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Essay Review

(Stop) Talking About Victorian Science

J. MEADOWS, *The Victorian Scientist: The Growth of a Profession*. London: British Library, 2004. vi+202 pp. £16.95. ISBN 0-7123-0894-6.

G. CANTOR, G. DAWSON, G. GOODAY, R. NOAKES, S. SHUTTLEWORTH and J. TOPHAM, *Science in the Nineteenth-Century Periodical: Reading the Magazine of Nature*. Cambridge: Cambridge University Press, 2004. xi+329 pp. £45.00/$75.00. ISBN 0-521-83637-9.

REVIEWED BY

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What do we know now about Victorian science? Rather more—but also in some respects rather less—than we did three decades ago, one might say. The study of science and its Victorian cultural context has almost become a microcosm of the way we do things now in the history of science. Thirty years ago, the nineteenth century was recognized as the age of scientific consolidation. This was when science parted company from religion and forged links with industry. It was the age of professionalization and specialization: a second—and institutional—scientific revolution to finish the task left undone by the first.[1] This was a global big picture of institutional progress to match the intellectual march of mind. Our picture of Victorian science now is considerably more fragmented. We worry now about audiences as much as practitioners, about buildings as much as what went on inside them, about books as much as we care about their contents. The result is that we know a great deal more about how science worked for the Victorians, how it fitted into the fabric of Victorian lives. We understand that Victorian science was not a given, neither was it a single corporate thing. What science was for the Victorians depended on just who the Victorians were.[2]

The canonical study of Victorian science remains Susan Cannon's classic *Science in Culture*. Cannon's study showed just whose cultural property Victorian science was. In so doing, it outlined the parameters of much that we still take for granted today about what matters in making sense of nineteenth-century natural philosophy's cultural place. For Cannon—and others such as Robert Young—Victorian natural philosophy was the property of a Liberal Anglican elite. It was a weapon in a war to confound both conservatism and radicalism in religion and politics by founding a new meliorist consensus around a reformed understanding of natural order.[3]

[1] Donald Cardwell, *The Organization of Science in England* (London, 1972); Colin Russell, *Science and Social Change, 1700–1900* (London, 1983); Marie Boas Hall, *All Scientists Now: The Royal Society in the Nineteenth Century* (Cambridge, 1984).

[2] A particularly fine recent overview is Bernard Lightman (ed.), *Victorian Science in Context* (Chicago, 1997).

[3] Susan F. Cannon, *Science in Culture: The Early Victorian Period* (New York, 1978) and Walter F. Cannon, 'Scientists and Broad Churchmen: an early Victorian Intellectual Network', *Journal of British Studies*, 4 (1964), 65–88; Robert M. Young, *Darwin's Metaphor: Nature's Place in Victorian Culture* (Cambridge, 1985).

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Cannon's work had the result of making science unambiguously cultural and as such the unambiguous property of particular cultural groups. This was, however, culture with a capital C. Cannon's science wars were fought out in the pages of prestigious literary quarterlies, the chambers of leading scientific societies or the cosy armchairs of gentlemen's clubs. The war's protagonists were equally exalted members of a self-proclaimed scientific elite. What Cannon showed decisively, moreover, was that science's cultural place was not pre-ordained; it was contingent on establishing authority. Investigating different ways of making authority over nature stick and the different spaces where such authority was made has been a central preoccupation for historians of Victorian science ever since.[4]

The big picture of Victorian science as leisured, progressive institutional consolidation is certainly now decisively broken. Professionalization, for example, is now seen as the contested outcome of local dogfights over intellectual and institutional authority in particular contexts rather than as the self-evident goal of reformist men of science.[5] Rather than see professionalization as the driving force pushing institutional change, we recognize that, on the contrary, our understanding of what professionalization means is predicated on the institutional structures put in place by the victors in those little local squabbles over territory. Instead of seeing mid-century efforts to reform the Royal Society as pioneering attempts to make the society more 'professional' and 'scientific', we see them as the strategic manoeuvrings of ambitious men trying to carve out institutional niches for their own particular visions of what a scientific society should be and do.[6] If we think about Victorian professionalization at all, these days, we see it as only one of a number of tools for self-fashioning—and even then only in retrospect. Tracing the contours of inevitable institutional progress towards self-evident goals has been replaced by an insistent focus on the micropolitics that determined change in very particular contexts.[7] Specialization did not happen because it was inevitable but because particular groups of individuals wanted knowledge and its institutions repackaged in this way for their own particular purposes.[8]

