Science

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Science

The term 'scientist' is a Victorian one, coined by William Whewell in 1833. From there it is easy to imagine Victorian science as advancing steadily, shedding spiritualism, natural theology, mesmerism and phrenology towards what we might recognize as science today. Yet, as with many such convenient historical myths, we find nothing of the sort, with some scientists at the end of the century denouncing state funding for research, defending the study of supernatural phenomenon and, in the pages of the late nineteenth-century popular science magazine *Science-Gossip*, having a lively discussion as to why the term 'scientist' should be abandoned as a barbarism.[1] Although those who practiced science might have claimed their results captured timeless truths about the natural world, what were considered truths and the methods with which they were derived and disseminated were drawn from the changing world around them. Equipment, methods, bodies of knowledge, research programs, networks of expertise, and mechanisms for the communication of results all rooted the production of objective scientific knowledge in historically contingent social practices. Not only does science

[1] John T. Carrington, '"Scientists," – A Protest', *Science-Gossip*, 1 (1894), 228 and John T. Carrington, 'The Word "Scientist"', *Science-Gossip*, 1 (1894), 242–3. See also Sidney Ross, 'Scientist: The Story of a Word', *Annals of Science*, 18 (1962), 65-85.

have a history, but for those Victorians practicing science there were a variety of subjects to study and ways in which to study them.

This is important as it means that science, as a part of Victorian culture, not only played a crucial role in how the Victorians thought about themselves and the world, but it also provided them with a vocabulary for expressing it. And of course, the concepts, ideas, and language of scientists were derived from the context within which they lived their lives. Victorian science, in other words, was part of Victorian culture, and Victorian culture in turn shaped Victorian science. It was not unusual for literary authors to engage with scientific ideas in their work; nor did scientists ignore the concerns, forms or techniques of literature. Indeed, the shared cultural context of both practices – whether this is the way in which the world was imagined, the shared social networks within which authors and scientists moved, or the common market within which they sold their work – meant that there were necessarily connections between the two, even when their practitioners maintained otherwise. In his writing, Dickens rarely engaged with scientific ideas directly: however, this does not mean that he was uninterested in science or that it does not play a part in his work. By first describing how science and scientists featured in society, and then considering the place of science in the market for print, this chapter argues that to understand Dickens's engagement with science it is first necessary to recognize the role of science as a constitutive part of nineteenth-century culture.

Science and Society

When the satirical weekly magazine *Tomahawk* imagined the notable figures of the day away at the seaside for the summer in August 1868, it made sure that scientists were among those depicted. On the left of the image are the astronomer Sir John Herschel and the naturalist Richard Owen. Herschel, depicted in the cartoon selling peeps through his telescope for a penny, followed in his father William's footsteps and dedicated his life to science, supporting himself and his large family through his mother's wealth. Owen, shown hawking 'fossil drops', was Superintendent of the natural history collections at the British Museum. Both were among the most famous scientists of the day and each represented a different type of scientific career. Herschel was born into a wealthy scientific dynasty and so could move easily within the scientific community, dedicating himself to whatever researches seem promising; Owen, on the other hand, initially had to take whatever scientific employment he could in order to support himself, using his position to create new research programs of his own. Whereas Herschel was an emblematic Victorian 'grand amateur', Owen represented the entrepreneurial scientists who increasingly took the lead in scientific affairs as the century progressed.

Although the amateur tradition, situated in the home, allowed the participation of women, they were excluded from the various clubs and societies that administered scientific prestige. There was pressure from within learned societies to admit women, but few were successful and women were not permitted to join the most prestigious of the learned societies, the Royal Society, until after the second world war. The increasing importance of scientific training, even for those sciences with large amateur bases such as natural history, operated to exclude women by further institutionalizing scientific credentials.

Such exclusions reinforced the perception of science as masculine, yet the variety of practices that it encompassed, coupled with the ready access to scientific knowledge and networks afforded by books and the periodical press, ensured that there were opportunities, although often contested, for women to contribute to all levels of scientific research.

