Critical Reflection section: Literature and Science

David Amigoni, (Keele University)

1. 'The Conveyance of Thought' in the Wonderful Century of Science

In this chapter, I critically reflect on the interface between literature and science in the long nineteenth century. I map trends in the field suggesting that, methodologically, literature and science paradigms are quite fundamental to the understanding of interdisciplinary nineteenth-century studies: in so far as the literature-science field has been characteristically concerned with the transmission of thought and its conveyance by the material channels of technological media. I consider the case of a 'transitional' literary writer who has not been seen, hitherto, as a contributor to the field: that writer is Arnold Bennett. In making the case for including Bennett I examine aspects of his novel writing practice that speak of his subtle engagement with Victorian ideas about science and technology in everyday life that have not, to date, been so prominent given the field's (understandable) preoccupation with Darwin and the question of evolution. I also explore Bennett's essay 'The Rising Storm of Life' (1907) as a magazine publication which provides a context for reflecting on more direct exchanges between popular writing and scientific ideas; and which, thereby, acknowledges the important role played by book and print history at the literature and science interface across the long nineteenth century.

I begin in 1899, on the cusp of the new century, when Alfred Russel Wallace published *The Wonderful Century*, a fin de siècle review of the remarkable progress of science during the nineteenth century as that century shaded into the twentieth. Wallace had a reputation as both scientist and social radical (Wallace, 1913) who had experienced poverty through an underprivileged childhood (Wallace, 1908). In 1899 he was still best known for his role in the articulation of the theory of evolution by natural selection, alongside the more prominent,

prestigious and socially privileged Charles Darwin in 1858. Evolution was evinced in the 'wonderful' selections and adaptations of species that Darwin and Wallace commonly observed through their independently realised theorizations of Thomas Malthus' population principle (Wallace, 1899: 139). Wallace refers to evolution as 'the great scientific work of the nineteenth century' (134), noting also that the philosopher of evolution, Herbert Spencer, wrote with 'skill and logical powers' that did much to prepare the minds of 'unprejudiced readers' (138). Significantly, Wallace's 'wonderful century' cast its net wider to reflect on the revolution in everyday life delivered by science and technology, beginning with the railway revolution: the origins of which Wallace recalled autobiographically, travelling (1837-8) in third-class supreme discomfort from Leighton Buzzard to Watford (4).

Wallace also recorded the effects of labour-saving machinery on everyday life: the domestic sewing machine for the making of clothes (12); and the typewriter for producing, with great mechanical ingenuity, a 'clear impression' of thought on paper. Wallace was struck by the sheer variety of typewriters available, all of which appear to have reached a high standard of efficiency (13). It was perhaps this sense of the abundance of the means of productivity that led to Oliver Herford's caricature of the late Victorian and Edwardian writer Arnold Bennett who became known for his prolific capacity for writing [Fig 1]:

Fig. 1, Oliver Herford, 'Arnold Bennett', Charles Scribner and Sons, New York, 1917

Bennett is here presented as taking full advantage of the productive capacity of the four typewriters he has at his disposal. Hands and feet are fully engaged: Bennett becomes a kind of human extension of the machines as his twenty digits (hands and toes) rattle out impressions of thought on the swirling mass of papers. I return to Bennett in due course.

Wallace's *Wonderful Century* marks the extent to which 'the Conveyance of Thought' – the title of his third chapter, reflecting on the way in which thought might be passed from one consciousness to another – had itself had been revolutionised in the nineteenth century. Though Wallace enacts science's indebtedness to literature by peppering his chapters with poetical epigrams from sources that reflect on science (Shelley, Tennyson, Sir Lewis Morris), Wallace was most concerned with what we might call the infrastructures supporting thought conveyance: in a progressive account of developments he identifies the postal services; followed by the electric telegraph, which had achieved world-wide coverage by the final third of the century (19-20); and finally the telephone, 'a marvellous and unexpected discovery', which organised and conveyed vocal vibrations through an electronic signal to reproduce voice from metallic discs (21-22). Though Wallace was concerned to explain the science, Steven Connor points to the link between ideas of disembodied voice and the spiritual in the nineteenth century which 'coil so closely together with … work of the scientific imagining and understanding' (Connor, 2000: 363). Indeed, Wallace was himself a convinced spiritualist and wrote a chapter defending psychical research and hypnotism (Wallace, 1899: 194-212). He was also attuned to the darker sides of scientific advance: the subtitle of Wallace's book was *Its Successes and Failures* and, for Wallace, the terrible failures of nineteenth-century science included military technology which Wallace condemned as 'the Curse of Civilisation' (324-41). Thus in 1899, Wallace told a highly complex story about nineteenth-century science and the variety of evolutions and transports, including transports of radical, material spiritual, and genocidal thought, that it had licensed.