[4] Jack Morrell and Arnold Thackray, *Gentlemen of Science: The Early Years of the British Association for the Advancement of Science* (Oxford, 1982); Ian Inkster and Jack Morrell (eds), *Metropolis & Province: Science in British Culture, 1750–1850* (London, 1983); Roger Cooter, *The Cultural Meaning of Popular Science: Phrenology and the Organization of Consent in Nineteenth-Century Britain* (Cambridge, 1984); Pietro Corsi, *Science and Religion: Baden Powell and the Anglican Debate* (Cambridge, 1988). More recently, Iwan Rhys Morus, *Frankenstein's Children: Electricity, Exhibition and Experiment in early Nineteenth-Century London* (Princeton, NJ, 1998).

[5] Robert Kargon, *Science in Victorian Manchester: Enterprise and Expertise* (Manchester, UK, 1977); Morris Berman, *Social Change and Scientific Organization: The Royal Institution, 1799–1844* (London, 1978); Peter Alter, *The Reluctant Patron: Science and the State in Britain, 1850–1920* (Oxford, 1987).

[6] David P. Miller, 'Between Hostile Camps: Sir Humphry Davy's Presidency of the Royal Society of London, 1824–27', *British Journal for the History of Science*, 16 (1983), 1–47; *idem,* 'Method and the Micropolitics of Science: The early Years of the Geological and Astronomical Societies', in *The Politics and Rhetoric of Scientific Method*, edited by John Schuster and Richard Yeo (Dordrecht, The Netherlands, 1986); David P. Miller, 'The 'Hardwicke Circle': The Whig Supremacy and its Demise in the 18th Century Royal Society', *Notes & Records of the Royal Society*, 52 (1998), 73–91; Roy McLeod, 'Whigs and Savants: Reflections on the Reform Movement in the Royal Society, 1830–48', in Inkster and Morrell (note 3); Iwan Rhys Morus, 'Correlation and Control: William Robert Grove and the Construction of a New Philosophy of Scientific Reform', *Studies in History & Philosophy of Science*, 22 (1991), 589–621.

[7] Stefan Collini, *Public Moralists: Political Thought and Intellectual Life in Britain, 1850–1930* (Oxford, 1993).

[8] Exemplary case-studies in this respect are Martin Rudwick, *The Great Devonian Controversy: The Shaping of Scientific Knowledge among Gentlemanly Specialists* (Chicago, 1985); James Secord, *Controversy in Victorian Geology: The Cambrian–Silurian Dispute* (Princeton, NJ, 1986).

One particularly important outcome of this reordering of our views of Victorian science and its institutions has been a reassessment of popular science. Until relatively recently, with a few pioneering exceptions, the study of popular science was very much at the margins of respectable history of science.[9] Popular science, if it was of interest at all, was merely what happened after the battle was over, and the smoke had cleared. It was just diffusion—the gradual dissemination (and vulgarization) of knowledge from its bastions to the hoi polloi. More recently, the dominant perspective has been determinedly—and, let us be quite clear, correctly—anti-diffusionist. Victorian institutions and media established to popularize the sciences were very far from being anodyne and inoffensive tools to bring an established and codified knowledge to the masses. On the contrary, they were at the very heart of the Victorian science wars. Looking again at sites and experiences once dismissed as simply popular has resulted in an important decentring of our understanding of the loci of Victorian scientific authority. Places like the Royal Polytechnic Institution and media such as the Society for the Diffusion of Useful Knowledge's or the Religious Tract Society's publications created their own sense of what science was, what it was for, how it should be practised and who its practitioners and audiences ought to be.[10]

