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Introduction

Geoffrey Cantor, Gowan Dawson, Richard Noakes, Sally Shuttleworth, and Jonathan R. Topham

Since the publication of Gillian Beer’s ground-breaking Darwin’s Plots in 1983, literary and cultural historians have focused increasingly on the role of science in nineteenth-century literature, as well as the cultural embeddedness of science itself. It is now taken for granted that science formed a fundamental and integral part of the cultural economy of nineteenth-century Britain, and several excellent studies have explored the literary and cultural representations of science in the period. There has, however, been far less work devoted to exploring the material and cultural forms through which such scientific material was transmitted. How, for instance, did writers, or the diverse constituencies of the general public, gain access to current scientific ideas and practices? With our increasing appreciation of reading patterns of the period, it is becoming clear that readers outside the relatively small and elite intellectual community depended largely on magazines, periodicals, and newspapers for their understanding of contemporary cultural issues. Before rigid disciplinary specialization, these sectors of the nineteenth-century print media not only provided information about science and related areas of cultural debate, but also played a major role in shaping public attitudes towards these historically important subjects.

Print media provide an extensive and immensely rich source for understanding the cultural roles of science in nineteenth-century Britain. Until relatively recently, though, scholars interested in the dissemination of science tended to concentrate on books. Yet, with a few notable exceptions—such as George Combe’s The Constitution of Man (1828), which sold 80,000 copies in its first twenty years—books reached a far smaller readership than did periodicals and newspapers. The ‘circulation of periodicals and newspapers’, as J. Donn Vann and Rosemary T. VanArsdel observe of the Victorian period, ‘was larger and more influential […] than printed books, and served a more varied constituency in all walks of life’. Indeed, Mark Pattison, writing in the 1870s, suggested that the ‘periodical seems destined to supersede books altogether’. The periodical’s hegemony among nineteenth-century modes of cultural production was particularly striking in relation to science, for, as William H. Brock notes, ‘almost all initial scientific communication took place through […] periodicals rather than books’. Thus in comparison with the 1250 copies of the first edition of Charles Darwin’s On the Origin of Species (1859) that were printed and in circulation, Darwin’s ideas soon reached a far larger audience through the reviews and other commentaries carried
by well over a hundred periodicals, several of which had print runs far in excess of 10,000. In this instance, as in many others, periodicals rather than books provided the main means of dissemination and therefore deserve the close attention of historians and literary scholars.

Periodicals should not, however, be viewed only in their relation to books. They were, after all, structured differently and could be read in very different ways. Whether weekly, monthly, quarterly, or annual, they appeared at discrete intervals of time. While the bound volumes in which nineteenth-century periodicals have generally been preserved (with ephemera-like endpapers and advertisements removed) seem rather similar to conventional printed monographs, the original format of publication encouraged very different reading patterns. As scholars such as Margaret Beetham and Laurel Brake have stressed, the physical juxtaposition of articles on many different subjects within the periodical facilitated a far greater ‘openness’ of interpretation. This is particularly true of general periodicals in which an article on the nebular hypothesis might be positioned next to a cartoon lampooning free trade, a religious homily, or the latest installment of a sensational serialized novel. Such different forms of periodical content are never self-contained or isolated; instead they constantly point beyond themselves, either to other articles in the same periodical or to pieces published in rival journals. The ‘periodical essay’, as Stephan Collini comments, ‘is an excerpt whose full intelligibility depends upon a fairly intimate acquaintance with the larger cultural conversation from which it is taken’.

Certainly formalist notions such as autonomy and self-containment have no place in the hybrid, and overtly pluralist, intertextual format of the periodical.

Mikhail Bakhtin’s concept of ‘dialogism’, which proposes that every discursive text springs from a set of anterior discourses and is structured in expectation of future responses, is particularly relevant to the study of nineteenth-century periodicals and the scientific material that was published within them.

When, for example, in July 1871, the Catholic biologist St George Mivart published an adverse review of Darwin’s Descent of Man in the Quarterly Review, Thomas Henry Huxley, with Darwin’s consent, responded in an article on ‘Mr Darwin’s Critics’ in the November number of the Contemporary Review; Mivart replied in turn to Huxley in an article on ‘Evolution and Its Consequences’, also published in the Contemporary, the following January. In such cases closure is perpetually deferred; the various articles enact a continuing dialogue, and it is only by appreciating the context of this ongoing war-of-words that we can fully understand each essay. The ‘Modern “Symposium”’ feature (based on the discussions of the Metaphysical Society) which James Knowles introduced in the Nineteenth Century in 1877 similarly makes clear the ‘dialogic’ format of the periodical press. Centralizing within a single textual space what had previously occurred across a variety of different periodicals, Knowles used the Nineteenth Century as a platform upon which to stage debates between the exponents and critics of scientific naturalism.