2. Darwin and Beyond: Literature and Science, Methods and Stories.

I begin deliberately at the end of the century because of the way in which writers were addressing the question of their 'present' and where, in all uncertainty, it might lead: the end of the century was simultaneously the closure of one episode, the deeply uneasy opening of

4

another. The field of Victorian literature and science studies has in its own illustrious past arguably been dominated by the heavyweights of literature and evolutionary science in the canonical mid-Victorian period, c.1850-80: George Eliot, the early Thomas Hardy, Charles Darwin and Thomas Henry Huxley. Eliot and Hardy were writers who were self-consciously literate *consumers* of Victorian scientific writing and Gillian Beer, in *Darwin's Plots* (1983), has been the most authoritative and innovative expositor of the way in which these canonical writers self-consciously wove advanced scientific thought into their fictional writings. Beer's method was innovative because it went beyond a unidirectional model of 'influence' which had been widely used prior to Beer's arrival (as early, in fact, as Edward Dowden's essay on 'The Scientific Movement in English Literature' of 1877). Beer was most interested in the complex ways in which ideas 'travelled', often far from directly or indeed under the direct supervision of consciousness. Her 'two-way traffic' metaphor, which looked not only at the way in which scientific 'reference' was adapted into literature, but also the way in which scientific ideas were themselves shaped by literary discourse, narrative and other genres, has been highly influential (Beer, 2009: 5).

Beer's work played a role in shaping George Levine's later *Darwin and the Novelists* (1988) because Levine was precisely interested in a wider, and earlier, range of nineteenth-century writers, including Jane Austen. Consequently, Levine's writers were not always avid, attentive readers of advanced scientific writing. While Levine's study could, on the one hand, show the extent to which Dickens' journalism and fiction was in dialogue with contemporary scientific ideas, Levine was also interested in the way in which the writings of Dickens and Darwin were commonly, and more or less unconsciously exploring narrative 'patterns' or 'thematic' projections of, for example, ecological connectedness (Levine, 1991:131).

In his awareness of the broader Victorian historical and cultural context, Levine also generated ways of thinking about Beer's metaphor of 'traffic' in ways that were both

conceptual and material. Scientific ideas, for Levine, were embedded in cultural practices and, early in his book, he acknowledged the way in which science also revolutionised the technologies that structured Victorian culture, including the systems of transportation that moved people and ideas between, say, a lecture on 'Evenings at a Microscope' and the home (Levine, 1991: 3-4). Alan Rauch's *Useful Knowledge* (2001) was another important contribution to the perception of early nineteenth-century science as information: useful and valuable knowledge that could be imparted through books and magazines as well as exhibitions and museums (Rauch, 2001: 3). The full methodological effects for the literature-science interface of this kind of research would be realised in the later work of, most notably, James Secord in his study of Robert Chambers' pre-Darwinian (1844) evolutionary 'sensation', *Vestiges of the Natural History of Creation* (Secord, 2000). Secord's masterful study drew out the way in which scientific ideas were materialised through the technologies of print, magazine and book production, to be consumed, debated and further disseminated through particular 'geographies' or networks of reading and social interaction. Secord and Jonathan R. Topham developed versions of the history of the book, and magazine and periodical culture, that have come to be highly important to the history of science through the work of Sally Shuttleworth's 'SciPer' project (see 'Science in the Nineteenth-Century Periodical', see also Cantor et al, 2004); and in particular to research at the literature-science interface.

Secord's work, foregrounding as it does the mid-century battle over natural history and the evolution question, is capacious in its grasp of the full range of sciences that contributed to pre-Darwinian evolution controversy, including for example astronomy and Laplace's Nebular Hypothesis (Secord, 2000: 90-91). Yet it still only tells part of the story about the Victorian science and literature relation. In turn, it needs to be seen in relation to the work of Crosbie Smith's narrative about the importance of the 'science of energy' in the later

Victorian period. Smith's narrative reminds us of the importance of other scientific authorities and the phenomena they theorised and introduced to public attention: Lord Kelvin on the laws of thermodynamics, James Clerk Maxwell and Sir Oliver Lodge on electro-magnetic waves. To explore Victorian science and literature from the perspective of 'energy science' introduces different forces, temporalities (the later Victorian period) and other geographies of knowledge formation and dissemination. Crosbie Smith's focus on what he characterised as 'North British' sciences of energy and electricity moves the narrative away from clerical Oxbridge and its theologically driven arguments over human distinctiveness and design that produced the 'science and religion' conflict; and towards a 'North British' science that was more imbricated into the fabric of industrial Britain and its emergence as a mass consumer culture (Smith, 1998). Smith's work on energy science needs also to be seen in the light of Laura Otis' research (2001) on the nineteenth-century railway and telegraph systems as modes for understanding, analogically, nervous embodiment, connectivity and the very idea of the circulatory or informational networks. If Beer read Eliot's 'web' metaphors in *Middlemarch* in the context of Darwinian evolutionary ecologies and theories of sexual selection, Otis read the novel in the light of communication networks. Otis' work connects Smith's late Victorian concerns with energy to the electronic sources of the telegraph revolution that were developed much earlier in the Victorian period, following the Romantic period experimentation of Galvani.