The club-like atmosphere that pervaded much of the higher reaches of Victorian science also enforced other cultural divisions. The learned societies were based in London and tended to be dominated by metropolitan cliques. However, there were thriving scientific communities distributed around Britain – particularly in the University towns and industrial cities – and these came to be incorporated into civic buildings such as new libraries and museums as expressions of middle-class civic pride. In the early nineteenth century science had been embraced by groups such as the Society for the Diffusion of Useful Knowledge as a supposedly politically-neutral activity that would both educate and pacify the working classes and science continued to function as an instrument of middle-class paternalism throughout the century. Although this approach alienated some scientific communities, particularly those who aligned science with radical politics or used it to advance unorthodox religious or spiritualist beliefs, it furnished opportunities for a range of scientific activities to take place.

This resulted in a rich and varied scientific culture made up of different groups who sometimes overlapped but were often constituted in opposition to one another. Science was thus stratified by divisions of class and gender but, at times, also provided the means

for transcending such social hierarchies. Richard Owen and John Herschel might have been two of the most recognized scientific authorities of the period, but their research was based upon a range of informal networks that stretched far beyond the prestigious scientific institutions to which they were publicly connected.

Science and Print Culture

In the nineteenth century scientists could be encountered outside gathering specimens, giving lectures, working in museums, hosting soirées, studying in library reading rooms, or corresponding with like-minded researchers around the world. They could also be found in the pages of books, magazines and newspapers, whether they were the subjects under discussion or featured as authors in their own right. Publishing was a crucial component of scientific practice and one of the most important mechanisms for the communication of scientific ideas. Both the press and the book trade offered potential sources of income for those who wished to devote their time to scientific pursuits. Specialist scientific journals such as those published by learned societies tended not to pay for contributions: instead, scientists were expected to submit material in exchange for the prestige that the publication might confer. The circulation of these publications tended to be small and restricted to the members of the society that published them; however, there was also a market for commercial science journals. Although it could be difficult to turn a profit with a publication dedicated exclusively to science, titles such as *Nature* (1869-), *Chemical News* (1859-1932) and the *English Mechanic* (1865-1923) found suitable readerships that sustained them throughout the century.

There was also a market for scientific articles beyond dedicated scientific publications and contributions to the wider periodical and newspaper press provided scientists with much-needed incomes. In 1853, for instance, Thomas Henry Huxley, then both a rising scientific star and unemployed, was offered six pounds and six shillings per issue for the science section of the *Westminster Review*. Science was newsworthy and, in addition to articles discussing recent discoveries or controversies, there was also demand for coverage of scientific affairs more generally. The meetings of scientific societies bound science into the social life of towns and cities and produced a steady flow of scientific content for the press.

Science was also the subject of a substantial proportion of the books published in the Victorian period. Although it is difficult to obtain accurate quantitative accounts of the publishing industry, it has been estimated that pure science represented about 5-6% of books published between 1840-1870. By comparison, religious works, history and literature each represented around 20% of the total, with social science providing a further 15%.[2] However, these subject classifications provide only rough approximations of the actual contents of the books: when we remember that science underpinned work in genres such as the social sciences, travel or geography, that the role of science in school textbooks increased throughout the century, or even that it was not unusual for religious works to contain scientific discussion, it becomes apparent that the figure for science is a considerable underestimate of its relative presence.

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[2] Simon Eliot, '*Patterns and Trends* and the *NSTC*: Some Initial Observation', *Publishing History*, 42 (1997), 51-64 and 43 (1998), 71–112.