The open-endedness of the periodical, along with its material ephemeralty and particular relationship to time, makes the form particularly suited to dialogue. By their very nature, periodicals are historically contingent—‘date-stamped’ in

Beetham’s phrase—and views expressed in them are almost immediately open to contestation, since the number of the periodical in which they are published will necessarily be out of date as soon as the next issue comes off the press. As John Morley notes, ‘Periodical literature is like the manna in the wilderness; it quickly loses its freshness’. With the commercial imperative to maintain topicality by incessantly superseding one set of ideas with another (whether this be a weekly, monthly or quarterly process), periodicals thrived on controversy and intellectual disputes like no other nineteenth-century mode of cultural production. Pattison, again writing in the 1870s, characterized them as different types of battleships, observing that while those ‘venerable old wooden three-deckers, the Edinburgh Review and the Quarterly Review, still put out to sea under the command […] of the Ancient Mariner’, the ‘active warfare of opinion’ was now ‘conducted by three new iron monitors, the Fortnightly, the Contemporary, and the Nineteenth Century’. The material form and commercial context of the print media, then, can be seen to have played a significant part in shaping many of the most important scientific controversies of the nineteenth century.

Periodicals also problematize traditional notions of genre and discipline, and, especially, the attempt to divorce science from culture. The ‘study of the periodical press’, as Lyn Pykett comments, ‘is inevitably interdisciplinary’, not only challenging ‘the boundaries between hitherto separately constituted fields of knowledge, but also […] the internal hierarchies and sub-divisions within discrete academic disciplines’. Scientific and literary writing for nineteenth-century periodicals, for instance, had to accord equally with the collective ‘codes of discourse’ (relating to such features as format, politics, and implied readership) of the particular journal in which they appeared. From this perspective, the common language that Beer, in Darwin’s Plots, suggested was shared by both scientists and literary writers in the mid-Victorian period can be seen to have derived, at least in part, from the conditions of periodical publication in which all articles—whether on contemporary politics or the latest theories of physics—had to be accessible to a general readership. Indeed, the twentieth-century disciplinary organization of knowledge that insisted on a clear distinction between culture and science was heavily dependent upon the marginalization of the general periodical press—with its awkward interconnectedness—as a subject of academic study. It is no coincidence, therefore, that the concern with the cultural embeddedness of science which emerged in the 1980s has been followed by a growing interest in print media, although it is only recently that the two have been conjoined explicitly as they are in the present volume.

John North, compiler of the Waterloo Directory of English Newspapers and Periodicals, 1800–1900, has estimated that around 125,000 periodical titles were published during the nineteenth century. Within that vibrant entrepreneurial world, publishers and editors recognized that for a periodical to be successful it had to find or create its own profitable niche. Although many titles were short-lived, others flourished and attracted sizeable—sometimes even immense—readerships. Most importantly, the periodical press displayed enormous diversity, with periodicals differing widely in form, content, and readership. Until recently, the invaluable Wellesley Index of Victorian Periodicals (1966–89) has largely defined
the canonical list of titles used by scholars.\textsuperscript{13} The Wellesley Index, however, concentrates on a narrow range of forty-three expensive quarterly and monthly titles—like the Edinburgh Review and the Nineteenth Century—which catered primarily for middle-class audiences; it does not therefore reflect the range of different audiences that read periodicals. Scholars have now started to pay far more attention to the types of periodical and audiences excluded by the Wellesley Index: the flourishing working-class radical press, for example, or the highly diversified religious press that fed a vast range of denominations and sects.\textsuperscript{14} Women readers—the subject of an increasing amount of recent scholarship—constituted another identifiable audience to which many periodical publications were directed; likewise juveniles, both male and female. Nor should we overlook satirical and comic periodicals, of which the infamous Punch is the best known. The enormous diversity of periodicals and associated forms of media, then, provides a particularly rich means of examining the cultural embeddedness of science across a wide range of nineteenth-century contexts.