The lives of pioneer scientists who developed ground-breaking forms of electrical experimentation traversed these overlapping temporalities as the workings of these forces became clearer. Sir Oliver Lodge was himself a major public figure during the late nineteenth and early twentieth centuries; though now somewhat forgotten. The first person to transmit a wireless signal, he was born (1851) and educated in the industrial heartlands of the Victorian Potteries. Lodge pursued higher education through the University of London: he recorded in

his autobiography *Past Years* (1931) how John Tyndall's tenure as lecturer at the Royal Institution during the 1870s, following in the footsteps of Michael Faraday, inspired Lodge's early scientific education (Lodge, 2012: 78). Once established, Lodge pioneered higher educational opportunities in industrial cities: he was founding professor of Physics at Liverpool University, and the first Principal of Birmingham University. Lodge's research on electricity, energy science and the idea of ether – a theoretical, perhaps even mysterious, space-filling medium for transmission of light and electro-magnetic waves – developed at Liverpool, was recast into popular lectures and publications and widely read and acclaimed. Lodge's theoretical work also translated into technological innovation: his experimental work on spark ignition, for example, would revolutionise the internal combustion engine through his sons' development of the spark plug. Lodge was also a committed spiritualist: and, through writing about communication with the deceased son he lost in the Great War, a public advocate of spiritualism. Lodge, a socialist educated in the tradition of John Ruskin (Lodge, 2012: 267), brings us back to Alfred Russel Wallace's own diverse formation, his complex make-up and the complex story he told about Victorian science and progress in 1899. But Lodge's birthplace – the mid-Victorian Potteries – also points us towards the writer Arnold Bennett.

3. Arnold Bennett between the Victorians and Moderns: literature, science, technology and 'Life'

Arnold Bennett is a persistently under-valued writer who was not, seemingly, engaged with science, despite a long friendship with the writer H.G. Wells, the 'father' of the scientific romance. Bennett merits attention here precisely because of the way in which he existed across multiple temporalities given that he began his writing career as a late Victorian. He operated, moreover, in a complex field of middle-brow and popular genres during the 1890s and 1900s: for example, his fashionable 'fantasia novel' *The Ghost* (1907) was a story about

8

high bourgeois romance in the operatic worlds of London and Paris which is built around the plot of a deeply malevolent haunting from the spirit world; a haunting so malevolent that the ghost of the title can seemingly prompt both a terrible storm and a train crash, both of which are described by the narrator in great detail. Bennett's sensational popular fiction could thus trade on the catastrophic possibilities that might lurk behind the apparently smooth running Victorian technologies of *transportation*, in both material and metaphorical senses of the word.

Bennett has attracted most regard for his quality 'Edwardian' fiction which reflected on the provincial Victorian past. Virginia Woolf almost succeeded in subsequently killing his reputation through her disdain for what she perceived as the non-artistic accumulation of material detail characterising Edwardian fiction. Though prolific – witness again the caricature of Bennett and his typewriter mania – Bennett was always a more subtle and self-aware novelist than Woolf could acknowledge, even or perhaps especially in the fictional 'Five Towns' novels, based on the Potteries where he was born in 1867: a younger but no less intellectually ambitious contemporary of Sir Oliver Lodge. Bennett negotiated, as I shall show, a variety of magazine and popular publishing contexts that can be seen as intertexts for his working through of concerns about life, science, technology, progress and culture. This volume considers, among other topics, questions of adaptation and the construction of neo-Victorian literatures. Bennett's contribution to the literature and science interface adds, I suggest, to this construction of a complex 'Victorian' periodicity.

Overarching his re-construction of the Victorian period, Bennett's writing project was committed to an exploration of the complex meanings associated with the term 'life': the fourth book of his 1908 novel, *The Old Wives' Tale*, traversing life in the Potteries and Paris between the 1860s and 1907, was gnomically entitled 'What Life Is'. In every sense, Bennett's project was representational and he used the aesthetic paradigms of nineteenth-

9

century realism – but also the science and nascent sociology that had been woven into the fabric from the legacy of the French novelist Balzac – both to guide and extend the exploratory power of his project (Amigoni, 2015). Bennett's conception of human 'life' was consequently also grounded in discourses of science and technology: again, Bennett drew attention to this in another book that he published in 1908: a kind of self-help guide tellingly entitled *The Human Machine*, where the help required was precisely one of recognition: 'considering that we have to spend the whole of our lives in this human machine, considering that it is our sole means of contact and compromise with the rest of the world, we really do devote to it very little attention' (Bennett, 1908: 14). The nature of the fleshly decline of the body may be unrecognisable to oneself: but others can recognise it as a malfunctioning machine, as Bennett acknowledges in a metaphor of an emerging automobile technology that Sir Oliver Lodge's science was beginning to revolutionise: 'Anyone can see the sparking apparatus is wrong' (Bennett, 1908 [1]: 13).

In his fictions, Bennett subtly drew attention to the transforming presence of science and technology in everyday life: his first novel, *A Man from the North* (1898) placed as a backdrop to consciousness the technology that could connect an aspiring young northern man to the dream of London: yet, while the heat of the steam engine could be felt from the platform from which Richard Larch observes its embarking passengers, prompting deep envy of the stoker (Lord Kelvin's laws of thermodynamics in everyday life and longing, one might say), the passengers' powers of conveyance to the pavements of Piccadilly Circus and the Strand remain somehow magical, a source of wonder (Bennett, 1908 [2]: 1).

