganza, *Great News, or a Trip to the Antipodes* (1794), which features a song about the telegraph and “demonstrates the immediate effect of the optical telegraph on the popular imagination” (28). Fairclough next discusses *The Gentleman’s Magazine*, which from September to December 1794 ran a series of articles detailing the new technology and its function, with particular focus on “how the French design might be improved upon by English ingenuity” (30). Here Fairclough also studies James Gillray’s print satire of 1795, *French Telegraph Making Signals in the Dark* (which depicts Whig opposition leader Charles James Fox as a human telegraph who leads a French fleet to London), and Thomas Maurice’s 1798 poem, *Grove-Hill* (which “makes the telegraph symbolise the universal communication required to enable Britain’s global imperial ambitions” (31)). Fairclough then moves on to examine telegraphic imagery in the press in order to demonstrate that the “battle over the polemical implications of telegraphic images forms a fascinating subset of the much broader battle over the expansion of the political press in the 1790s” (33). “Part Two: The Telegraph and Periodical Politics in Britain” argues that the *Telegraph*’s savvy depiction of the telegraph as both material technology and political symbol allows the paper to emphasise its speedy dissemination of news while also “enlightening and radicalizing readers” (34). In this section Fairclough also discusses how the *Telegraph* “complicate[s] existing critical models of print culture” (35), specifically Jon Klancher’s paradigm for transmitting political information.
Perhaps unsurprisingly, the Telegraph’s emphasis on radical communication drew a great deal of attention, and in “Part Three: Communication on Trial,” Fairclough examines two cases in which the Telegraph’s transmission was “subject to particular scrutiny” (38). Finally, in “Part Four: The Limits of Global Communication,” Fairclough turns to cases where telegraphic communication “is sorely tested, as reformers in London encounter the difficulties inherent in sustaining lines of communication with compatriots in Botany Bay” (43). While “radicals exploited the slippage between telegraphic technology itself, and its metaphoric version, to allude to the possibility of universal communication,” they were confronted “with the difficulty of sustaining radical solidarity over enormous distances” (43). Yet Fairclough suggests that even in the face of these obstacles, the telegraph metaphor works to ensure “the survival of radical solidarity” (48) and maintain “the possibility that ‘the whole world’ might become a politically active ‘Corresponding Society’” (49).

Offering astute readings of a wide array of archival material, from satirical cartoons to court proceedings, Fairclough demonstrates vividly how technological and scientific development, communication and media, and the figurative use of language “all bear upon national identity in Britain” (26). I appreciate especially how this argument zooms in and out from the particular to the axiomatic with ease and grace: From evidence in a single court trial to the larger political climate of the 1790s, from the Telegraph to questions about the expansion of the press in the early nineteenth century, from the practical application of a single invention to the larger scope of intellectual history, Fairclough continually connects her argument to important questions about technology, power, and print culture. Indeed, this article contributes directly to our understanding of print culture and repression in the 1790s, and Fairclough clearly situates her argument in light of other important theories about media and communication technologies as put forth by scholars like Klancher and Nigel Leask. Most pressingly, Fairclough shows how technology and figurative understandings and representations of that technology develop in tandem as individuals explore the many implications of technological change in diverse ways. In fact, perhaps most relevant to readers of JLS is how Fairclough allows us to see clearly the “epistemological role of metaphor,” which gives individuals from across the disciplinary spectrum the language to conceptualise new phenomena and think through technological change (34). One can’t help but notice that this article is particularly evocative in light of our current tech boom and its political applications: As Fairclough suggests, “We might read the effects of online communication as the eighteenth-century metaphor of universal communication made actual” (49).