This collection of twenty-two original essays is one of the first to explore the intriguing and multifaceted interrelationship between science and culture through the nineteenth-century periodical. These essays seek to address the wide range of publishing formats which existed in the period, looking at the diverse ways in which culture and science were disseminated to various audiences. The term ‘science’, as is well known, was a contested and fluid designation throughout the nineteenth century, and it is here interpreted in its broadest sense to include a whole range of ideas and practices which, for readers in the period, had connections with emerging fields of scientific enquiry. Contributors to the volume include scholars from English Literature, the History of Science, and Cultural Studies, and the essays draw on recent insights from all these domains to present a richly interdisciplinary picture of the workings of the nineteenth-century print media. Above all, the essays offer the first ‘samplings and soundings’ (to borrow the sub-title of a volume that did much to advance the study of periodicals in the early 1980s) from the emergent field of scholarship on the relations between science and the nineteenth-century media.\textsuperscript{20}

The book is divided into six parts, the first of which focuses on ‘Women, Children and Gender’. While a growing range of leisure publications had been addressed to middle-class women and children from the mid-eighteenth century, the nineteenth century witnessed an explosion in the provision of periodicals for female and juvenile audiences. Over recent years, women’s periodicals have increasingly been recognized as important sources for women’s and gender history.\textsuperscript{21} Examining three magazines spread over half a century, Ann Sheir’s chapter shows that they provide an invaluable means of exploring shifting gender roles in relation to science. In particular, as scientific reading became available in the emerging commercial science journals and as women’s magazines themselves were addressed to divergent social classes, these changes in the periodical marketplace were reflected in the scientific content offered and the gender roles represented within women’s magazines. Gendered representations of science did not, of course, only appear in women’s magazines. As Suzanne Sheffield’s chapter demonstrates, popular perceptions about science and gender were brilliantly encapsulated in the comic journal Punch. In particular, Sheffield shows that Punch embodied the conflicting impulses common in the period concerning the role of women in relation to science education. The expansion of elementary education and leisure reading made periodicals for children one of the largest growth markets of the nineteenth century. In her chapter, however, Caroline Sumpter points to the fact that children’s columns in more family oriented periodicals also represent an important source for understanding the ways in which children were introduced to science. In particular, she shows that the distinctive natural history of these columns combined practical science and folkloric myth to articulate a socialist utopia.

The second part addresses ‘Religious Audiences’ which, as Josef Altholz has established, were among the most voracious consumers of periodicals.\textsuperscript{22} Not only did the number of religious periodicals expand considerably throughout the nineteenth century, but by mid-century the religious periodical press had become highly differentiated, catering for almost every denomination, sect, and shade of theological opinion. As Alvar Ellegård demonstrated in the late 1950s, this diversity of sources enables the researcher to compare the reactions of different religious communities to such scientific innovations as Darwin’s theory of evolution.\textsuperscript{23} However, in contrast to Ellegård’s approach, which assumes the transparency of periodicals, the four papers in this section explore alternative forms of analysis that problematize the production and consumption of religious periodicals. Thus in his chapter Sujit Sivasundaram shows that the Evangelical Magazine was not intended to be read passively; instead it was intended to assist the reader in meditating on religious issues, in achieving an elevated state of piety, and in stimulating good works. Jonathan Topham, who focuses on another evangelical publication, the Youth’s Magazine, demonstrates how it created a reading audience of evangelicals from across the denominational spectrum. Aileen Fyfe analyses the books and periodicals published by the Religious Tract Society in order to reach a working-class readership, and particularly the relatively successful Leisure Hour which adopted a serious Christian tone but avoided overt religiosity. The role of science in the Quaker periodical press is analysed by Geoffrey Cantor who shows that Quakers welcomed science not only for its rich informational value but also because the study of nature enhanced religious feeling. All the papers in this section emphasize the multiple roles performed by science—not just those topics that historians have with hindsight deemed scientifically important, but rather a vast range of scientific issues that were deployed in the religious press.

Part III, ‘Naturalizing the Supernatural’, offers, by contrast, studies in the popular, highly contested arena of cultural and scientific debate around the occult. Historians recognize that one of the ways that nineteenth-century astrology, phrenology, mesmerism, and spiritualism achieved their cultural status was through dedicated journals. However, few scholars have explored how general periodicals fuelled debate on, and shaped the trajectory of, alternative sciences. Throughout the nineteenth century, contributors to these serials presented a range...
of arguments concerning the plausibility and credibility of alternative sciences, arguments that show the entanglement of the ‘alternative’ sciences with what came to be seen as ‘orthodox’ approaches to the mind and strange natural phenomena. This feature is powerfully illustrated in chapters by Katharine Anderson, Louise Henson, and Roger Luckhurst who show how three different types of periodical—the almanac, the fiction-led miscellany, and the ‘new journalism’ review—facilitated discussion of the boundaries between the ‘sciences’ of astrology and meteorology, between ghost hunting and psychology, and between telepathy and telegraphy.