Bennett's later 'Five Towns' novel, *The Price of Love* (1914) immerses the reader in the transforming early twentieth-century world of comic-romantic domestic intrigue (marriage and the suspected theft of money); again, Bennett's setting for the novel illuminates the transition from a Victorian gas-lit, to an electronically dazzling, world. The heroine, Rachel

Fleckring, begins the novel as the youthful housekeeper to the widowed, ageing Victorian matriarch Mrs Maldon. At the opening of the novel, Bennett's narrator takes the trouble to describe for his readers the precise task that Rachel performs in lighting the drawing room gas mantle: from collecting the metal pipe (imitation brass) full of tapers; lighting it at the open fire; and standing on a stool to reach the gas-fitting, 'which is a flexible pipe, resembling a thick black cord, and swinging at the end of it a specimen of that wonderful and blessed contrivance, the inverted incandescent mantle within a porcelain globe' (Bennett, 2006: 2). While this could be seen as damning evidence fuelling the Woolf campaign against superfluous detail, Bennett introduces subtle perspectival shifts that comment on the experience of technological innovation. Though coal gas as a source of power had been harnessed and stored in urban gasometers as early as 1824 in Leeds, and the first electric power station opened in Deptford in 1889, for many gas power was a still a novel arrival into late Victorian domestic life. For Mrs Maldon, as a pillar of Five Towns respectability, gas lighting had only recently been adopted 'as the dangerous final word of modern invention' – the danger underlined by the 'mild, disconcerting explosion, followed by a few moments' uncertainty as to whether or not the gas had "lighted properly"' (2). It is as though technology places everyday domestic life precipitously on the edge of catastrophe.

The yet more advanced energy of electricity could prompt other potential crises: the youthful perspective of Rachel registers the seductive powers of electronically conveyed 'pleasures' in the form of the new cinema in the Pottery town of Bursley: as Rachel settles into this new environment 'she was in bliss. She surrendered herself to the joy of life, as to a new sensation. She was intoxicated, ravished, bewildered …   The screen glowed again.' (145-6) Bennett reminds his readers of the multiplicity of temporalities through which science and its technological offspring could be experienced, in the realms both of the real and fantasy.

These complex temporalities were also evident in the more widely known and indeed acclaimed novel *Clayhanger* of 1910 ('a very great novel' according to the, *North American Review*: Hepburn, 1981: 264). The novel is a bildungsroman, the history of young Edwin Clayhanger's development of self as he does battle with his poverty-hardened father, the self-made printer Darius. In chapter 12, entitled simply 'Machinery', Bennett rendered the presence of a technological object that is at once mechanical *and* animal. The old printing press in Darius Clayhanger's Victorian printing works is a good example of Bennett's 'weaving' of a complex of discourses from Victorian scientific naturalism along a cultural binary (animal/machine): the printing press is an object that conveys something of the complex cultural evolution that it has helped to shape, creating a sense of time and being that disrupts simple binaries:

> Then there was what was called in the office the 'old machine,' a relic of Clayhanger's predecessor, and at least eighty years old. It was one of those machines whose worn physiognomies, full of character, show at once that they have a history. In construction it carried solidity to an absurd degree. Its pillars were like the piles of a pier. Once, in a historic rat-catching, a rat had got up one of them, and a piece of smouldering brown paper had done what a terrier could not do. The machine at one period of its career had been enlarged, and the neat seaming of the metal was an ecstasy to the eye of a good workman. Long ago, it was known, this machine had printed a Reform newspaper at Stockport. Now, after thus participating in the violent politics of an age heroic and unhappy, it had been put to printing small posters of auctions and tea-meetings. Its movement was double: first that of a handle to bring the bed under the platen, and second, a lever pulled over to make contact between the type and the paper. It still worked perfectly. It was so solid, and it had been so honestly made, that it could never get out of order nor wear away. And, indeed, the

conscientiousness and skill of artificers in the eighteenth century are still, through that

resistless machine, producing their effect in the twentieth. But it needed a strong hand

to bestir its smooth plum-coloured limbs of metal, and a speed of a hundred an hour

meant gentle perspiration. The machine was loved like an animal. (Bennett. 1910:

100-101)

The machine communicates a 'life force' through physiognomy, signified by limb-like

protuberances and the suggestion of character features. 'Loved like an animal', the machine

has dispatched pests in the manner of a faithful pet which is however not subject to the same

laws of decay: the product of eighteenth-century 'artificers', it is also itself the maker and

conveyer of meanings that have shaped cultural history, from the founding mission to print a

radical newspaper in the late eighteenth century, to its present occupation printing posters

supporting respectable middle-class life (auctions and tea meetings).

Though Bennett does not 'declare' his sources there are, it seems to me, sources of

nineteenth-century scientific writing with which Bennett (as we shall see) was familiar that

permeate this portrait of the machine. Herbert Spencer, as a Lamarckian philosopher of

evolution, devised a theory which probed the fine dividing line between organic and

inorganic, the animal and the machine with which Bennett plays. His founding text of

evolutionary philosophy, *First Principles* (1862) theorised a universal process of movement

and particle organisation that represented the triumph of the complex heterogeneous over the

simple homogenous. Moving from the organisation of animal bodily structure to the

organisation of the complex social organism and its attendant artistic and industrial

'machinery' of modernity, *First Principles* theorised precisely the way in which levers and

axles could themselves develop in complexity and confederacy to become an organised,

productive, cooperative evolutionary force (Spencer, 1946: 290). Notably, the printing press

in the Clayhanger office is worked by a simple handle and lever; but, it has been added to,

improved, integrating additional parts to make it into a more heterogeneous whole which has contributed to *both* the history of radical struggle and its consolidation in peaceable respectability.