The book had a high cultural value, and many scientists chose to publish what they thought were their definitive ideas as books. These publications tended to be expensive and issued in short print runs. Although Darwin's *Origin of Species* is often presented as a bestseller, selling out its first edition on its day of publication, the first edition was only of 1250 copies, with a second edition of 3000 published later that year.[3] The market for books about science was dominated by what were considered popular science writers. Although books by writers like the Revd John G. Wood, Arabella Buckley, Richard Anthony Proctor, and Margaret Gatty did not have the same influence upon scientific thought as those of Darwin, Charles Lyell or James Clerk Maxell, they reached many more readers, in turn creating new audiences for science as well as underpinning scientific communities in their own right.[4]

The various manifestations of science in print culture – specialist monographs, dedicated periodicals, popular magazines; contributed by leading scientists, critics, or interested amateurs – provided the context through which readers encountered scientific ideas. In negotiating their way through these various texts, wherever they appeared, readers were exposed to new concepts, images and, most importantly, languages. The role of science within culture was negotiated through this fluid and multiple print culture; for its readers,

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[3] See R.B. Freeman, *The Works of Charles Darwin: An Annotated Bibliographical Handlist*, Folkestone, Kent, William Dawson and Archon Books, 1977, 75–84. In *Darwin Online: The Complete Works of Charles Darwin Online* <http://darwin-online.org.uk> [accessed 4 September 2008].

[4] For more on these writers – and many others – see Lightman, *Victorian Popularizers of Science*.

it provided the conceptual and linguistic means through which to interpret the natural world and, of course, their own place within it.

Science and Dickens

As a notable literary figure in metropolitan society, Dickens mixed with a number of scientific men and women. His closest scientific acquaintance was Richard Owen and Dickens published some of Owen's work in his periodical, *Household Words*.[5] Indeed, Dickens owned many important works of science and his two most successful periodicals, *Household Words* and *All the Year Round*, published a number of scientific articles over their respective runs. However, the extent to which Dickens himself understood and engaged with contemporary scientific debates is unclear. Dickens was an early advocate of the evolutionary ideas contained within the anonymous *Vestiges of Creation* (1844) and he published a respectful but largely sceptical review of Darwin's *Origin of Species* in *All the Year Round* shortly after its publication in 1859.[6] Yet, despite numerous references to contemporary science within his literature, it is difficult to make the case for Dickens as an active contributor to scientific debates, or even a well-informed commentator. Unlike, for instance, George Eliot, Dickens's interest in science

[5] Adelene Buckland, ''The Poetry of Science': Charles Dickens, Geology, and Visual and Material Culture in Victorian London', *Victorian Literature and Culture*, 35 (2007), 679–694.
[6] Anonymous, 'Natural Selection', *All the Year Round*, 3 (1860), 293-299; K.J. Fielding, 'Dickens and Science?', *Dickens Quarterly*, 13 (1996), 201-3.

seems to be casual, certainly no better than any reasonably educated man or woman of letters.[7]

There is one well-known incident, however, that demonstrates Dickens's concern with scientific legitimacy.[8] In December 1852 Dickens published the tenth instalment of *Bleak House*. This number, published for the lucrative Christmas market, was the centrepiece of the novel, providing the gruesome account of Krook's death by spontaneous combustion. Immediately on publication, this scene was criticized by Dickens's friend, George Henry Lewes, in the weekly newspaper and review the *Leader*. Lewes was the editor of the literary section of the *Leader*, and he claimed that Dickens's erroneous science had marred his fiction. Lewes wrote that the episode 'overstepped the limits of Fiction' by introducing the 'Improbable' into art. It was science that dictated the probability of spontaneous combustion: for Lewes, there was insufficient evidence to support it as a phenomenon and so he stated it was 'only admissible as a metaphor', suitable for the communication of symbolic meaning but not as a narrative event in its own right.[9] Dickens responded in the next instalment of *Bleak House*, claiming that there were scientific precedents for such an incident. Lewes, in return, published two open letters to Dickens in the *Leader*, disputing these authorities and giving scientific reasons for its impossibility. Dickens was not to be persuaded, however, and, when the novel was published in a single volume in September 1853, he once more defended his position

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[7] Francis O'Gorman, *The Victorian Novel*, Oxford, Blackwell, 2002, p. 252.
[8] A good overview of this incident is Gordon S. Haight, 'Dickens and Lewes on Spontaneous Combustion', Nineteenth-Century Fiction, 10 (1955), 53-63.
[9] Anonymous [G.H. Lewes], 'Literature', *Leader*, 3 (1852), 1189. In the *Nineteenth-Century Serials Edition* (2008) <www.ncse.ac.uk> [accessed 10 December 2009].