It is largely through this new emphasis on investigating the popular that historians of Victorian science have started paying particular attention to spaces and to audiences. This is another outcome of the decentring of our view of where scientific authority lay. If we want to understand the brass tacks of Victorian science, we need to understand where it was practised (and why it was practised there) and for whom. Recent studies have focused on museums, exhibitions, societies and pubs not as places where prepackaged knowledge was diffused to largely passive audiences but as places where scientific knowledge was actively being made.[11] One thing that becomes clear through studies such as these that seek to understand science through its cultural spaces (both literal and metaphorical) is that there was no such thing as Victorian science. The picture that emerges instead is one of an array of competing and complementary practices jockeying for position on the cultural map. Far from being settled, the locus of intellectual authority throughout the nineteenth century was constantly being resituated as different practitioners jostled for legitimacy. What science was taken to be for the Victorians really did depend on who they were, where they went to experience it and who they trusted to deliver the appropriate intellectual goods.

The two books being reviewed here show clearly just how broad a spectrum is now covered by historical accounts of Victorian science. Meadows's approach is robustly old-fashioned. This is clearly a historian that has no truck with more recent perspectives in the historiography of Victorian science. As its title indicates, there is no doubt expressed here that what mattered about Victorian science was the slow, inexorable drive towards professionalization. Similarly, there is no question as to who the scientists were or wherein lay their authority. Cantor, Dawson, Gooday, Noakes,

[9] Roger Cooter and Stephen Pumfrey, 'Separate Spheres and Public Places: Reflections on the History of Science Popularization and Science in Popular Culture', *History of Science*, 32 (1994), 237–67.

[10] Morus, (note 3); Aileen Fyfe, *Science and Salvation: Evangelical Popular Science Publishing in Victorian Britain* (Chicago, 2004).

[11] Samuel Alberti, 'Placing Nature: Natural History Collections and their Owners in Nineteenth-century Provincial England', *British Journal for the History of Science*, 35 (2002) 291–311; Anne Secord, 'Science in the Pub: Artisan Botanists in early 19th-century Lancashire', *History of Science*, 32 (1994), 269–315.

Shuttleworth and Topham, on the other hand, have produced a volume that deploys some of the most current historiographical perspectives. Science here is multivalent, carefully tailored to fit the tastes of different audiences with a range of expectations. It is what its audiences and users make of it as much as a thing in itself. The range spanned by these two books makes them a fascinating comparison, displaying as they do the way things have changed in our understanding of Victorian science in recent years. The comparison is particularly interesting, since it may tell us something about what we have lost as well as what we have undeniably gained through new approaches.

Meadows, in his account, betrays little doubt about just who nineteenth-century scientists were and what they were up to. The author describes his book as a collective biography of eminent Victorian scientists and uses his survey to oversee the workings of nineteenth-century scientific institutions from educational establishments to scientific societies, journals and communication networks. As he informs his readers at the beginning of his introduction: 'History textbooks will tell you that the origins of modern science are to be found in the seventeenth century. In terms of the basic ideas, this is quite true. But, for the building of the modern scientific community, the nineteenth century is the key period' (p. 1). Passing over the fact that no respectable modern textbook would say any such thing, this remains a fascinating statement. It identifies institution building as being at the very core of Victorian science. Many Victorian men and (occasional) women of science were indeed obsessed by science's institutional framework. Meadows is quite wrong, however, in his implication that this concern with institutions had nothing to do with ideas and that institutions and ideas develop apart. Far from it, the institutions mattered to Victorian protagonists precisely because the ideas mattered, too.[12] The reason that so much blood was spilt over institutional structures was because as far as many Victorians were concerned, institutional structures defined the structure and content of scientific knowledge, too. Interestingly, too, for Meadows, the relevant movers and shakers of the Victorian scientific community were a relatively small and self-contained group: they were scientific practitioners, narrowly defined—and a fairly elite set, too. Audiences, by this account, matter little. At best, they are passive onlookers. One outcome of this perspective, as articulated here at any rate, is that Victorian science ends up seeming curiously divorced from Victorian culture.