The detail that Bennett employs here is indicative of what might be seen as an investment in Spencer's radical Victorian scientific philosophy which has been somewhat overlooked in work on Victorian literature and science, given Darwin's prominence. Indeed, recent revisionist work on Spencer's philosophy draws out Spencer's radical reputation. Spencer is now best known for his phrase 'the survival of the fittest', which has led to his being viewed as a crude apologist for power and, in the context of late Victorian imperialism, racial supremacy and empire. Chris Renwick, Thomas Dixon and Naomi Beck are all scholars who have recently recovered Spencer's other reputation as a pacifist and arch critic of imperialism appealing to an audience 'of profoundly left-leaning convictions' (Renwick, 2012: 75). Bennett, we need to remember, was a figure of the liberal left.

I shall turn now, finally, to Bennett's explicit reference to Spencer's *First Principles* for it is included in one of Bennett's few direct and indeed radical discussions of scientific writing, published in 1907; but it also illustrates the way in which the continuation of a tradition of popular magazine publication could act as a nexus of ideological exchange and social thinking, positioned as it was between the fiction market and Victorian traditions of scientific writing in the long nineteenth century.

4. Penny Magazines, 'Rising Storms' and the politics of literature and science

Spencer's *First Principles* comes to play a significant role in Bennett's brief essay of 1907, 'The Rising Storm of Life', published in the popular *T.P.'s Weekly* (5 July). For Bennett, *First Principles* was nothing short of revolutionary: 'it turned a universe upside down' (108). I shall establish the context for Bennett's discussion of Spencer in a moment, for the

philosopher of evolution figures as part of Bennett's reflection on an 'economy' of writerly influence from the fields of science (Spencer, Wallace, Darwin) and literature (Dickens). First, the magazine context: *T.P.'s Weekly* which was a penny magazine, established by the radical Liberal MP T.P. O'Connor in 1902 with a mission to bring literature to the masses. Perhaps its most remarkable achievement in this regard was the serialisation of Joseph Conrad's *Nostromo* in 1904 which Cedric Watts has discussed while also giving a flavour of the lower middle-class, culturally aspiring audience that the magazine sought to captivate – not least through its advertisements for the products of a burgeoning consumer culture (Watts, 2007: 99-100). In doing this, *T.P.'s Weekly* was continuing a mission that had started in the early nineteenth century with 'improving' popular scientific publications such as *The Penny Magazine* (Topham, 2004: 37-9), and which continued with Dickens' *Household Words* (1850) and the great innovation of the shilling monthlies, led by the *Cornhill* from 1859, in which a mission to entertain was blended with the mission to educate. Bennett wrote for the magazine in that spirit: chapters from what came to be published as *The Human Machine* were published in *T.P.'s Weekly* in instalments during 1908 (Hepburn, 1981: 50).

Bennett's essay 'The Rising Storm of Life' appeared in the magazine on 5 July 1907: it sought to entertain through a vividly literary idiom, though its purpose was to urge the recognition of the prescience and power of Spencer's philosophy of science; in so doing, it offered a provocation to conventional thinking. Bennett, who was living in France, records returning to London on a bright windy Sunday in June. 'Everything was moving as fast as the wind' he notes, as he climbs the stairs of a motorised omnibus while seeking to hold on to his hat. The bus is a 'street steamer', one of a number that 'swept past in long rattling curves like ships with their bolts loose'. Indeed, much is 'loose' in London: from Bennett's wind-disturbed hat to 'new blouses and neckties' that seem to be swarming the streets independently of their smiling wearers, so that at 'every corner the earth threw up blouses and

neckties as a volcano throws up lava' (Bennett, 1979 [1]: 107). If the nineteenth century was a period when geological and mining sciences revealed the inner secrets of the earth, from rock formations to fossil evidence of extinctions, it is significant that a metaphor from what may be described as the extractive imagination delivers a sense of the newness afoot in London: transportation machines move beneath the ground as though they are insects in burrows: 'I could almost see the electric trains flitting about in their lighted burrows under the sewers.' The tactic of defamiliarisation is central to the question that Bennett poses to reflect the profound shock that this experience of intense movement offers the observer in a post-Victorian world. 'Is this London, and Sunday?' (106). Bennett's imaginative construction of a post-Victorian world increasing in pace and intensity is registered in the shock that this is a Sunday afternoon in 'Spurgeon's city!' C.H. Spurgeon had been the most publicly visible preacher in a London dominated by Sabbatarian orthodoxy when, as Baptist minister of the Metropolitan Tabernacle, he preached to multitudinous crowds: whereas the 'joyous, expectant, pagan, well-dressed crowd' that Bennett sees in Piccadilly seek 'luxury and pleasure' from a popular restaurant that he initially mistakes for a gold and marble palace. By the fin de siècle and early twentieth century, evolutionary science and scientific naturalism figured ambiguously in new meanings that came to be associated with aestheticism and pleasure. As Gowan Dawson has argued in *Darwin, Literature and Victorian Respectability* (2007), this was an association that troubled Huxley and Darwin who sought to promote a public image of respectability. Nonetheless, pleasure and paganism were seen as potentially dangerous cultural by-products of evolutionary scientific arguments in the closing decades of the century: by-products which could range from cartoons forcing an association between the male pleasure in tobacco and a lewd sexual banter licensed by the public discussion of creature congress, to the high cultural revival of paganism pioneered by