in the novel's Preface. Wearily, Lewes returned to the subject in the *Leader*, restating that he had shown, 'by the evidence of Science, in agreement with the testimony of some its greatest names, that the phenomenon was not merely improbable, but *impossible*' and referring readers back to his letters from earlier in the year.[10]

For both Dickens and Lewes science was an important instrument in establishing the probability of phenomena, fictional or nonfictional, but their conceptions of what constituted science were different. As a journalist, novelist, editor and proprietor, Dickens recognized the value of scientific work in the market for print, but he also knew its value as a way to both understand and describe the world. For Lewes, Dickens's evidence was simply not authoritative, not even able to render spontaneous combustion improbable, let alone probable. Dickens, however, was not concerned with convincing men of science of the plausibility of spontaneous combustion, but the readers of his novels. In his Preface, Dickens describes Krook as if he was a real person: his readers, of course, knew he was not real, but would concede to the conceit on the basis of the plausibility of the fictional world of the novel. This world, although featuring recognizable aspects of that beyond the text, was literary and so its success depended not on the reproduction of natural processes but on their representation. As critics have noted, the demands of fiction do not always permit the accurate rendering of the natural world, but this is only a problem when we cease to read it as literature.[11] Dickens might

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[10] Anonymous [G.H. Lewes], 'Literature', *Leader*, 4 (1853), 858. In the *Nineteenth-Century Serials Edition* (2008) <www.ncse.ac.uk> [accessed 10 December 2009]. The emphasis is Lewes's.

[11] See, for instance, George Levine, *Darwin and the Novelists: Patterns of Science in Victorian Fiction*, Cambridge, Ma, Harvard University Press, 1988 and Gillian Beer,

not have had a thorough understanding of science, or ensured that he accurately depicted scientific phenomena in his literature, but this does not mean that he was uninterested in science or that his work can tell us nothing about it. On the contrary, the way Dickens used science for literary ends allows us to see beyond the idea of science as an authoritative, objective method for the generation of truth and instead recognize it for the complex, varied cultural practice that it was.

Conclusions: Science as Culture

Once we begin to understand the place of science in nineteenth-century culture we can move beyond the question of whether Dickens was scientific or not and instead start to explore why Dickens engaged with science as he did. Science played an important part in the society that Dickens depicted in his novels. Science was also an important part of the literary marketplace for which Dickens crafted his work to be sold. But, most importantly, science provided a set of ways in which to understand natural phenomena and a language for describing them. Despite their efforts to police the boundaries of the plausible, the ideas, methods and language of science were employed and understood in a variety of different ways and for a wide range of purposes. Even within science, authority was contested: just four months after criticizing Dickens, Lewes found himself accused of being unscientific in a review of his latest book written by Huxley in the *Westminster Review*.[12] Scientific authority conferred the right to describe nature and

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Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction, 1983; Cambridge, Cambridge University Press, 2009.

[12] Anonymous [T.H. Huxley], 'Science', *Westminster Review*, 61 (1854), 254-270.

speak on its behalf, but this status was not simply a matter of scientific knowledge. Just as gender, class and personal connections could all contribute to the making of a scientific career, so the use of scientific language could lend credibility to ideas that might otherwise be dismissed. It is within this heterodox understanding of science and its status in wider society that we must situate Dickens.

Further Reading

Beer, Gillian, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, Cambridge, Cambridge University Press 1983, 2000, 2009.

Cantor, Geoffrey, and others, *Science in the Nineteenth-Century Periodical: Reading the Magazine of Nature*, Cambridge, Cambridge University Press 2004.

Levine, George, *Darwin and the Novelists: Patterns of Science in Victorian Fiction*, Chicago, University of Chicago Press, 1991.

Shuttleworth, Sally, *George Eliot and Nineteenth-Century Science: The Make-Believe of a Beginning*, Cambridge, Cambridge University Press, 1984.