The approach taken by Cantor et al. could hardly be more different in this respect. For them, audiences are at the sharp end of making Victorian science. Science, as articulated here, is unambiguously cultural. In the first half of the book, the individual authors cast their eyes over the scientific offerings of a range of nineteenth-century journals representing different genres; from literary to religious to juvenile. In the second half, they explore different themes such as biography and gender. One of the problems with Meadows's account is that, since all the chapters seem to agree as to what is best for science, there is no debate and therefore no opportunity to explore the multiplicity of different visions for science put forward during the nineteenth century. In *Science in the Nineteenth-Century Periodical* on the other hand, debate about just what science is, is everywhere. Exploring the place of

[12] Thomas W. Heyck, *The Transformation of Intellectual Life in Victorian England* (London, 1983); A. J. Engel, *From Clergyman to Don: The Rise of the Academic Profession in 19th Century Oxford* (Oxford, 1984).

science in nineteenth-century popular periodicals, the authors eschew easy definitions and get down instead to the business of investigating how it was put to work in the context of different editorial agendas.[13] Rather than being treated as a given, science in the periodical press is exposed as multivalent and open-ended. What we learn from this is that as far as large sections of the Victorian reading public were concerned, science was defined by the kind of place it held in their favourite reading matter. We also learn that science—or rather that a set of practices and discourses that different constituencies presented as science—was everywhere in middlebrow Victorian culture. These were not all, maybe, scientific practices and discourses that would be taken too seriously by Meadows's institution-building elite, but they should matter just as much to historians trying to make sense of this thing called Victorian science.

The authors show in different chapters how science was embedded in a wide range of political and cultural projects and how editors and journalists tailored their product carefully to capture their audiences. The result provides a fascinating cross-section of the ways in which science worked for the Victorian public. Science in the *Mirror of Literature, Amusement and Instruction* was clearly a very different beast from science in *Punch* or the *Boy's Own Paper*. By looking like this in rather less obvious places for traces of science, the authors provide a compelling series of vignettes of public science in action. Science, differently interpreted, clearly played a number of different roles for Victorian editors and their publics. Its presence in their papers was certainly not always evidence of a mission to inform. Science could be there as polemic or as satire. In the pages of *Punch*, it might be either the butt of jokes itself or the means to lampoon others. In the *Boy's Own Paper*, it helped define gender expectations for a Victorian generation. What is quite clear is that science was never an accidental or a neutral presence in the Victorian press. It was there because it fitted in with the personal, political, religious or other projects those periodicals were meant to advance. Its presence, in other words, was always calculated.

Both these books demonstrate how closely tied trends in the historiography of Victorian science are to trends in cultural history more generally. Meadows's focus on broad historical trends such as professionalization place him firmly in a particular genre of social history.[14] Our other authors' fascination with fragmentary science gives their work a distinctly postmodern edge. Victorian science looked at this way is a distinctly slippery customer, changing its features to fit its surroundings. The book's approach conforms to other recent accounts seeking to bring about a broad re-evaluation of Victorian culture and our understanding of it.[15] Both these books agree that science is cultural property in some sense or another (though Meadows might not recognize this reading). Where they differ is in their accounts of just whose

[13] Books (and periodicals), as objects as well as texts, have received renewed attention not only by historians of Victorian science, but of science more generally. An important case-study is James Secord, *Victorian Sensation: The Extraordinary Publication, Reception and Secret Authorship of Vestiges of the Natural History of Creation* (Chicago, 2001). For a recent overview, see Jon Topham, 'Scientific Readers: A View from the Industrial Age', *Isis*, 95 (2004), 431–42.

[14] Harold Perkin, *The Rise of Professional Society: Enland since 1880* (London, 1989).

[15] Patrick Joyce, *Visions of the People: Industrial England and the Question of Class, 1848–1914* (Cambridge, 1991); *idem., Democratic Subjects: The Self and the Social in Nineteenth-century England* (Cambridge, 1994); Dror Wahrman, *Imagining the Middle Class: The Political Representation of Class in Britain, 1780–1840* (Cambridge, 1995).

property it was and how malleable and open-ended Victorian science remained. Victorian science was certainly not the exclusive property of an intellectual elite, though members of such an elite certainly tried to make it so over the course of the century. Victorian science was embedded in a cultural marketplace where it jostled with other practices and ideas. It was part of consumer culture and as such could be taken up, toyed with, appropriated and reappropriated in any manner of ways.