Anne M. Thell
National University of Singapore
All too often, for reasons too variegated to debate here, the Humanities and Sciences are considered opposites rather than partners in pedagogy. Whatever C. P. Snow’s intentions, this perceived antagonism was not helped by his famous Two Cultures lecture; but whatever its origins, the dichotomy is false. In “A Compaignye of Sondry Folk” Janine Rogers provides further evidence of the shared inheritance and goals of the Sciences and the Humanities, especially medieval literature. Rogers is able to do this partly through her own expertise and partly through analysis of Richard Dawkins’s *The Ancestor’s Tale* (2004). Dawkins, a controversial figure and former Chair of the Public Understanding of Science at Oxford, channels Darwin and Chaucer to offer a history of evolution-cum-warning against overly rigid anthropocentrism. To illustrate his thesis Dawkins adopts Chaucer’s model of pilgrimage and storytelling to offer a “[b]ackward chronology in search of ancestors,” ultimately to “a single concestor [sic] of all surviving life” (Dawkins 6-7). For her part, Rogers explores why the *Canterbury Tales* might play such a key role in this modern scientific inquiry. The result is a detailed and convincing elucidation of Dawkins’s use of medieval poetics.

Rogers contends that “contemporary science and literature share poetic resonances” (47). For Rogers, Dawkins is concerned equally with ethics as with evolution, and he employs Chaucerian poetics to assist in evading and critiquing the anthropocentric ideology that dominates much modern thinking on evolution. Since for Dawkins all life is inter-related, it is “unethical to imagine one form of life as discrete from and non-continuous with other life forms” (48). This is where Chaucer comes in, since his poetry provides a model (and similar interrogation) of the complex relationships between the parts and the whole. In terms of science and literature, argues Rogers, both Chaucer and Dawkins “are interested in emphasizing common bonds and merged boundaries” (50). Hence, one might add, the generic plurality of the *Canterbury Tales* or Dawkins’s mixture of genes. Rogers then turns to a variety of subsections and subjects, outlining how they are used in each set of tales: frame stories; pilgrimage allegory; and medieval poetics. Rogers insists that frame stories are inherently mereological. As she points out, Dawkins’s backwards pilgrimage through time allows him to introduce many new pilgrims and ancestors *en route*, whereas Chaucer’s pilgrims are almost all present from the outset of his journey. Nevertheless, the literary frame narrative’s “message of unity in diversity presents a structural idea of evolution that unifies all living beings” (52): by medieval thinking pilgrimage is both an “allegory for a human life” and a path to God; in Dawkins’s account pilgrimage becomes a path to the fount of biological or evolutionary origin, our common ur-ancestor or “Concestor 0” (53-4).

Dawkins’s use of *Canterbury Tales* runs deeper than just structure and variety. Just as Chaucer’s pilgrims travel to the shrine and relics of Thomas à Becket, so Dawkins presents “fossils as analogous to relics” and DNA as a “‘renewed relic’” or “re-copied relic”, not unlike a “‘written text’” (54). Rogers compellingly argues that Dawkins sees “reading DNA through evolutionary time [as] akin to textual archiving”, where the body represents and indeed writes “identity, history and community” (55). For Rogers, Dawkins enhances this metaphor through manipulation
of medieval ideas of *compilatio*. Here, even more than in the comparisons with Chaucer, Rogers draws insightful connections between science and literature, for archiving, she argues, is “a form of compilation, and the practice of compilation is at the heart of medieval textual culture,” building new from old but also mirroring the creation of the world in microcosm (55). Books and genes each contain stories within stories and exist as both part and whole; the relation of the part to the whole is as central to the study of DNA as it is to the medieval codex. Dawkins gives a rather rosy comparison of evolution to manuscript production, ignoring scribal contamination, but both he and Chaucer share “an interest in the ethical implications of disrupting established orders,” whether those orders are based on medieval estates theory or modern biological theories of species division (58). In this sense, Rogers reads Dawkins as a humanist as much as a scientist, one who is equally sceptical of “contentious disciplinary divisions of literature and science” as of creationism (58).

Ultimately, for Rogers, Dawkins’s use of Chaucer and medieval poetics alerts us to the possibility – and significance – of redrawing modern disciplinary boundaries. Impressively, Rogers is equally at home explaining medieval poetics or evolutionary history, and the result is a cogent, well written and persuasive study. Rogers begins and ends her conclusion by noting the ways in which Dawkins blurs period boundaries. The same is true of Rogers herself. Although her overall thesis is entirely convincing, her emphasis on the similarities and potential for cooperation between literature and science, especially codicology and scientific classification, is arguably the greatest contribution this article makes to the field.