Part IV, ‘Contesting New Technologies’, examines how the periodical format was used as a forum for conducting debates on the efficacy and desirability of new technologies. Recent work in the sociology and history of technology challenges the claim that we passively adapt to technological change and demonstrates that ‘public discussion, choice, and politics’ and other social factors need to be restored to our accounts of invention. Although general periodicals were among the most powerful forums of public debate, their role in negotiating technology has received comparatively little attention. Elizabeth Tilley, Richard Noakes, Harriet Ritvo, and Graeme Gooday show, however, that general periodicals contain an embarrassing richness of material for addressing such questions. Their close analyses show how nineteenth-century writers and artists used a wide range of periodical genres—for example, cartoons, editorials, letters, and reviews, and frontispieces—to question and reinforce the links between technology and such key issues as Irish economic prosperity, social progress, environmentalism, and women’s domestic power.

Another historically important area of confluence between science and the periodical press is explored in the essays comprising Part V, ‘Professionization and Journalism’. It has become a historical commonplace that with the establishment of modern laboratories and salaried positions, as well as the emergence of specialist scientific societies and journals, professional men of science became ever more isolated from the wider public during the last decades of the nineteenth century. The formation of a separate and self-conscious scientific community (the so-called ‘professionization model’), however, was a much less straightforward process than has often been assumed. Indeed, putatively professional scientists like Crookes, Huxley and Tait still engaged with the wider public both in popular scientific periodicals like Nature as well as the general periodical press throughout the period. These scientists, as the chapters by William Brock, Bernard Lightman, Peter Kjærgaard, and Ruth Barton make clear, operated in the literary marketplace as prominent writers, editors, and journalists, and the major scientific controversies in which they became involved were often conducted principally within the pages of periodicals designed for a general readership. The scientific and intellectual life of the country thus became inexorably linked with the periodical press.

The final part, ‘Evolution, Psychology, and Culture’, addresses one of the era’s most crucial intersections of scientific and cultural debate. Most nineteenth-century writers were prepared to include discussions of the nature of mind within their definitions of ‘science’; indeed, during the middle decades of the century the main contributors to the ‘science of mind’ published extensively in the general periodical press. It is here that the historian can find the changing meanings of the term ‘science’ and the early stages in the emergence of psychology as a separate subject. The essays in this section explore the shifting cultural meanings of both psychology and evolution, from the 1860s through to the eugenics debates of the 1890s. Rick Rylance and David Amigoni highlight the role of writers such as George Henry Lewes and Grant Allen, whose output embraced both science and aesthetics, in the battles for intellectual and discursive territory which took place in the periodical press. Julia Reid looks more directly at the ways in which the cultural agenda of two periodicals was itself shaped by evolutionary theory. Whilst both the Academy and Cosmopolis shared the desire to shape and reform the intellectual life of the nation, the self-confident evolutionary euhemerism of the former appeared no longer tenable amidst the uneasy international political situation of the 1890s. Angelique Richardson also explores the political complexion of evolutionary theory in the 1890s, considering the ways in which feminism, in some of its guises, became entangled with the development of eugenics. Whilst the periodical press fostered these debates, arguably its very freedom acted to hold in check any further advances down this road.

Through these ‘samplings and soundings’ the volume seeks to offer a broad-brush picture of the ways in which science was represented and created within the nineteenth-century media. Some of the materials analysed will undoubtedly be new to readers, whilst others will have a ring of familiarity due to their subsequent republication in books of collected essays. Once placed in their original publishing context, however, even legendary scientific essays start to take on new meanings as their role within wider cultural debates is uncovered. At a time when scientific issues, such as the spread of GM crops, can dominate the press, yet with little expectation that the public will understand the science involved, it is instructive to look back to an era when a scientist might choose to publish his first major pronouncement in the generalist press. The choice of periodical, however, was crucial, signalling the particular nature of the targeted audience. This collection opens up a sense of the sheer diversity covered by that all-embracing term, ‘media’. From the high moral tone of early religious magazines to the radical free-thinking journals of the 1890s, we can trace the ways in which periodicals captured the cultural complexities of nineteenth-century responses to science. Whether dealing with the challenges of technology or changing theories of selfhood and evolutionary history, science—and its representations in the nineteenth-century press—lay at the heart of nineteenth-century social and cultural life.

Notes

2 For example, Sally Shuttleworth, George Eliot and Nineteenth-Century Science: The Make-Believe of a Beginning (Cambridge, 1984); George Levine, Darwin and the
In line with much scholarship in this area, the term 'media' is used in the title of this volume in place of 'periodicals' or 'journalism' to indicate a highly diverse continuum of serial formats—including annuals and part-issues—which existed in a state of continual interaction with books and the practices of monograph publishing. See Laurel Brake, Bill Bell, and David Finkelstein, eds, Nineteenth-Century Media and the Construction of Identities (Basingstoke, 2000); and Laurel Brake, Print in Transition: Studies in Media and Book History (Basingstoke, 2001).


The Social Shaping of Technology, ed. by Donald Mackenzie and Judy Wajcman, 2nd edn (Buckingham, 1999), 5.