One important outcome of the recent surge of interest in Victorian popular science is that the very notion of 'popular science' has, to a large degree, collapsed in on itself.[16] Without the diffusionist model and its view of science leaking down through society from the intellectual heights, it is increasingly unclear what might coherently be meant by popular science—'popular' as opposed to what, after all? The term has been used as something of a catch-all category, capturing anything from science in the media to heterodox (to our eyes) practices such as mesmerism and phrenology. Such a category only made sense when there appeared to be a coherent set of ideas and practices to which it might be opposed. Without such an opposing ideal—call it 'professional', 'elite', or even 'orthodox' science—there is little left of 'popular' science either.[17] Popular science always depended on the assumption that there was something else going on as well, with more authority, a more legitimate voice. Increasingly, however, we are seeing that there was no single authoritative voice of Victorian science. There was instead a cacophony of competing voices clamouring for public attention. Whether such voices were 'popular', or 'professional', or 'elite' depended on how they were heard by their audiences as much as anything else. Terms such as 'popular', in other words, are at best to be understood as retrospective assessments of cultural place rather than as its determinants.

Rather than being built around such retrospective judgements, our accounts of Victorian science should eschew such categorizations and look instead to trying to make sense of science through examining the spaces it occupied in Victorian society. What we need is a more refined and nuanced sense of Victorian science's cultural geography.[18] To understand how science made sense to the Victorians, we need to know what else was going on in the same places at the same time. This is one of the virtues of Cantor et al.'s survey of science in the periodical press, exploring as it does the way that science was usually just one element in a carefully crafted cultural repertoire. Thinking about science's cultural geography should also help us to delineate the networks that sustained science as cultural practice. Such a cultural geography is, of course, a physical geography as well. Understanding London science, for example, in the nineteenth century means quite literally finding out where on the metropolitan map that science took place. It matters that the Royal Institution was on Albemarle Street and the Royal Polytechnic Institution on Regent Street. By simply looking to see where such places were, we can understand a great deal about the position they consequently held in the eyes of their audiences and who those intended audiences were as well.

[16] Cooter and Pumfrey (note 8).

[17] Adrian Desmond, 'Redefining the X Axis: 'Professionals', 'Amateurs and the Making of Mid-Victorian Biology—A Progress Report', *Journal of the History of Biology*, 34 (2001), 3–50.

[18] An exemplary early example is Martin Rudwick, 'Charles Darwin in London: The Integration of Public and Private Science', *Isis*, 73 (1982), 186–206. For discussions of science and space, see Jon Agar and Crosbie Smith (eds), *Making Space for Science: Territorial Themes in the Making of Knowledge* (London, 1998); David Livingstone, *Putting Science in its Place* (Chicago, 2003).

Rethinking the place of Victorian science requires some careful thought about self-fashioning as well. One of the virtues of approaches such as that adopted by Meadows is that it renders such questions moot. If we understand Victorian science through tracking the inexorable rise of professionalization, we do not need to ask much else about what the protagonists were doing. They were moving towards a self-evident and pre-ordained goal. Without that Holy Grail, however, we need to be a little more imaginative in our understanding of the place that science held in individual practitioners' lives and how they used science to fashion themselves as public beings.[19] Precisely because Victorian science, according to our new picture of it, was so open-ended and multivalent, we need to think again about who the Victorian man of science was and why they were doing anything like science at all. We need to be able to make sense of the ways in which it might make sense for Victorians to care about science—as practitioners and as audiences—at all. What did it say about them as public beings that this was one of the tools they used to fashion themselves and present themselves to others? In just the same way, what does the observation that science was so used by particular groups and individuals tell us about the cultural place of Victorian science?

In recent years, the historiography of Victorian science has developed a number of sophisticated tools with which to think and talk about consumption. Increasing attention has been devoted to the spaces of public science and the audiences who consumed science in such settings. We certainly know far more now about exhibition halls, lecture theatres, museums and periodicals than we did a few years ago. Some, at least, of this new literature has paid rather less attention than it maybe should to the networks of production that exist side by side and intersect with networks of consumption. This is not to suggest that public performances of various kinds do not matter, but to point out that a great deal else has to go on around and beside those public performances to make them a success. We need to remember science's underground and the material culture, resources, skills and labour that make science work.[20] That means looking at things and how they were made as much as we ponder texts. Our own historical discourses about Victorian science have become increasingly obsessed with discourse. We need to stop talking quite as much as we do about talk and remember that talk is only one species of practice. Too often, efforts to trace the nodes in scientific networks stop at the stage door and fail to continue into the basement.