K. S. Whetter
Acadia University

James Macpherson’s Ossian poems, sophisticated forgeries published as *Fragments of Ancient Poetry* (1760), exerted a seminal influence upon early Romantic nationalism. In spite of well-founded doubts regarding their authenticity, these ostensible records of ancient Gaelic traditions captivated audiences throughout Europe, as well as luminaries such as David Hume, Denis Diderot, and Johann Gottfried Herder. In “Ossian’s Folk Psychology,” John Savarese provides fresh insight into Macpherson’s project by exploring the influence of contemporaneous theories about embodied cognition on both the style and content of the Ossian poems.

Savarese begins by contextualizing the works within the broader philosophical discourses of the Scottish Enlightenment, emphasizing theories of mind advanced by Macpherson’s contemporaries at the University of Aberdeen. He investigates the similarity between the “common sense” philosophy of the Aberdeen professor Thomas Reid, and the depiction of a coherent “folk psychology” within the Ossianic texts. Savarese links Reid’s philosophy to the burgeoning late eighteenth-century interest in ancient and invented folk traditions. He suggests that “ballad collectors, antiquarians, and, in Macpherson’s case, forgers, understood themselves to be turning from the realm of learned dispute to something like common sense” (730). Savarese relates this in turn to modern discourse around “folk psychology,” which regards the capacity of attributing mental states to others, or mindreading, as a basic human cognitive capacity.

Drawing on the ideas of Macpherson’s near-contemporary, the Scottish philosopher Dugald Stewart, Savarese proposes we read the *Fragments* as stadial history, a philosophical account of experience focusing on speculation as to the inherent “primitive” qualities of the mind. Relating the Ossianic project to eighteenth-century discourses of panpsychism and animism, Savarese suggests that Macpherson turned to the genre of pseudo-primitive writing as a strategy to bypass the philosophical accoutrements of more modern literary creations. Macpherson’s poems can thus be understood as a materialistic investigation of the soul as firmly located in the body, with a primal focus on sensation and the sentimental aesthetics.

This interdisciplinary approach leads Savarese to insightful analyses that bring the cognitive into dialogue with the literary. For example, discussing “Morna’s Genuine Remains,” Savarese notes that Macpherson abandons the folk model “at the very moment when the text confesses its reconstructedness” (735). The crisis described by the poem is the nearly simultaneous deaths of Morna and Duchommar at each other’s hands: Morna stabs Duchommar, who stabs her back; as she falls, she places a rock between their bodies, continuing to reject him even in death. Macpherson depicts these events with lyrical lines interspersed with shifts from the first to the third person, abrupt cuts that Savarese terms “stage directions” (731). He relates this break in literary style to the insufficiency of the folk model to express Macpherson’s depiction of the action.

In interpreting Macpherson’s stylistic experiments within a text purportedly based on an oral tradition, Savarese calls upon the ideas of the influential Scottish physician Robert Whytt. He compares the depiction of Morna’s actions immediately after her fatal stabbing to Whytt’s discussion of behaviors observed in recently decapitated animals. Whytt was interested in posthumous actions that appear to display traces of intention, such as the ability of certain reptiles to retain movement.
for a period of time after death. Savarese uses Whytt’s examples to illuminate Macpherson’s depiction of Morna’s last volitional action on the cusp between life and death. He suggests that we regard Morna’s posthumous action as representing Macpherson’s conception of the embodiment of mental states in bodily practices. Savarese thus claims that *Fragments of Ancient Poetry* straddles a moment in which two conceptions of literature diverged: the poem as “a key to the embodied mind,” on the one hand, and as “a reflex of the mind’s social operations” on the other (741).