the man of science John Tyndall and the aesthete Walter Pater (Dawson, 2007, 58 and 82-115).

Bennett seeks to explain this, rehearsing first the thesis of a 'great journalist' who claims that the pleasure-seeking 'pagan' crowds turn to hedonism because 'they are no longer sure of another life' (107). Bennett rejects this, not least because religious organisations seem equally invested in a fast-paced and strident mission to attract ('I was … struck by a long, glaring banner which tempted people to God by the offer of precisely similar attractions' (108). The London crowds are communally invested in and dependent on the extraction of earthly goods, communication and 'co-operative organisation'. Bennett consequently explains the vigorous windy day and the intense activity of people that he witnesses through the idea of vitalism: a persistent form of nineteenth-century scientific thought which held that there was a 'vital' principle of life that exceeded the material elements of natural history or biology, chemistry and electricity. Bennett sees evidence of 'a general quickening of vitality' (108) or 'the revolutionary force of life itself' (109). As Robert Mitchell has recently argued in his wide-ranging account of Romantic vitalism *as* science, the idea that life is a '*provocation*', or a complex process that demanded new forms of conceptual and practical experimentation to unlock its meaning, was a way of seeing that had its origins in the late eighteenth and early nineteenth centuries. Crucially, for our context, Mitchell notes the revival of vitalism at the fin de siècle and early twentieth century (Mitchell, 2013: 2). Bennett's sense of a revolutionary life force drew on vital science as a means of minimising the boundaries that were appearing between proliferating fields of scientific expertise and specialisation (for example between the biological and energy sciences). Thus in an earlier essay published in *T.P.'s Weekly* (28 September 1906) entitled 'The Secret of Content', Bennett observed that: 'All Force is the same Force. Science just now has a tendency to call it electricity' (Bennett, 1979 [2]: 103); thus simultaneously adopting Spencer's theories of the limits of symbolic

conceptions ('the Unknowable') while capitalising on print culture's fascination with electrical force as a conveyancing power in the later decades of the nineteenth century: 'the electric thrill in the air which is affecting the nerves of civilisation' as W.T. Stead put it in the *Review of Reviews* in 1890, forging a metaphor of atmospheric nervous contagion and *conveyance* (Gooday, 2004: 238). If electricity represented the cutting edge of science for Bennett and many others in the 1890s and 1900s, it was precisely because of its appeal to, as Graeme Gooday has shown, ethereal, almost indeed magical agency: as well as the uncertainty that this engendered (Gooday, 2008).

The telephone, an electronic technology for conveying voice, and Herbert Spencer's philosophy of evolution in *First Principles,* become the means by which the uncertainty about the future as vast, vital storm and impending crisis, are explored rhetorically; in turn they lead to a critique of the different statuses attached to texts and authors in the print cultures in which science and literature were circulated and consumed. In effect, Bennett stages a confrontation between the playful stimulation of simple pleasures, and the rigours of the philosophy of science. His example of the individual man who uses Thomas Edison's invention of telephone is explicitly contrasted with the deeper effects of Spencer's *First Principles*: this is because:

> The revival of philosophy is infinitely more important than the revival of science, and equally of course its results are less obvious and slower to come. But they are coming. They are coming. And compared with them the results of science are as naught. Herbert Spencer wrote *First Principles* long before Edison hit on the telephone, and not one man in a thousand who uses a telephone has yet read a line of *First Principles*. But *First Principles* laughs at the Edisonian toy and the man who plays with it, for while he is playing with it *First Principles* has turned the universe upside

down, and the man absorbed in the telephone has scarce begun to suspect the revolution (Bennett, 1979 [1]: 108).

Sir Oliver Lodge, in his autobiography, described the telephone as 'the fundamental invention of the latter half of the nineteenth century': yet, he also acknowledged that the device had 'become so familiar that one forgets the wonder' that was originally beheld from 'making a spring speak' (Lodge, 2012: 98, 97). Bennett presents Edison's electromagnetic telephone as just a toy: innocent and unaware 'play' with the capacity of the device to convey voice depends on an ethereal agency which is infinitely more powerful, and uncertain in its effects, than the conveyancing technology. By contrast, it is Spencer's *First Principles* which grasps and conveys the philosophical lessons of 'Force', is equal to the lesson of the 'Rising Storm of Life', and which is in the process of turning the universe 'upside down'. As Bennett seeks to get his reader to understand the scale of the possible changes grasped by Spencer's philosophy of evolution he compares the idea of the blithe unsuspecting man on the telephone with the fortunes of people who have lived through epochal transformation that is, with hindsight, inscribed under labels such as the 'Renaissance', or the 'Reformation'. Bennett compares the historical experience of involuntary, unknowing participation in such epochal transformation by analogy with the experience of a railway accident: the fundamental transportation technology of the Victorian period (109). Building on the analogy, Bennett contends:

> In the same way, we are entering now on a mighty change, on a world movement, on a subversive, vitalizing epoch, compared to which, in my opinion, the Renaissance and Reformation are insignificant … We feel the great storm of life is rising, the clouds gathering, the winds moaning ere they scream. I think that the some of us see that luxury and pleasure are nothing but the 'white horses' flecking the ocean' (109)

19

Bennett notably changes the register of his essay at this point: if the essay begins as a playful reflection on a vigorous windy day, by this point it enters the prophetic territory formerly cultivated by John Ruskin's lectures delivered at the London Institution 1884, 'The Storm Cloud of the Nineteenth Century'. Ruskin's lectures, delivered from an institution that had popularised scientific learning throughout the nineteenth-century, professed a degenerative connection between relentless industrial production, air pollution and the increasing dominance of terrible storm clouds. Ruskin took as evidence his own observations of the sky (which led him to correspondence with scientific authorities, including Sir Oliver Lodge, on cloud formation); but also visual art and literature. For Bennett, 'luxury and pleasure' become mere epiphenomena, 'white horses' flecking the storm-whipped ocean that threatens to engulf civilisation. Bennett draws upon nautical metaphors to contemplate the best response: those who stand the worst chance of surviving the storm are those who pretend there is no storm, and 'lay up in a cove and drop anchors' (109). Tellingly, in employing nautical metaphors to urge courage – 'put out to sea … rejoice openly in the tempest, accepting it, braving it …' – Bennett also looks to literature as a response to the 'rising storm of life'; or, rather, it may be more accurate to say that he looks to reading preferences within print culture.

Bennett interrogates the print culture to which he contributes, which has been shaped by intellectual conservatism; 'no popular magazine … dares to deal with any open question of theology, philosophy or politics' (110). It is important to recall that *T.P.'s Weekly* was a penny magazine run by a radical liberal MP; thus, the context of publication licensed Bennett to reflect critically on the culturally cautious legacy inherited from Victorian magazine journalism, exemplified in the *Cornhill*'s eschewal of politics and theology. 'We hate to think', Bennett opines, adding 'We hate those who make us think' (109). Critical thought and intellectual courage are associated with 'pioneers of thought', or Herbert Spencer, Alfred Russel Wallace and Charles Darwin, 'creators of the whole fabric of evolution'. However, in

focusing on Thomas Malthus as 'the first of the real moderns' through his authorship of *An Essay on the Principle of Population*, Bennett looks to the material production of books to enquire critically into the curation of the 'fabric' of evolutionary thought:

> There is no copyright in *An Essay on the Principle of Population*, a book universally recognised by competent authority as one of the landmarks of human thought. Is it in Everyman's Library? Is it in the Universal Library? Is it in the National Library?
>
> No. Only one publisher in England to-day dares print it. (110)

In making this point, Bennett aligns himself with, and effectively revives, the freethinking controversies of the high Victorian period of the 1870s and 80s which, politically, go beyond Malthus' status as a 'source' for the argument of Darwin's *Origin*: in particular, the political struggles of Charles Bradlaugh and Annie Besant over Malthus' place in an argument about human birth control into which Darwin was drawn, though much against his will as Gowan Dawson has shown (Dawson, 2007:116-61). If in 'a competition for esteem Dickens would leave Darwin' and other scientific authorities 'out of sight', Bennett seeks in 'The Rising Storm of Life' to redress that balance of esteem by situating Darwin, again, among a more radical pantheon of scientists, such as Herbert Spencer and Alfred Russel Wallace.

Looking forward, literature and science studies of the long nineteenth century should, I suggest, draw more fully on the complex interconnections between the varied economies of scientific writing, from evolutionary science to energy science, that the wider field has researched in recent years. Given that so much of this is vested in book and print histories, it is important that this work should acknowledge *politically inflected* reading preferences.

Bennett thus makes a contribution to the Victorian, and post-Victorian, fields of literature and science studies, suspended as they were between concerns about evolution and energy, as

well as material and spiritual possibilities of explanation *and* fascination. In doing so Bennett also makes a contribution to a febrile sense of catastrophic possibility and foreboding that characterised the fin de siècle and opening years of the twentieth century. If the long nineteenth century had one finite point of termination, then it was between the Great War years of 1914-18. Bennett's 'Rising Storm of Life' and its image of the surging ocean arguably presaged that outcome, in the way that Wallace had glimpsed it, too, in his assessment of the century's failures in *The Wonderful Century*. If Victorian science was successfully translating its pioneering discoveries into technologies that would revolutionise domestic and social life, there was a double edge to this process. Bennett warned, metaphorically, in 'The Rising Storm of Life' against the dangers of laying up in a cove and dropping anchor; in doing so he was in tune, to a degree, with Sir Oliver Lodge, another radical in science, as he recalled in his autobiography the pleasure of sailing into Cromarty Firth before 1914 only to discover the place 'where the first Dreadnought was at anchor … stowed away there in seclusion'. While Lodge and his party looked at the time upon 'that first Dreadnought as a mere curiosity', with hindsight 'the expensive naval machine' had become, Lodge says in a voice echoing Bennett's friend Joseph Conrad, 'a thing of horror' (Lodge, 2012: 241-2).