As this essay started by observing, we certainly know more about Victorian science now than we did thirty years ago. As Cantor et al. demonstrate, we now have questions to ask that would not have been thinkable then. Meadows's book should remind us, however, that in important senses, we also know rather less than we did. We no longer have a coherent account of Victorian science, no big picture. Big

[19] Interesting and important in this respect is Andrew Warwick, *Masters of Theory: Cambridge and the Rise of Mathematical Physics* (Chicago, 2003) and *idem.,* 'Exercising the Student Body: Mathematics and Athleticism in Victorian Cambridge', in *Science Incarnate: Historical Embodiments of Natural Knowledge*, edited by Christopher Lawrence and Steven Shapin (Chicago, 1998), pp. 288–326.

[20] Simon Schaffer, 'Late Victorian Metrology and its Instrumentation: A Manufactory of Ohms', in *Invisible Connections: Instruments, Institutions and Science*, edited by Robert Bud and Susan Cozzens (Bellingham, WA, 1992), pp. 23–56; Simon Schaffer, 'Where Experiments End: Tabletop Trials in Victorian Astronomy', in *Scientific Practice: Theories and Stories of Doing Physics*, edited by Jed Z. Buchwald (Chicago, 1995), pp. 157–89; Simon Schaffer, 'Accurate Measurement is an English Science', *Values of Precision*, edited by Norton Wise (Princeton, NJ, 1995), pp. 135–72.

pictures have ceased to be fashionable across the spectrum of history, so our loss in that respect is neither surprising nor unusual. We might want to pause and ponder a little, though, about whether or not in the end we really can make sense of Victorian science and culture without some overarching account of the subject of our inquiry.[21] Is it possible to resuscitate a non-essentialist and non-progressive big picture of Victorian science, and should we want to do so? In my view, the answer to both these questions had better be yes—and for two reasons. In the first place, as other historians start painstakingly piecing together their own grand narratives for the Victorian era once more, the history of Victorian science needs some way of maintaining its hard-won relevance to the broader field. More importantly, however, a history of science that becomes too fractured and local in its concerns (and particularly one that spends too much time talking about consumption and not enough talking about production) is in some danger of collapsing in on itself. We need to remember what the history of Victorian science is meant to be the history of.

One way of doing this might be to make sure that we place politics at the centre of our historical narratives once again. Making claims about nature and carving out institutional spaces where claims about nature can be made are political acts, conferring authority and power to groups and individuals. There is more to communicating science, in other words, than simply passing it on from place to place, through whatever media, even if we recognise the transformations that take place during that process. We need to remember about power and its distribution. Communicative acts always take place in particular directions, and it is this sense of direction that makes them political and therefore makes them interesting.[22] The cultural geography of science is an ineluctably political geography as well, and as such it has its share of hills and valleys rather than being an even playing field. Looking at Victorian science's spaces should certainly have shown us that place and status are inextricably linked. Thinking politically about Victorian science provides a way of seeing that the narratives we construct about intellectual and institutional empire-building can indeed provide a new overarching perspective that might hold our histories together. What Victorian scientific practitioners wanted was legitimacy. They wanted the right to speak for nature, since being able to speak for nature conferred cultural capital. The only way in which such legitimacy could be achieved was through acting politically and finding ways of making ideas, institutions and power work together. The nature that emerged out of such struggles for cultural place was itself unavoidably political, too. Victorian nature and Victorian science were both inevitably organized around the social distribution of authority and power. By looking at Victorian science as Victorian politics by another name—making authority and the distribution of authority our central themes—we ought to be able to find new ways of making it hang together again.

[21] John R. R. Christie, 'Aurora, Nemesis and Clio', *British Journal for the History of Science*, 26 (1993) 391–405.

[22] See James Secord, 'Knowledge in Transit', *Isis*, 95 (2004) 654–72.