Ultimately, as Savarese shows, every forgery cannot help but reveal the dreams of its creator. By locating Macpherson within broader intellectual currents of the Scottish Enlightenment, this excellent article represents a first-rate example of the insights that literary scholars stand to gain in engaging with cognitive historicism and the history of science. Dense but well argued, it makes a substantial contribution to contemporary understandings of the Ossianic project. Further analyses of neurophysiological ideas embodied in the depictions of human behavior within the works would be a welcome supplement to the current work, as would a more fleshed-out account of the relationships between Reid, Macpherson, and Whytt. Given the ferment of medical research in Edinburgh at the time, one also wonders as to the effect of other contemporaneous theories of physiology upon Macpherson’s poems. Overall, “Ossian’s Folk Psychology,” contains a wealth of provocative ideas suggesting a number of further directions for research.

Carmel Raz
Yale University
Emily Bowles is a doctoral candidate at the University of York researching representations of Charles Dickens 1857-1939 and the creation of a ‘characteristic’ Dickens. Her research interests include Victorian afterlives, and the influence of modernity and technology on the Victorians and their representation. She is editing a new edition of Dickens’s short stories “George Silverman’s Explanation” and “Holiday Romance”, forthcoming in 2015.

Greg Garrard is Sustainability Professor at the University of British Columbia and a National Teaching Fellow of the British Higher Education Academy. A founding member and former Chair of the Association for the Study of Literature and the Environment (UK & Ireland), he is the author of Ecocriticism (Routledge 2004, 2011 2nd edn) and numerous essays on eco-pedagogy, animal studies and environmental criticism. He has recently edited Teaching Ecocriticism and Green Cultural Studies (Palgrave 2011) and The Oxford Handbook of Ecocriticism (OUP 2014) and become co-editor of Green Letters: Studies in Ecocriticism.

Peter Johnston completed his Ph.D. on J.M. Coetzee and mathematics in 2013, at Royal Holloway, University of London. With wider interests in the intersection between literature, mathematical philosophy, and digital humanities, he is currently working on a stylometric analysis of the works of David Foster Wallace.

Bernard Lightman is Professor of Humanities at York University.  Lightman’s most recent publications include Victorian Popularizers of Science, Victorian Scientific Naturalism (co-edited with Gowan Dawson), Evolution and Victorian Culture (co-edited with Bennett Zon), and The Age of Scientific Naturalism (co-edited with Michael Reidy). He is currently working on a biography of John Tyndall and is one of the editors of the John Tyndall Correspondence Project, an international collaborative effort to obtain, digitalize, transcribe, and publish all surviving letters to and from Tyndall.

Gregory Lynall is Senior Lecturer in English at the University of Liverpool. He is the author of Swift and Science: The Satire, Politics, and Theology of Natural Knowledge, 1690-1730 (2012) and a number of essays on literature and science, particularly in the long eighteenth century. He is currently writing a cultural history of solar technology and a biography of John Arbuthnot.


Carmel Raz is completing a dissertation at Yale University on the interaction between medico-scientific discourse on perception and auditory cultures in the early Romantic era. Her work has been published in 19th Century Music, Zeitschrift der Gesellschaft für Musiktheorie, and the Journal of Neo-Victorian Studies. She holds degrees from the Hochschule für Musik in Berlin and from the University of Chicago.
Emilie Taylor-Brown is a PhD Candidate in the English department at the University of Warwick, generously funded by the Wolfson Foundation. She holds a BSc (First Class) in Biology and English, as well as an M.Res (Dist) in humanities, jointly supervised by members of the English, History and Biology departments at Keele University. Her current doctoral project analyses the emergent dialogue between Parasitology and the British literary imagination in the years 1885-1935.

Anne M. Thell is an Assistant Professor of eighteenth-century literature and culture at National University of Singapore. Her current book project, Minds in Motion, examines travel literature alongside shifts in eighteenth-century epistemology. From 2012-2015, she is president of the Southeast Asia Society for Eighteenth-Century Studies (SASECS).

K. S. Whetter is Professor of English at Acadia University. His interests are wide-ranging, but his principal areas of research are heroic literature, genre theory, and mediaeval Arthurian literature, especially Malory’s Morte Darthur. His publications include Understanding Genre and Medieval Romance (2008), Re–Viewing Le Morte Darthur, co-edited with Raluca L. Radulescu (2005), and The Arthurian Way of Death, co-edited with Karen Cherewatuk (2009).