Bibliography

Amigoni, David (2015). 'Bennett and Realist Aesthetics' in Shapcott, John (ed.), *An Arnold Bennett Companion: A Twenty-First Century Perspective*. Leek: Churnet Valley Books.

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

Bennett, Arnold (1908 [1]). *The Human Machine*. London: New Age Press.

_____ [1908] (1996). *The Old Wives' Tale*. Ed. Wain, John, Harmondsworth: Penguin.

_____ [1898] (1908 [2]). *The Man from the North.* New York: Doran and Co.

_____ (1910). *Clayhanger*. London: Methuen.

_____ (1907). *The Ghost: A Fantasia on Modern Themes*. London: Chatto and Windus.

_____ [1914] (2006). *The Price of Love*. Ed. Shapcott, John. Leek: Churnet Valley Books.

_____ [1906] (1979). 'The Secret of Content', in *Sketches for Autobiography*. Ed. Hepburn, James.

_____[1907] (1979 [1]). 'The Rising Storm of Life',, in *Sketches for Autobiography.* Ed. Hepburn, James.

_____ (1979 [2]). *Sketches for Autobiography*. Ed. Hepburn, James. London: George Allen and Unwin.

Cantor, Geoffrey et al. (2004). *Science in the Nineteenth-Century Periodical*, Cambridge: Cambridge University Press.

Connor, Steven (2000). *Dumbstruck: A Cultural History of Ventriloquism*, Oxford: Oxford University Press.

Dawson, Gowan (2007). *Darwin, Literature and Victorian Respectability*, Cambridge: Cambridge University Press.

Dowden, E. (1909). 'The Scientific Movement in English Literature', in *Studies in Literature 1780-1877*. London: Kegan Paul, Trench, Trubner & Co.

Gooday, Graeme (2004). 'Profit and Prophecy: Electricity in the late Victorian Periodical', in Cantor, Geoffrey et al, *Science in the Nineteenth-Century Periodical*. pp. 238-54.

_____ (2008). *Domesticating Electricity: Technology, Uncertainty and Gender, 1880-1914*. London: Pickering and Chatto.

Hepburn, James (1981). *Arnold Bennett: The Critical Heritage*. London: Routledge and Kegan Paul.

Levine, George [1988] (1991). *Darwin and the Novelists: Patterns of Science in Victorian Fiction* [1988]. Chicago and London: University of Chicago Press.

Lodge, Oliver [1931] (2012). *Past Years: An Autobiography*. Cambridge Library Collection, Cambridge: Cambridge University Press.

Mitchell, Robert (2013). *Experimental Life: Vitalism in Romantic Science*. Johns Hopkins University Press, 2013

Otis, Laura (2001). *Networking: Communicating with Bodies and Machines in the Nineteenth Century*. Ann Arbor: University of Michigan Press.

Rauch, Alan (2001). *Useful Knowledge; The Victorians, Morality and the March of Intellect*. Durham, NC: Duke University Press.

Renwick, Chris (2012). *British Sociology's Lost Roots: A History of Futures Past*. Basingstoke: Palgrave.

Ruskin, John (1884). *The Storm Cloud of the Nineteenth Century: Two Lectures Delivered at the London Institution, February 4th and 11th, 1884*, in *The Library Edition of the Works of John Ruskin*. Ed. Cook, E.T., and Wedderburn, A., vol. XXIV, available at Ruskin Library and Research Centre, Lancaster University: http://www.lancaster.ac.uk/depts/ruskinlib/stormcloud

Secord, James (2000). *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of the* Vestiges of the Natural History of Creation. Chicago and London: Chicago University Press.

Topham, Jonathan R. (2004). 'The *Mirror of Literature*, *Amusement and Instruction* and cheap miscellanies in early nineteenth-century Britain', in Cantor, Geoffrey et al. Cambridge 2004, pp. 37-66.

'Science in the Nineteenth-Century Periodical', http://www.sciper.org

Smith, Crosbie (1998). *The Science of Energy: A Cultural History of Energy Physics in the Nineteenth Century*. Chicago and London: Chicago University Press.

Spencer, Herbert [1862] (1946). *First Principles,* sixth and final edition. The Thinkers Library, London: Watts and Co.

Wallace, Alfred Russel (1899). *The Wonderful Century: Its Successes and Failures*. London: Swan Sonnenschein.

_____, (1908). *My Life: A Record of Events and Opinions* [1905] (1908), new edition. London: Chapman and Hall

_____ (1913). *Social Environment and Moral Progress*. London: Cassell.

Watts, Cedric (2007). '*Nostromo* in *T.P.'s Weekly*'. *Yearbook of Conrad Studies*, III, 97-112.